PES MODERN COLLEGE OF PHARMACY
(NBA Accredited) (FOR LADIES)
Approved by AICTE, New Delhi (F.No.06/07/MS/PHARMA/2004/047, DTE.Mumbai (2/NGC/2004/342)
Government of Maharashtra No. TEM/2004(235/04) TE-1, Pharmacy Council of India (32-347/2012-PCI).
Permanently affiliated to Savitribai Phule Pune University, ID No. PU/PN/Pharmacy/200/2004
PARENT SOCIETY :- PROGRESSIVE EDUCATION SOCIETY
Prof. Dr. S. N. Dhole
M. Pharm., Ph. D.
Principal
Prof. Dr. G. R. Ekbote,
(M.S., M.N.A.M.S.) Chairman,
Business Council P.E. Society, Pune

3.3.1 Number of research papers published per teacher in the Journals as notified on UGC CARE list during the last five year

Findings of DVV

1 Please provide a direct link to the research paper, the journal's website, and the URL of the content page if it's a print journal.

2. In case if documents are in regional language please provide translated copy in English. Google drive links are not accepted.

DVV Clarification

1. Provided a direct link to the research paper, the journal's website, and the URL of the content page if it's a print journal.

2. Research Publications are not in regional language and Google drive links are not provided for publications.

SHASHIKANT NIVRUTTI DHOLE

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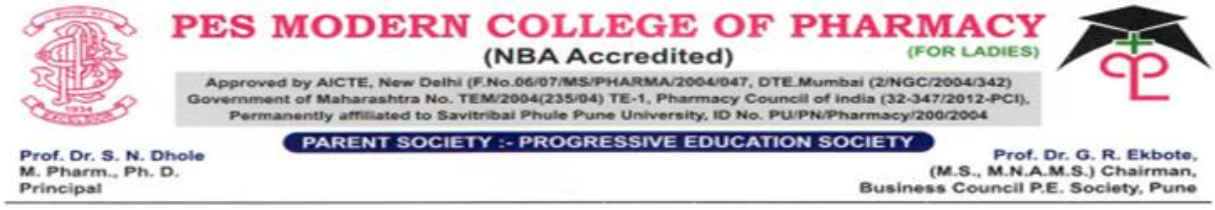

CRITERIA III

Key Indicator 3.3 - Research Publication and Awards

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Research Publications for last Five Years

Publication Year	Link on college website	Link to document	Page Number
Research Publication 2023	Research-Publication-2023_compressed.pdf (mcpledu.org)	View Document	48-72
Research Publication 2022	Research-Publication-2022_compressed.pdf (mcpledu.org)	View Document	73-125
Research Publication 2021	Research-Publication-2021_compressed.pdf (mcpledu.org)	View Document	126-162
Research Publication 2020	Research-Publication-2020-1_compressed.pdf (mcpledu.org)	View Document	163-199
Research Publication 2019	Research-Publication-2019_compressed.pdf (mcpledu.org)	View Document	200-2017
Research Publication 2018	Research-Publication-2018_compressed.pdf (mcpledu.org)	View Document	218-227

PES Modern college of Pharmacy (For Ladies), Moshi, Pune 412105

Links to Redirecting to Journal Source-Cite Website in Case of Digital Journals (Publication list 2018 onwards)

Year	Sr. No.	Name of Faculty	Title of the Paper	Name of Journal	Year, Vol, Page No, Issue	ISSN No.	Link To the Research Journal	Direct link to the research paper
2023	1	Shashikant Dhole, Nilesh Kulkarni	Development, Characterization and In Vitro - In Vivo Evaluation of Efinaconazole Loaded Niosomal Nail Lacquer for the Treatment of Onychomycosis	European Chemical Bulletin	2023, 12(04),	2063-5346	European Chemical Bulletin (eurchembull.com)	https://www.eurchembull.com/archives/volume-12/issue-4/3023
2023	2	Dr. Nilesh Kulkarni,Mr. Manojkumar Munde	A Concise Literature Review on Niosome Drug Delivery from Ancient to Recent	Asian Journal of Pharmaceutics	2023	0973-8398	https://www.asiapharmaceutics.info/	View of A Concise Literature Review on Niosome Drug Delivery from Ancient to Recent (asiapharmaceutics.info)
2023	3	Dr. Nilesh Kulkarni, Dr. S N Dhole	Assessment and Outcome on Preparations, Characterization of Topical Targeted Nanosponge Based Drug Delivery: Critical Review	Asian Journal of Pharmaceutical and Clinical Research (AJPCR)	2023	2455-3891	https://journals.innovareacademics.in/index.php/ajpcr/index	https://doi.org/10.22159/ajpcr.2023.v16i5.46809 , https://journals.innovareacademics.in/index.php/ajpcr/article/view/46809
2023	4	Dr. Ms. R. L. Mhetre	Nanonization-Based Solubility Enhancement By Loaded Porous Starch Foam: Nifedipine Tablet Formulation	Journal of Pharmaceutical Innovation	2023, 18- 60-67.	1872-5120	https://link.springer.com/journal/12247	https://link.springer.com/article/10.1007/s12247-022-09622-4
2023	5	Dr. Mohini Upadhye	Impact of Hazardous Chemical compounds on Reproductive System Reported in Sanitary Products	Research Journal of Pharmacology and Pharmacodynamics	2023, 15 (03), 112-118.	0975-4407	RJPPD - About Journal	RJPPD - Impact of Hazardous Chemical compounds on Reproductive System Reported in Sanitary Products
2023	6	Ms. Rekha Bhalerao, Dr. Mohini Upadhye	A Review on Pharmacological Properties of Rubus fructicosus	International Journal of Ayurvedic Medicine	2023, 14 (11), 22-28	0976-5921	International Journal of Ayurvedic Medicine (ijam.co.in)	A Review on pharmacological properties of Rubus fructicosus. | International Journal of Ayurvedic Medicine (ijam.co.in)
2023	7	Hemant Alhat, Manojkumar Munde, Nilesh Kulkarni,	Comprehensive review on nanocrystal technology in pharmaceutical formulations	International Journal of Pharmacy and Pharmaceutical Sciences	2023, 15 (4), 1-7	Online ISSN: 0975-1491 Print ISSN: 2656-0097	Archives | International Journal of Pharmacy and Pharmaceutical Sciences (innovareacademics.in)	View of COMPREHENSIVE REVIEW ON NANOCRYSTAL TECHNOLOGY IN PHARMACEUTICAL FORMULATIONS (innovareacademics.in)

		VrushaliTambe						
2023	8	Dr. Manojkumar Munde, Dr. Nilesh Kulkarni	A novel validated stability indicating method for quantification of Empagliflozin in bulk and marketed formulation by HPTLC applying experimental design approach	Indian Drugs	2023, 60 (6), 66-75.	0019462X	Indian Drugs Journal | Indiandrugsonline | Pharmaceutical Research Publication | IDMA	Issue's Article Details (indiandrugsonline.org)
2023	9	Dr. Mohini Upadhye	Ayurvedic and Herbal Remedies for Neurological Disorders	International Journal of Creative Research Thoughts	2023, 11 (1), c513-c524	2320-2882	https://ijcrt.org/?gad_source=1&gclid=EAIaIQobChMI4fDg5YrvhwMV6EBIAB03Djr4EAAYASAAEgKYWPD_BwE	IJCRT2301310.pdf
2023	10	Dr. Smita More	A Narrative Review on Drug Loaded Nanosponges as a Carrier for Drug Delivery	International Journal of Pharmaceutical Quality Assurance	2023, 14 (1), 244-249.	0975 9506	IJPQA Journal Quality Assurance	Volume14,Issue1 - IJPQA , https://impactfactor.org/PDF/IJPQA/14/IJPQA,Vol14,Issue1,Article42.pdf
2023	11	Dr. Vijaya Vichare, Dr. V S Tambe, Dr. S N Dhole	Identification of Oxidative Degradation Products of Dapsone in Presence of Adapalene by RP-HPLC–MS	Chromatographia	2023, 223-235.	0009-5893	Home | Chromatographia (springer.com)	Identification of Oxidative Degradation Products of Dapsone in Presence of Adapalene by RP-HPLC–MS | Chromatographia (springer.com)
2023	12	Dr.VijayaVichare, Dr. S N Dhole	Molecular Docking Studies of Selected Phytoconstituents from Some Indigenous Medicinal Plants against Different Targets of Severe Acute Respiratory Syndrome Coronavirus 2	Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (JPDTSM)	2023; 2(1):p 24-32.	2949-6594	Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (lww.com)	Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (lww.com),
2023	13	Shashikant Dhole,	Improved UV-Visible Spectrophotometric Analytical Method Development and Validation for Precise, Efficient and Selective Quantification of Atorvastatin Calcium in Bulk Form	International Journal of Pharmaceutical Sciences and Nanotechnology	2023;16(5) :6966-75.	0974-3278	International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	Improved UV-Visible Spectrophotometric Analytical Method Development and Validation for Precise, Efficient and Selective Quantification of Atorvastatin Calcium in Bulk Form | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com), https://doi.org/10.37285/ijpsn.2023.16.5

2023	14	Smita D. More,	A Review on Solid Lipid Nanoparticles as Nano Drug Delivery Transporters	Current Nanoscience	20 (5); 2024: 644 - 670 Published on: 24 July, 2023	1875-6786	Journal - Current Nanoscience | Bentham Science (eurekaselect.com)	A Review on Solid Lipid Nanoparticles as Nano Drug Delivery Transporters | Bentham Science (eurekaselect.com)
2023	15	VijayaVichare, Shashikant Dhole,	Simultaneous Estimation of Adapalene from Marketed Gel Formulation along with the Preservative Phenoxyethanol by UV-Visible Spectroscopy	Asian Journal of Pharmaceutical Research	2023; 13(3):206-9	2231-5691	Asian Journal of Pharmaceutical Research (asianjpr.com)	Asian Journal of Pharmaceutical Research (asianjpr.com)
2023	16	R. S. Shivarkar, N. S. Kulkarni, M. C. Upadhye	Formulation Development and Evaluation of a Polyherbal Suspension Containing Curcuma longa, Ocimumsantum and Azadirechta indica with Improved Antimicrobial Activity.	Journal of Natural remedies	*2023; 23*(3), 1025–1034.	2320-3358	Journal of Natural Remedies (informaticsjournals.com)	Formulation Development and Evaluation of a Polyherbal Suspension Containing Curcuma longa, Ocimum sanctum and Azadirachta indica with Improved Antimicrobial Activity | Journal of Natural Remedies (informaticsjournals.com), https://informaticsjournals.com/index.php/jnr/article/view/33332/22639
2023	17	ChaitaliDongaonkar, NileshKulkarni and Shashikant Dhole	Delivery System for Improvement in Solubility of Poorly Soluble Drugs	Indian Journal of Natural Sciences	2023; 14 (79): 60098-60104.	:0976 – 0997	Tamilnadu Scientific Research Organization (TNSRO) i (tnsroindia.org.in)	ISSUE 79 AUGUST 2023 - FULL TEXT PART 02.pdf (tnsroindia.org.in)
2023	18	SwapnaliPharande	Design and Evaluation of Gastroretentive Mucoadhesive Tablet of Antihypertensive	**European Chemical Bulletin**	2023, 12(Special Issue 10), 4768 – 4781	2063-5346		d1530f0c28ab34448b2d7fdb25397566.pdf (eurchembull.com)
2023	19	R. S. Shivarkar	Formulation of Novel Silver Nanoparticles (Snps) Using Fungal EndophyteMacrosporiumFasciculatum and Evaluation of Their Antimicrobial Potential	Journal of Chemical Health Risks	2024; 14 (1): 2577-2581	ISSN:2251-6727	Journal of Chemical Health Risks (jchr.org)	View of Formulation of Novel Silver Nanoparticles (Snps) Using Fungal Endophyte MacrosporiumFasciculatum and Evaluation of Their Antimicrobial Potential (jchr.org)
2023	20	Nilesh S. Kulkarni, Shashikant N. Dhole, Rahul S. Shivarkar	Development of Fast-dissolving Oral Dosage Form as Tablet using Binder as	Asian Journal of Pharmaceutics	Oct-Dec 20: 23 • 17 (4) | 754-762	1998-409X	Asian Journal of Pharmaceutics (AJP) (asiapharmaceutics.info)	Development of Fast-dissolving Oral Dosage Form as Tablet using Binder as Vigna Mungo Mucilage and Oral Film using Solvent Casting Technique: Comparative Study | Asian Journal of Pharmaceutics (AJP) (asiapharmaceutics.info),

			VignaMungo Mucilage and Oral Film using Solvent Casting Technique: Comparative Study					https://www.asiapharmaceutics.info/index.php/ajp/article/view/5097/1557
2023	21	Nilesh S. Kulkarni, Shashikant N. Dhole,	A Comprehensive Review on Novel Lipid-Based Nano Drug Deliver	Advanced Pharmaceutical Bulletin	2024;14(1):34-47. Epub 2023 Oct 14.	2228-5881	https://apb.tbzmed.ac.ir/	https://apb.tbzmed.ac.ir/Article/apb-37690
2023	22	Nilesh S. Kulkarni	A Review on recent approaches for the use of different Analytical Techniques to Analyze some Calcium Channel Blockers and their Combinations with otherAntihypertensive Drugs	Current Indian Science	2023; 1(1): 1-28	2210-3007	Journal - Current Indian Science | Bentham Science	A Review on recent approaches for the use of different Analytical Techniques to Analyze some Calcium Channel Blockers and their Combinations with other Antihypertensive Drugs | Bentham Science
2022	23	Dr. Prajakta Kothawade, Dr.VrushaliTambe	A Comparative Molecular Docking Study of Crocetin With Multiple Receptors for the Treatment of Alzheimer's Disease	Biomedical and Biotechnology Research Journal (BBRJ)	2022, 6 (2), 230-242.	print: 2588-9834, online: 2588-9842	Biomedical and Biotechnology Research Journal (BBRJ) (lww.com)	https://journals.lww.com/bbrj/fulltext/2022/06020/a_comparative_molecular_docking_study_of_crocetin.12.aspx
2022	24	Ms.RutujaAher	Formulation and Characterization of Buccal patches of Oxaceprol	Research Journal of Pharmacy And Technology	2022, 15 (12), 5512-5516.	0974-360X 0974-3618	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - Formulation and Characterization of Buccal Patches of Oxaceprol (rjptonline.org)
2022	25	Ms.Rutuja Aher	Development and Characterization of Tenofovir Dixoproxil Fumarate Loaded Nanoparticles	Asian Journal of Organic & Medicinal Chemistry (AJOMS)	2022; 7 (1): 1599-1605.	2456-8937	https://asianpubs.org/index.php/ajomc/index	https://asianpubs.org/index.php/ajomc/issue/view/361
2022	26	Ms.RutujaAher	Cosmetic Hydrogel under eye patch: Review	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (8), 1621-1636.	2456-3315	Welcome to IJRTI UGC CARE norms ugc approved journal norms IJRTI Research Journal | ISSN : 2456 - 3315	IJRTI2208260.pdf
2022	27	Ms.RutujaAher	Role of chlorophyll in cosmeceuticals: an overview	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (8), 1660-1670.	2456-3315	Welcome to IJRTI UGC CARE norms ugc approved journal norms IJRTI Research Journal | ISSN : 2456 - 3315	IJRTI2208263.pdf
2022	28	Ms.RutujaAher	A Review: Retinol-Infused Products ByMicrosponge Technology	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (9), 24-35	2456-3315	Welcome to IJRTI UGC CARE norms ugc approved journal norms IJRTI Research Journal | ISSN : 2456 - 3315	IJRTI2209004.pdf

2022	29	Ms.RutujaAher	Tretinoin A Peptide In Anti-Aging Therapy: An Overview	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (9), 191-200.	2456-3315	Welcome to IJRTI UGC CARE norms ugc approved journal norms IJRTI Research Journal | ISSN : 2456 - 3315	IJRTI2209025.pdf
2022	30	Ms.BhagyashreeParande	Formulation and evaluation of herbal anti-acne emulgel of BerberiesAristata	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (8), 763-772.	2456-3315	Welcome to IJRTI UGC CARE norms ugc approved journal norms IJRTI Research Journal | ISSN : 2456 - 3315	https://ijrti.org/papers/IJRTI2208130.pdf
2022	31	Ms.BhagyashreeParande	Diversified outlook on Pharmacognosy and Pharmacological activities of BerberiesAristata:ADelineated Review	World Journal of Pharmacy and Pharmaceutical Sciences (WJPPS)	2022, 11 (7), 567-580.	2278-4357	WJPPS - A Journal Following UGC Guidelines - Refereed Journal - Peer Reviewed Journal - World Journal of Pharmacy and Pharmaceutical Sciences	1656573316.pdf (storage.googleapis.com)
2022	32	Ms.BhagyashreeParande	Niosomes As Novel Drug Delivery System	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (6), 1115-1121.	2456-3315	Welcome to IJRTI UGC CARE norms ugc approved journal norms IJRTI Research Journal | ISSN : 2456 - 3315	https://ijrti.org/papers/IJRTI2206176.pdf
2022	33	Ms.PallaviKakade	Evaluation of Antihypertensive Activity of Punica Granatum Linn in high fat diet and Sreptozotocin Induced Diabetes in Rats	international Journal of Innovative Research and Technology	2022, 9 (14), 393-430.	2349-6002	ISSN approved and Scopus Journal IJIRT.org Call For Paper February 2024 International Journal of Innovative Research in Technology apply for ugccare approved journal, UGC Approved Journal, ugc approved journal, ugc approved list of journal, ugc care journal, care journal, UGC-CARE list, New UGC-CARE Reference List, UGC CARE Journals, ugc care list of journal, ugc care list 2020, ugc care approved journal, ugc care list 2020, new ugc approved journal in 2020, Low cost research journal, Online international research journal, Peer-reviewed, and Refereed Journals, scholarly journals, impact factor 7.37 (Calculate by google scholar and Semantic Scholar | AI-Powered Research Tool)	IJIRT156668_PAPER.pdf
2022	34	Ms. Neve TD	Development and Validation of UV spectrophotometric method for Macitentan bulk drug and formulation	International Journal of Pharma Research and Technology		0975-5357	Home (ijprt.com)	

2022	35	Ms. Neve TD	Enhancement of Dissoluion Profile of Torsemide by solid dispersion technique	International Journal of Pharma Research and Technology		0975-5357	Home (ijprt.com)	solid despersion technique.pdf
2022	36	Shashikant N. Dhole	ANTI-DIABETIC AND WOUND HEALING POTENTIAL OF JASMINUM GRANDIFLORUM	World Journal of Pharmaceutical Research	2022, 11 (05)	2277-7105	Welcome to WJPR	https://www.wjpr.net/abstract_file/19280
2022	37	Shashikant N. Dhole	DEVELOPMENT AND EVALUATION OF ANTIFUNGAL SOAP WITH HERBAL ANTIBACTERIAL PROPERTIES	European Journal of Molecular & Clinical Medicine	2022	2515-8260	EJMCM	EJMCM
2022	38	Dr.VrushaliTambe	Novel stability indicating RP-HPLC Method for estimation of Clobazam and its related Substances in Oral Suspension	Indian Drugs	2022, 59 (11), 65-72	0019462X	Indian Drugs Journal | Indiandrugsonline | Pharmaceutical Research Publication | IDMA	Issue's Article Details (indiandrugsonline.org)
2022	39	Dr. VrushaliTambe	Knowledge, Attitude and Practices Study on Hand Hygiene among the Children Aged 12-17 Years	Journal of Coastal Life Medicine	2022, 10 (3), 147-164	2309-5288	Journal of Coastal Life Medicine (jclmm.com)	https://www.jclmm.com/index.php/journal/article/view/155/144
2022	40	Dr. Nilesh Kulkarni, Dr. S N Dhole	Oral Fast Dissolving Films Containing Lyophilized Labetalol HCL with Hydroxy Propyl β-Cyclodextrin/ Soluplus: Formulation Development, In Vitro Evaluation	International Journal of Pharmaceutical Sciences and Nanotechnology	2022	0974-3278	International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	A Oral Fast Dissolving Films Containing Lyophilized Labetalol HCL with Hydroxy Propyl β-Cyclodextrin/ Soluplus: Formulation Development, In Vitro Evaluation | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)
2022	41	Dr. Nilesh Kulkarni, Ms. Priyanka Shinde	An occular Route of Administration for Drugs through Novel Approach of self- microemulsifying Formulation- Asystematic review	Asian Pacific Journal of Health Sciences	2022, 9 (4); 414-418	2350-0964	Indexing | Asian Pacific Journal of Health Sciences (apjhs.com)	https://www.apjhs.com/index.php/apjhs/article/view/2990/1597
2022	42	Dr. Mohini Upadhye	Verbena Officinalis (Verbenaceae): Pharmacology, Toxicology and Role in Female Health	International Journal of Ayurvedic Medicine (IJAM)	2022, 13 (2), 296-304	0976-5921	International Journal of Ayurvedic Medicine (ijam.co.in)	https://ijam.co.in/index.php/ijam/article/view/2748/877

2022	43	Dr. Mohini Upadhye, Sonali Chintamani	Antimicrobial Activities of the different fractions from Momordica Dioica Roxb Fruit	International Journal of Research and Analytical Reviews	2022, 9 (3), 746-750.	2349-5138	https://ijrar.org/?gad_source=1&gclid=EAIaIQobChMInbbtqY3vhwMV2aVmAh28eQG0EAAYASAAEgL0m_D_BwE	https://ijrar.org/viewfull.php?&p_id=IJRAR22C1098
2022	44	Dr. Vijaya Vichare	Development of new Validated HPTLC Method for simultaneous estimation of Canagliflozin and Metformin in Tablet Formulation	Research Journal of Pharmacy and Technology	2022, 15 (06), 2599-2604.	0974-3618	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - Development of new Validated HPTLC Method for simultaneous estimation of Canagliflozin and Metformin in Tablet Formulation (rjptonline.org)
2022	45	Dr. Vijaya Vichare	Development and Validation of Chemometric-Assisted Spectrophotometric Method for the Simultaneous Estimation of Aceclofenac, Paracetamol, and Chlorzoxazone with Impurities	Biomedical and Biotechnology Research Journal	2022, 6 (3), p458-465.	25889842	Biomedical and Biotechnology Research Journal (BBRJ) (lww.com)	Development and Validation of Chemometric-Assisted Spectroph... : Biomedical and Biotechnology Research Journal (BBRJ) (lww.com)
2022	46	Dr. Vijaya Vichare, Dr. S N Dhole	Cytotoxicity Testing of Tinospora Cordifolia Extracts against Human Kidney Cancer Cell Line	International Journal of Pharmaceutical Sciences and Nanotechnology	2022, 15 (5), 6140-6146.	0974-3278	International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	Cytotoxicity Testing of Tinospora cordifolia Extracts against Human Kidney Cancer Cell Line | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)
2022	47	Dr. Raksha Mhetre	Formulation and Appraisal of innovative Acyclovir emulsion	Neuroquantology	2022, 20 (11), 6968-6980	1303-5150	Home | Neuroquantology	https://www.neuroquantology.com/open-access/Formulation+and+Appraisal+of+innovative+acyclovir+emulsion_9904/?download=true
2022	48	Dr. Raksha Mhetre	Design, Docking, In Silico ADME prediction of novel indole based Benzamide scaffolds targeting for estrogen receptor Alfa in 2 domain for effective anticancer treatment	Journal of pharmaceutical negative results		2229-7723	https://www.pnrjournal.com/index.php/home	https://www.pnrjournal.com/index.php/home/article/view/9837/13721
2022	49	Dr. Raksha Mhetre, Dr. S N Dhole	Formulation and evaluation of Naproxen Orodispersiblemini tablets for Paediatric use	International Journal of Pharmaceutical Sciences and Nanotechnology	2022, 15 (04), 6055-6060.	0974-3278	International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	Formulation and Evaluation of Naproxen Orodispersible Tablets | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)

2022	50	Dr. Vijaya Vichare, Ms.BhagyashreePa rande, Dr. S N Dhole	A Review on Anticancer Potential of Berberis aristata and Berberine with Focus on Quantitative Methods	Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (JPDTSM)	2022, 1 (2), 67-75.	2949-6594	Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (lww.com)	Search Results : Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (lww.com)
2022	51	Amruta Shinde	DEVELOPMENT AND EVALUATION OF BOVINE COLOSTRUM INTERMEDIATEPRODUCT	THE JOURNAL OF ORIENTAL RESEARCH MADRAS		0022-3301	ORIENTAL RESEARCH MADRAS – NCMRP2021 (koshambifoundation.org)	
2022	52	Amruta Shinde	DESIGN AND EVALUATION OF DOSAGE FORM CONTAINING PREBIOTICS AND PROBIOTICS	THE JOURNAL OF ORIENTAL RESEARCH MADRAS		0022-3301	ORIENTAL RESEARCH MADRAS – NCMRP2021 (koshambifoundation.org)	
2022	53	Dr. Ms. V.S. Tambe	Development And Validation Of Liquid Chromatography Method For Simultaneous Estimation Of Miconazole And Clobetasol And Characterization Of Hydrolytic Degradation Products Using Liquid Chromatography With Tandem Mass Spectrometry	Indian Journal of Pharmaceutical Sciences	2022;84(2): 268-280	0250-474X	Indian Journal of Pharmaceutical Sciences | Open Access (ijpsonline.com)	Development and Validation of Liquid Chromatography Method for Simultaneous Estimation of Miconazole and Clobetasol and Characterization of Hydrolytic Degradation Products using Liquid Chromatography with Tandem Mass Spectrometry (ijpsonline.com)
2022	54	Dr. Ms. M.C. Upadhye	Biopolymers: A comprehensive review	Open Access Research Journal of Science and Technology	2022, 04(01), 013–018	2782-9960	Open Access Research Journal of Science and Technology | ISSN 2782-9960 (Online) (oarjst.com)	https://oarjst.com/sites/default/files/OARJST-2021-0070.pdf
2022	55	Dr. Ms. M.C.Upadhye, Dr, Ms. R. R. Pujari	Antidiabetic Potential of Ficus glomerata Roots with a Special Emphasis on Estimation of Bioactive Compounds by a Novel Validated HPTLC Technique	Indian Journal of Pharmaceutical Education and Research,	2022, 56(2), 470-478	0019-5464	Indian Journal of Pharmaceutical Education and Research | Indian Journal of Pharmaceutical Education and Research (ijper.org)	https://archives.ijper.org/sites/default/files/IndJPhaEdRes-56-2-470.pdf
2022	56	Mr. M. K Munde, Dr. Mr. N. S.	Review on forced degradation study of statins	Asian Journal of Pharmaceutical Analysis	2022, 12 (2), 135-141	2231-5675	Asian Journal of Pharmaceutical Analysis (ajpaonline.com)	https://ajpaonline.com/AbstractView.aspx?PID=2022-12-2-12

		Kulkarni, Dr. Ms. V. S. Vichare,						
2022	57	Dr. Ms. V. S. Vichare, Dr. Ms. V.S. Tambe, Dr. Prof. S. N. Dhole	Inherent stability testing of empagliflozin in the presence of metformin HCl by HPTLC and characterization of degradation products of empagliflozin by LC–ESI–QTOF–MS/MS	Journal of Planar Chromatography	2022, 35, 61–71.	1789-0993	Home | JPC – Journal of Planar Chromatography – Modern TLC (springer.com)	Inherent stability testing of empagliflozin in the presence of metformin HCl by HPTLC and characterization of degradation products of empagliflozin by LC–ESI–QTOF–MS/MS | JPC – Journal of Planar Chromatography – Modern TLC (springer.com)
2022	58	Dr. Ms. V. S. Vichare, Dr. Ms. V.S. Tambe , Dr. Prof. S. N. Dhole	Characterization of Oxidative Degradation Product of Canagliflozin by LC-MS/MS	Advances in Pharmacology and Pharmacy	2022,10(3): 173-180,	2332-0036	HRPUB | Advances in Pharmacology and Pharmacy	https://www.hrpub.org/download/20220530/APP3-17325468.pdf
2022	59	Mr. M. K Munde, Dr.N.S.Kulkarni	Novel Validated Stability Indicating Analytical Method For Quantification of Empagliflozin in Bulk and Marketed Formulation by RPHPLC Applying Experimental Design Approach	Indian Drugs	2022, 59(05),48-57	0019-462X	Indian Drugs Journal | Indiandrugsonline | Pharmaceutical Research Publication | IDMA	Issue's Article Details (indiandrugsonline.org)
2022	60	Dr. Ms. R.L. Mhetre, Mr. R. R. Chanshetti, Dr. Prof. S. N. Dhole	Optimisation Of Cilnidipine Nanoparticles Using Box-Behnken Design In-Vitro Toxicity And Bioavailability Assessment	Materials Technology	2022, 37 (11),	1753-5557	Materials Technology | Taylor & Francis Online (tandfonline.com)	Optimisation of cilnidipine nanoparticles using box-behnken design: in-vitro, toxicity and bioavailability assessment: Materials Technology: Vol 37 , No 11 - Get Access (tandfonline.com)
2022	61	Dr. Ms. R. L. Mhetre, Mr. R. R. Chanshetti, Dr. Prof. S. N. Dhole	Tailoring Of Antihypertensive Drug Loaded Nanoparticles Invitro Toxicity Bioavailability Assessment	BioNanoScience	2022, 12, 28-40	2191-1630	Home | BioNanoScience (springer.com)	Tailoring of Antihypertensive Drug-Loaded Nanoparticles: In Vitro, Toxicity, and Bioavailability Assessment | BioNanoScience (springer.com)
2022	62	Ms. A.S .Gadakh, Ms. P. P. Taru, Ms. D. R. Kad	Dashamoola: A Systematic Overview	Gis Science Journal	2022, 9(4), 1334	1869-9391	Gis science journal – Issn No: 1869-9391 || Scopus Active AndUgc Care Group 2 Journal	131-GSJ7004.pdf - Google Drive, VOLUME 9 ISSUE 4 2022 – Gis science journal
2022	63	Ms. R. S. Aher	Development And Characterisation Of Intra canazole loaded Emulgel	Turkish Journal Of Physiotherapy And Rehabilitation	2022, 32(3), 38620 -38635	2651-4451		

2022	64	Dr. Ms. S.D. More	Review article TDDS	World journal of pharmacy and pharmaceutical sciences	2022, 11(1), 248-272	2278 – 4357	WJPPS - A Journal Following UGC Guidelines - Refereed Journal - Peer Reviewed Journal - World Journal of Pharmacy and Pharmaceutical Sciences	wjpps | ABSTRACT,
2022	65	Dr. Ms. M.C. Upadhye, Ms. S. Chintamani	Review on phytochemistry and pharmacological aspects of euphorbia hirtalinn. (family-euphorbiaceae)	World Journal of Pharmaceutical Research	2022, 11 (1), 306-315.	2277-7105	https://www.wjpr.net/	https://www.wjpr.net/abstract_file/18297
2022	66	V. Kashikar	Phytochemical Nanocarrier: A Green Approach towards Cancer Therapy	Journal of Pharmaceutical Research International	34(7A): 71-80, 2022; Article no.JPRI.88650	2456-9119	https://journaljpri.com/index.php/JPRI/index	https://journaljpri.com/index.php/JPRI/article/view/5874
2022	67	Dr. Nilesh S. Kulkarni	Insight on development and evaluation of nanosponge drug delivery for improved therapeutic effectiveness	Asian Journal of Pharmacy and Technology	2022; 12 (2), 129-135	2231-5705	https://ajptonline.com/AboutJournal.aspx	https://journaljpri.com/index.php/JPRI/article/view/5874/11757
2022	68	Mr. M. K Munde	A Review on HPLC Method Development and Validation for Gliptin Class: New Oral Antidiabetic Agents	Research Journal of Pharmaceutical Dosage Forms and Technology	2022, 14(1); 79-86	0975-4377.	https://rjpdft.com/AboutJournal.aspx	https://rjpdft.com/AbstractView.aspx?PID=2022-14-1-13
2021	69	Dr. Ms. V.S. Tambe, Mr. R.R. Chanshetti	Bioactivity Enhanced Isolated CarpaineFromCarica Papaya Leaves For Platelet Stimulating Activity	Indian Journal of Pharmaceutical Sciences	2021,84(2), 268-280	0250-474X	Indian Journal of Pharmaceutical Sciences | Open Access (ijpsonline.com)	Bioactivity Enhanced Isolated Carpaine from Carica papaya Leaves for Platelet Stimulating Activity (ijpsonline.com)
2021	70	Dr. Ms. V. S. Tambe	Validated Stability Indicating RP-LC Method For Propylthiouracil with LCMS studies of Forced Degradation Products and Simulataneous Estimation of Its Impurity,	International Journal of Pharmaceutical Sciences and Research	2021, 21(1), 432-442	0975-8232	Volume 15 (2024) | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	A VALIDATED STABILITY-INDICATING RP-LC METHOD FOR PROPYLTHIOURACIL WITH LC-MS STUDIES OF FORCED DEGRADATION PRODUCTS AND SIMULTANEOUS ESTIMATION OF ITS IMPURITY | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)
2021	71	Dr. Prof. S.N. Dhole	Enhanced Pharmacological Efficacy of Berberine Hydrochloride Loaded Lipid Based Pellets	Biomedical & Pharmacology Journal	2021, 14(2), 993-1005	2456-2610	Biomedical and Pharmacology Journal – Biomedical and Pharmacology Journal is an international, peer reviewed	Enhanced Pharmacological Efficacy of Berberine Hydrochloride Loaded Lipid Based Pellets for the Treatment of Metabolic Diseases – Biomedical

			For The Treatment Of Metabolic Diseases				quarterly research journal (biomedpharmajournal.org)	and Pharmacology Journal (biomedpharmajournal.org)
2021	72	Dr. Ms. R. L Mhetre, Dr.S.N.Dhole	Formulation And Optimization Of Chlorthalidone Loaded Nano-Particles By Antisolvent Precipitation Using Box-Behnken Design	International Journal Of Pharmaceutical Sciences And Research	2021, 12(1), 260-271.	9074-3278	Volume 15 (2024) | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	FORMULATION AND OPTIMIZATION OF CHLORTHALIDONE LOADED NANO-PARTICLES BY ANTISOLVENT PRECIPITATION USING BOX-BEHNKEN DESIGN | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)
2021	73	Ms. M. C. Upadhye	A review on viral infections including special magnitude on synthetic and herbal remedies	International Journal Of Modern Pharmaceutical Research	2021, 5(1), 20-23	2319-5878	IJMPR | A Journal Following UGC Guidelines - Refereed Journal - Peer Reviewed Journal - International Journal Of Modern Pharmaceutical Research (ijmpronline.com)	https://ijmpronline.com/admin/assets/article_issue/1611972644.pdf
2021	74	Dr. Ms. R. L Mhetre, Dr. N. S. Kulkarni, Dr.S.N.Dhole	Natural and Modified Excipients in Novel Drug Delivery System: A Review	Research Journal of Pharmaceutical Dosage Forms and Technology.	2021, 13(2), 147-152	0975-4377	Research Journal of Pharmaceutical Dosage Forms and Technology (rjpdft.com)	Research Journal of Pharmaceutical Dosage Forms and Technology (rjpdft.com)
2021	75	Dr. Ms. R. L Mhetre, Dr.S.N.Dhole	Patent review on nanosponge: targeted drug delivery system	J. Global trends Pharm. Sci,	2021, 12 (3), 9922 - 9931	2230-7346	:: Journal of Global Trends in Pharmaceutical Sciences :: (jgtps.com)	https://www.jgtps.com/admin/uploads/zJCdcF.pdf
2021	76	Ms. M. H. Tapkir	Colocasia Esculenta Starch: Novel Alternative Disintegrant For Pharmaceutical Application	Indian Drugs	2021, 58 (02), 41-53	0019-462X	Indian Drugs Journal | Indiandrugsonline | Pharmaceutical Research Publication | IDMA	Issue's Article Details (indiandrugsonline.org)
2021	77	Dr. N. S. Kulkarni, Mr. M.K.Munde, Dr.S.N.Dhole,	A Comprehensive Review on Application of Microwave Irradiation for Preparation of Inclusion Complexes with Cyclodextrins	Research Journal of Pharmacy and Technology.	2021, 14 (02), 1131-1136.	0974-360X	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - A Comprehensive Review on Application of Microwave Irradiation for preparation of Inclusion Complexes with Cyclodextrins (rjptonline.org)
2021	78	Dr. N. S. Kulkarni,	A Review on Applications of Hydroxy Propyl Methyl Cellulose and Natural polymers for the development of modified release drug delivery systems.	Research Journal of Pharmacy and Technology.	2021, 14 (02), 1163-1170.	0974-360X	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - A Review on Applications of Hydroxy Propyl Methyl Cellulose and Natural polymers for the development of modified release drug delivery systems (rjptonline.org)
2021	79	Dr. N. S. Kulkarni, Dr.S.N.Dhole	A Systematic Review on Oral Drug Delivery as a Fast	Research Journal of Pharmacy and Technology	2021,14(03), 1771-1778.	0974-360X	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - A Systematic Review on Oral Drug Delivery as a Fast Dissolving Film to Improve Therapeutic Effectiveness (rjptonline.org)

			Dissolving Film to Improve Therapeutic Effectiveness.					
2021	80	Dr. Ms. S. D. More, Dr.S.N.Dhole	A Review On Microparticulate Drug Delivery System	Bull.Env.Pharmacol.Lifesci	2021, 10(3), 163-171	2277-1808	Bulletin of Environment, Pharmacology and Life Sciences (bepls.com)	https://bepls.com/beplsfeb2021/21.pdf
2021	81	Ms. R. S Aher	Development and Characterization of Itraconazole Loaded Emulgel	Turkish Journal of Physiotherapy and Rehabilitation	2021, 33 (3), 38620- 38635	2651-446X	https://turkjphysiotherrehabill.org/	
2021	82	Dr. Prof. S.N. Dhole	Niosomes: A Promising Drug Delivery System in Transdermal Drug Delivery (TDDS	Journal of Pharmaceutical Research International	2021, 33(48B), 6-17	2456-9119	Journal of Pharmaceutical Research International (journaljpri.com)	https://journaljpri.com/index.php/JPRI/article/view/4043/8095
2021	83	Dr. Ms. V.S. Tambe	Plant Phyto-Constituents As Antibiotic Adjuvants A Systematic Review And Bibliometric Analysis	Journal Of Pharmaceutical Research International	2021,33(4), 335-351,	2456-9119	Journal of Pharmaceutical Research International (journaljpri.com)	https://journaljpri.com/index.php/JPRI/article/view/3171/6351
2021	84	Prof. Dr. S. N. Dhole, Mr. O.M.Bagade	A Concise Insight on Pulsatile Drug Delivery System: An Outlook Towards Its Development	International Journal of Pharmaceutical sciences and Nanotechnology	2021, 14 (5) 5577-5587	9074-3278	International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	A Concise Insight on Pulsatile Drug Delivery System: An Outlook towards its Development | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)
2021	85	Ms. A. S. Gadakh	Ayurveda A Promising Tool For The Eradication Of Covid-19	International Journal Of Pharmaceutical Sciences And Research	2021, 12(6), 3006-3009.	0975-8232	Volume 15 (2024) | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	AYURVEDA A PROMISING TOOL FOR THE ERADICATION OF COVID-19 | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)
2021	86	Prof. Dr. S. N. Dhole, Mr. O. M. Bagade	An Updated Overview on Mucoadhesive Buccal Drug Delivery System	Research Journal of Pharmacy and technology	2021,14(8), 1495-	0974-360X	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	https://rjptonline.org/AbstractView.aspx?PID=2021-14-8-87
2021	87	Mr. H. P. Alhat, Mr. S.V.Joshi	Validated HPTLC Method For Simultaneous Determination Of Lopinavir And Ritonavir In Tablet Dosage	European Journal Of Pharmaceutical And Medical Research	2021, 8(3), 367-374	2394-3211	www.ejpmr.com	EJPMR | ABSTRACT
2021	88	Mr. R. R. Chanshetti	Leaves of Stereospermumsuaveolens DC Exhibit Anti-inflammatory and Anti-arthritic Potential Action in Experimental Animals	Journal of Pharmaceutical Research International	2021, 33(33A) , 164-175	**2456-9119**	Journal of Pharmaceutical Research International (journaljpri.com)	https://journaljpri.com/index.php/JPRI/article/view/2611/5231

2021	89	Dr. Ms. V.S. Tambe	A Review In-Vivo And In-Vitro Testing Models For Antiallergic Formulations	World Journal Of Pharmacy And Pharmaceutical Sciences	2021, 10 (8), 806-821	2278 – 4357	WJPPS - A Journal Following UGC Guidelines - Refereed Journal - Peer Reviewed Journal - World Journal of Pharmacy and Pharmaceutical Sciences	wjpps | ABSTRACT
2021	90	Dr. Ms. V.S. Tambe	A Review Role Of Dietary Supplementation In Covid-19 Pandemic	World Journal Of Pharmacy And Pharmaceutical Sciences	2021, 10 (9), 804-827	2278 – 4357	WJPPS - A Journal Following UGC Guidelines - Refereed Journal - Peer Reviewed Journal - World Journal of Pharmacy and Pharmaceutical Sciences	wjpps | ABSTRACT
2021	91	Dr. Ms. V.S. Tambe, Dr. Ms. V.S. Vichare	Simultaneous Analysis of Eprosartan and Hydrochlorothiazide In Tablet Formulation By High-Performance Thin Layer Chromatography With Ultraviolet Absorption Densitometry	International Journal Of Pharmaceutical Chemistry And Analysis	2021;8 (3): 123–128	2394-2789	IJPCA - Int J Pharm Chem Anal	https://www.ijpca.org/journal-article-file/15061
2021	92	Dr. Mr. N.S. Kulkarni, Dr. Ms. M.C. Upadhye, Dr. Prof. S. N. Dhole	Development And Evaluation of Floating Microspheres Of Sumatriptan Succinate Using Ethyl Cellulose And Mucilage Extracted FromVigna Mungo	Journal Of Pharmaceutical Research International	2021, 33(43A), 24-36.	2456-9119	Journal of Pharmaceutical Research International (journaljpri.com)	https://journaljpri.com/index.php/JPRI/article/view/3285/6579
2021	93	Dr. Ms. S.D. More, Dr. Prof. S.N. Dhole	Formulation And Evaluation Of Oral Fast Dissolving Deliveray For Rosuvastin	International Journal of Biology, Pharmacy and Allied Sciences	2021, 10(10): 67-81	2277–4998	International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)	https://ijbpas.com/pdf/2021/October/MS_IJBPAS_2021_OCT_SPCL_1006.pdf
2021	94	Dr. Ms. S.D. More	A REVIEW ON BLACK FUNGUS/MUCORMYCOSIS	World journal of pharmacy and pharmaceutical sciences	2021, 10(12), 2106-2121	2278 – 4357	WJPPS - A Journal Following UGC Guidelines - Refereed Journal - Peer Reviewed Journal - World Journal of Pharmacy and Pharmaceutical Sciences	wjpps | ABSTRACT
2021	95	Dr. Ms. V. S. Vichare	Development Of Validated RP-HPLC Method For Estimation Of Empagliflozin And Metformin In Combined Formulation	Journal Of Pharmaceutical Research International	2021,33(60A), 1-7	2456-9119	Journal of Pharmaceutical Research International (journaljpri.com)	https://journaljpri.com/index.php/JPRI/article/view/5108/10225
2021	96	Dr. V S. Vichare	Production and Analysis of Lip Balm using Herbal Resources	Journal Of Pharmaceutical Research International	2021,33(59A), 540-546	2456-9119	Journal of Pharmaceutical Research International (journaljpri.com)	https://journaljpri.com/index.php/JPRI/article/view/7174/14357

2021	97	Dr. Ms. P. B. Kothawade	Novel Niacin Receptor Agonists A Promising Strategy For The Treatment Of Dyslipidemia	Mini Reviews In Medicinal Chemistry	2021;21(17):2481 -2496	1389-5575	Mini-Reviews in Medicinal Chemistry | Bentham Science (eurekaselect.com)	Novel Niacin Receptor Agonists: A Promising Strategy for the Treatment of Dyslipidemia | Bentham Science (eurekaselect.com)
2021	98	Ms. S.A. Koli	Evaluation Of The Effect Of Chrysin In Renal Ischemia Reperfusion Induced Renal Failure In Wistar Rats	International Journal Of Analytical And Experimental Model Analysis	2021, XIII(X),771-799	0886-9367	The International Journal Of Analytical And Experimental Modal Analysis (IF-6.3) An UGC-CARE Approved Group – II Journal (Scopus Indexed Till 1992) – ISSN NO: 0886-9367: Download UGC-CARE Group 'II' Journals list -Serial No. 36272 SUBMIT YOUR PAPER TO: Email id: submitijaema@gmail.com	
2021	99	Ms. P.G. Kakade,	Exploration Of Antidiabetic Potential Of Aerial Parts Of Abutilon Indium Linn In Streptozotocin - Nicotinamide Induced Diabetes In Rats	The International Journals Of Analytical And Experimental Model Analysis	2021, XIII(X),405-420	0886-9367	The International Journal Of Analytical And Experimental Modal Analysis (IF-6.3) An UGC-CARE Approved Group – II Journal (Scopus Indexed Till 1992) – ISSN NO: 0886-9367: Download UGC-CARE Group 'II' Journals list -Serial No. 36272 SUBMIT YOUR PAPER TO: Email id: submitijaema@gmail.com	
2021	100	Rohini R. Pujari	Exploration of Elephant Foot Yam (Amorphophallus paeoniifolius) Starch: An Alternative Natural Disintegrant for Pharmaceutical Application	Indian Journal of Pharmaceutical Education and Research	2021; 55 (1)Suppl, S209-S219.		https://ijper.org/	https://www.ijper.org/sites/default/files/IndJPhaEdRes-55-1s-209.pdf
2020	101	Ms. M.C. Upadhye, Dr. Ms. R.R. Pujari	Antidiabetic activity of Ficusglomerata roots	Current bioactive compounds	2020, 16(1), 33-41	1875-6646	Current Bioactive Compounds | Bentham Science (eurekaselect.com)	Antidiabetic Effects of Ethanolic Extract of Ficus glomerata (L.) Roots | Bentham Science (eurekaselect.com)
2020	102	Ms. M.C. Upadhye, Dr. Ms. R.R. Pujari	Pharmacognostic, phytochemical and antioxidant activity of Ficusglomerata	Current bioactive compounds	2020,16(1), 42-47	1875-6646	Current Bioactive Compounds | Bentham Science (eurekaselect.com)	Pharmacognostical, Phytochemical and Antioxidant Studies of Indigenous Medicinal Plant | Bentham Science
2020	103	Dr. Ms. V.S. Tambe	Direct chiral HPLC-MS/MS method for determination of R-Lacosamide in human plasma	Pharmaceutical Chemistry Journal	2020, 54(1), 96-103	1573-9031	Home | Pharmaceutical Chemistry Journal (springer.com)	Direct Chiral HPLC-MS/MS Method for Determination of R-Lacosamide in Human Plasma | Pharmaceutical Chemistry Journal (springer.com)

2020	104	Dr. Ms. V.S. Tambe	Qualitative analysis of Carica papaya leaves tablet formulation and study of fragmentation pattern of Rutin	Indian drugs	2020, 57 (11), 83-86	0019-462X	Indian Drugs Journal | Indiandrugsonline | Pharmaceutical Research Publication | IDMA	Issue's Article Details (indiandrugsonline.org)
2020	105	Dr. Ms. V.S. Tambe	HPTLC Method Development for the Simultaneous Estimation of Ketorolac Tromethamine and Tramadol Hydrochloride from a Formulation	Acta Scientific Pharmaceutical Sciences	2020, 4(1), 84-88	2581-5423	Acta Scientific | International Open Library | Journals Publishing Group	https://actascientific.com/ASPS/pdf/ASPS-04-0468.pdf
2020	106	Ms. P. P. Taru	A Review on post covid -19 Redevelopment Plans	Pharmaceutical Resonance COVID-19 Special Issue	2020, 6-9	2581-6136		
2020	107	Mr. R.R. Chanshetti,	Anti-Inflammatory Potential Effect of Flavonoid Rich Ethyl Acetate Fraction of Methanolic Extracts of StereospermumSuaveolens DC (Bignoniaceae) Leaves in Experimental Animals	Pharmacology eJournal	2020, 4(26)	-		Anti-Inflammatory Potential Effect of Flavonoid Rich Ethyl Acetate Fraction of Methanolic Extracts of StereospermumSuaveolens DC (Bignoniaceae) Leaves in Experimental Animals by Rahul Chanshetti, Deepti Bandawane :: SSRN
2020	108	Ms. S.R. Chintamani	Extraction, identification, and screening of Brassica oleraceavat.italicaplenck (Broccoli) floret to be an alternative for nanoparticle formulation	Indian Journal of Pharmaceutical Education and Research	2020, 54 (3), 724-731	2581-5423	Indian Journal of Pharmaceutical Education and Research | Indian Journal of Pharmaceutical Education and Research (ijper.org)	https://archives.ijper.org/sites/default/files/IndJPhaEdRes_54_3_724.pdf
2020	109	Ms. P.B. Kothawade	Novel nitrogen-containing heterocyclic compounds in GPR109A as an anti-hyperlipidemic: Homology modeling, Docking, dynamic simulation studies	Journal of Research in Pharmacy	2020, 24 (4), 1-12	2581-6136	Journal of Research in Pharmacy (jrespharm.com)	https://jrespharm.com/uploads/pdf/pdf_MPJ_809.pdf
2020	110	Prof. Dr. S. N. Dhole	Formulation and Evaluation of Sustained Release Colon Targeted Mesalamine Tablet.	Research Journal of Pharmacy and Technology	2020, 13(5), 22-41	0974-360X	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - Formulation and Evaluation of Sustained Release Colon Targeted Mesalamine Tablet (rjptonline.org)

2020	111	Dr. N. S. Kulkarni	A comprehensive Review on Analytical method development and validation for SGLT-2 inhibitors by HPLC in its API and Dosage form.	Research Journal of Pharmacy and Technology	2020, 13 (7); 3472-3479	0974-360X	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - A Comprehensive Review on Analytical Method Development and Validation for SGLT-2 Inhibitors by HPLC in Its API and Dosage Form (rjptonline.org)
2020	112	Dr. N. S. Kulkarni, Mr.M.K.Munde, Dr. S. N. Dhole	Improvement of Water Solubility and In Vitro Dissolution Rate of Deflazacort ByComplexation With βCyclodextrin Through Freeze Drying Process.	Indian Drugs.	2020, 57 (07), 70-73.	N 1083-7450	Indian Drugs Journal | Indiandrugsonline | Pharmaceutical Research Publication | IDMA	Issue's Article Details (indiandrugsonline.org)
2020	113	Dr. N. S. Kulkarni, Mr.M.K.Munde	A systematic review on development and evaluation of controlled release and fast dissolving formulations for Anti-diabetic drugs over past decade.	International Journal of Pharmaceutical Sciences and Research.	2020, 11 (10), 4874-4883.	0975-8232	Volume 15 (2024) | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	A SYSTEMATIC REVIEW ON DEVELOPMENT AND EVALUATION OF CONTROLLED RELEASE AND FAST DISSOLVING FORMULATIONS FOR ANTI-DIABETIC DRUGS OVER PAST DECADE | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)
2020	114	Dr. N. S. Kulkarni, Dr. S.N. Dhole	Formulation and evaluation of gastro retentive floating microspheres: a systematic review.	International Journal of Pharmaceutical Sciences and Research.	2020, 11 (11), 5404-5416	0975-8232	Volume 15 (2024) | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	FORMULATION AND EVALUATION OF GASTRO-RETENTIVE FLOATING MICRO-SPHERES: A SYSTEMATIC REVIEW | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)
2020	115	Dr. Ms. S. D. More, Dr.R.L.Mhetre	A Review On 3D Printing Technologies In Pharmaceutical Science	Bull.Env.Pharmacol.Lifesci	2020, 9(9), 126-134	2277-1808	Bulletin of Environment, Pharmacology and Life Sciences (bepls.com)	https://bepls.com/aug_2020/17.pdf
2020	116	Dr. Ms. S. D. More, Dr. N. S. Kulkarni	A Review On Novel Approaches Of Mucoadhesive Oral Film Manufacturing Aspects	Bull.Env.Pharmacol.Lifesci	2020, 9(9), 116-125	2277-1808	Bulletin of Environment, Pharmacology and Life Sciences (bepls.com)	https://bepls.com/aug_2020/16.pdf
2020	117	Ms. M. C. Upadhye, Ms. P.P.Taru, Dr.S.N.Dhole	A review on *bryphyllumpinnatum* (lam) Oken.	Res. J. Pharmacognosy and phytochem	2020,12, 111-113	0975-2331	Research Journal of Pharmacognosy and Phytochemistry (rjpponline.org)	Research Journal of Pharmacognosy and Phytochemistry (rjpponline.org)
2020	118	Ms. V. S. Vichare	Simultaneous Estimation Of Dapsone And Adapalene In Gel Formulation By Uv-Spectroscopy	International Journal Of Pharmaceutical Sciences And Research	2020, 11(12), 6179-6183.	0975-8232	Volume 15 (2024) | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	SIMULTANEOUS ESTIMATION OF DAPSONE AND ADAPALENE IN GEL FORMULATION BY UV-SPECTROSCOPY | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)

2020	119	Ms. V. S. Vichare, Dr.S.N.Dhole	Simultaneous Estimation Of Dapsone And Adapalene In Gel Formulation By Derivative Spectroscopy	Current Trends In Pharmacy And Pharmaceutical Chemistry	2020, 29(4), 1-7	2582-5062	https://www.ctppc.org/	
2020	120	Mr. M. K. Munde, Dr. N. S. Kulkarni	A Novel Validated Stability Indicating Analytical Method for Simultaneous Quantification of Metformin Hydrochloride and Empagliflozin in Bulk and Marketed Formulation by HPTLC using Box-Wilson Experimental Design Approach	International Journal Of Pharmaceutical Education And Research	2020, 54(3),644-655	01-5464	Indian Journal of Pharmaceutical Education and Research | Indian Journal of Pharmaceutical Education and Research (ijper.org)	https://archives.ijper.org/sites/default/files/IndJPhaEdRes-54-3s-s644.pdf
2020	121	Mr. M. K. Munde, N. S. Kulkarni	Development and Validation of Novel Analytical Method for Empagliflozin and Metformin Hydrochloride in Bulk and Pharmaceutical Dosage Form by Four Different Simultaneous Estimation Approaches using UV Spectroscopy	Research J. Pharm. and Tech.	2020, 3(3)	0974-360X	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - Development and Validation of Novel Analytical Method for Empagliflozin and Metformin Hydrochloride in Bulk and Pharmaceutical Dosage Form by Four Different Simultaneous Estimation Approaches using UV Spectroscopy (rjptonline.org)
2020	122	Mr. O. M. Bagade, Dr.S.N.Dhole	An Influence of Lyophilization on Praziquantel Loaded Nanosponge's by using food protein as a stabilizer with effect of Statistical Optimization.	Research J. Pharm. and Tech.	2020; 13(9):4491-4498.	0974-360X	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - An Influence of Lyophilization on Praziquantel Loaded Nanosponge's by using food protein as a stabilizer with effect of Statistical Optimization (rjptonline.org)
2020	123	Mr. O. M. Bagade, Dr.S.N.Dhole	A Corollary of Nanoporous Carrier Drug Delivery System: An Updated Perspective	International Journal of Pharmaceutical Sciences and Nanotechnology	2020, 13 (5)	9074-3278	International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	A Corollary of Nanoporous Carrier Drug Delivery System: An Updated Perspective | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)
2020	124	Ms. S. R. Chintamani	Trends in Nanotechnology for the Treatment of Breast Cancer	Journal of Pharmaceutical Research International	2020, 32(36), 42-57	2456-9119	Journal of Pharmaceutical Research International (journaljpri.com)	https://journaljpri.com/index.php/JPRI/article/view/1821/3650

2020	125	Ms. S. R. Chintamani	Preparation Characterization And Evaluation Of Green Synthesis Nanoparticle Of Hydro Alcoholic Floret Extract Of Brassica Oleracea Var ItalicaPlenck (Broccoli) Using Qbd Approach For Breast Tumor Cells T-47D Treatment	International journal of scientific & technology research	2020, 9 (2), 1175-1187	2277-8616	https://ijstr.org/	https://www.ijstr.org/final-print/feb2020/Preparation-Characterization-And-Evaluation-Of-Green-Synthesis-Nanoparticle-Of-Hydro-Alcoholic-Floret-Extract-Of-Brassica-Oleracea-Var-Italica-Plenck-broccoli-Using-Qbd-Approach-For-Breast-Tumor-Cells-T-47d-Treatment.pdf
2020	126	Ms. S. R. Chintamani	A Review On The Solubility Enhancement Techniques With Their Pros And Cons	Pensee	2020,50(12),1508-1526	0031-4773	https://ores.su/en/journals/pensee/	
2020	127	Ms. S. R. Chintamani	Role Of Exotic Plants In Cancer	Pensee	2020, 11(12) 6067-6077	0031-4773	https://ores.su/en/journals/pensee/	
2020	128	Ms. S. S. Jadhav	Curcumin Potentiates Therapeutic Efficacy of Metformin: A Preclinical Study in STZ-NA Induced Hyperglycemia in Wistar Rats	Research journal of pharmacy and technology	2020, 13(6)	0974-360X	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - Curcumin Potentiates Therapeutic Efficacy of Metformin: A Preclinical Study in STZ-NA Induced Hyperglycemia in Wistar Rats (rjptonline.org)
2020	129	Ms. P. B. Kothwade	GPR109A receptor (PM0083972)	PMDB data bank	-	-		
2020	130	Mrs. B. N. Atre	Disease Modifying Potential Of Wedelolactone Rich Fraction Of Eclipta Alba In Adjuvant Induced Arthritis In Rats By Inhibition Of Proinflammatory Cytokines.	International Journal Of Pharmaceutical Sciences And Research	2020, 11(12), 6067-6077.	0975-8232	Volume 15 (2024) | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	DISEASE MODIFYING POTENTIAL OF WEDELOLACTONE RICH FRACTION OF ECLIPTA ALBA IN ADJUVANT INDUCED ARTHRITIS IN RATS BY INHIBITION OF PRO-INFLAMMATORY CYTOKINES | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)
2020	131	Ms. Parande B	Convulsant Plasma as a potential therapy for trating COVID 19 patients	Pharmaceutical Resonance COVID 19 Special issue 2020	2020, Covid-19-Spcial Issue	2581-6136		
2020	132	KashikarVrushali	A HERBAL CREAM FOR ACNE VULGARIS	Indian Drugs	2020 , 57 (2), 32-40	**0019-462X**	Indian Drugs Journal | Indiandrugsonline | Pharmaceutical Research Publication | IDMA	https://www.indiandrugsonline.org/issuesarticle-details?id=MTAyMw==

2019	133	Dr. V.S. Kashikar	Study of buckwheat (*Fagopyrum esculentum*) seed powder as a tablet binder	Indian Drugs	Vol. 2019, Issue 56 (02), 73-77	**0019-462X**	Indian Drugs Journal | Indiandrugsonline | Pharmaceutical Research Publication | IDMA	Issue's Article Details (indiandrugsonline.org)
2019	134	Ms. V. S. Vichare	Development and validation of UV-visible spectroscopic methods for simultaneous extimation of canagliflozin and metformin in pharmaceutical formulation	Asian Journal of Research in Chemistry	Vol. 2019, Issue 12 (1), 16-20.	ISSN 0974-4150(Online)	Asian Journal of Research in Chemistry (ajrconline.org)	Asian Journal of Research in Chemistry (ajrconline.org)
2019	135	Dr. V. S. Kashikar	Development and validation of spectroscopic estimation by area under curve method of eperisone hydrochloride with aceclofenac	World Journal of Pharmacy and Pharmaceutical Sciences	Vol 8, Issue 7, 949-956, 2019.	ISSN: 2278-4357	WJPPS - A Journal Following UGC Guidelines - Refereed Journal - Peer Reviewed Journal - World Journal of Pharmacy and Pharmaceutical Sciences	wjpps | ABSTRACT
2019	136	Dr. V. S. Kashikar	Development and validation of chromatographic estimation and forced degradation study of eperisone hydrochloride & ibuprofen	World Journal of Pharmacy and Pharmaceutical Sciences	Vol 8, Issue 7, 957-973, 2019.	ISSN: 2278-4357	WJPPS - A Journal Following UGC Guidelines - Refereed Journal - Peer Reviewed Journal - World Journal of Pharmacy and Pharmaceutical Sciences	wjpps | ABSTRACT
2019	137	Dr. Prof. S. N. Dhole,	Multiparticulate floating drug delivery system of anagliptin: design and optimization for its efficacy in management of metabolic syndrome	International Journal of Applied Pharmaceutics	2019, 11(4), 171-181	0975-7058	International Journal of Applied Pharmaceutics || Archives (innovareacademics.in)	MULTIPARTICULATE FLOATING DRUG DELIVERY SYSTEM OF ANAGLIPTIN: DESIGN AND OPTIMIZATION FOR ITS EFFICACY IN MANAGEMENT OF METABOLIC SYNDROME | International Journal of Applied Pharmaceutics (innovareacademics.in)
2019	138	Dr. Prof. S. N. Dhole,	Lipid-based floating multiparticulate delivery system for bioavailability enhancement of berberine hydrochloride	Journal of Applied Pharmaceutical Science	2019, 9(11)	2231-3354	Journal of Applied Pharmaceutical Science (japsonline.com)	https://journals.innovareacademics.in/index.php/ijap/article/view/33249/20352
2019	139	Dr. Ms. S. D. More	Review on Nano Flare: A Novel Diagnostic Probe	Current Trends in Pharmacy and Pharmaceutical Chemistry	2019, 24 (3), 24-30	2582-5062	https://www.ctppc.org/	
2019	140	Dr. Ms. S. D. More, Dr. Ms. M.C. Upadhye	Formulation and Evaluation of Diclofenac Aqua Gel	American Journals of Pharmacy & Health Research	2019, 7 (7), 1-6	2321-3647	https://ajphr.com/	https://ajphr.com/ajphrfiles/uploaddir/AJPHR_707001.pdf , https://ajphr.com/archive/volume-7/july-2019-issue-7

2019	141	Ms. V. S. Vichare	Study of intrinsic stability of mometasonefuroate in presence of salicylic acid by HPTLC and characterization, cytotoxicity testing of major degradation product of mometasonefuroate	Current Pharmaceutical Analysis	2019,15, 592-603	1875-676X	Current Pharmaceutical Analysis | Bentham Science (eurekaselect.com)	Study of Intrinsic Stability of Mometasone Furoate in Presence of Salicylic Acid by HPTLC and Characterization, Cytotoxicity Testing of Major Degradation Product of Mometasone Furoate | Bentham Science (eurekaselect.com)
2019	142	Dr. Mr. N.S. Kulkarni, Dr. Prof. S.N. Dhole	A Review on Hydrotropic Solubilization for Poorly Water-Soluble Drugs: Analytical application and Formulation development.	Research Journal of Pharmacy and Technology.	2019, 12 (7), 3157-3163.	0974-3618	RJPT - Research Journal of Pharmacy and Technology (rjptonline.org)	RJPT - A Review on Hydrotropic Solubilization for Poorly Water Soluble Drugs: Analytical Application and Formulation Development (rjptonline.org)
2019	143	Dr. Mr. N.S. Kulkarni, Dr. Prof. S.N. Dhole	Characterization of Self-Microemulsifying Dosage Form: Special Emphasis on Zeta Potential Measurement	International Journal of Pharmaceutical & Biological Archives	2019, 10 (3), 172-179.	09763333	About the Journal | International Journal of Pharmaceutical & Biological Archive (ijpba.info)	Characterization of Self-Microemulsifying Dosage Form: Special Emphasis on Zeta Potential Measurement by Nilesh S. Kulkarni, Nisharani S. Ranpise, Devendra Singh Rathore, Shashikant N. Dhole :: SSRN, http://www.ijpba.info/index.php/ijpba/article/view/1809/1225
2019	144	Dr. Mr. N.S. Kulkarni	Simultaneous Equation and Area Under the Curve Spectrophotometric Methods for 1Estimation of Ranolazine Hydrochloride Presence of its Base-induced Degradation Product: A Comparative Study	International Journal of Pharmaceutical & Biological Archives	2019, 10 (3), 202-206.	09763333	About the Journal | International Journal of Pharmaceutical & Biological Archive (ijpba.info)	Simultaneous Equation and Area Under the Curve Spectrophotometric Methods for Estimation of Ranolazine Hydrochloride Presence of its Base-induced Degradation Product: A Comparative Study by Dr. Rahul H. Khiste, Aishwarya S, Ambekar, Nilesh S. Kulkarni :: SSRN , http://www.ijpba.info/index.php/ijpba/article/view/1814/1230
2019	145	Ujjwala Y. Kandekar, Rohini Pujari	Exploration of Mucoadhesive Microparticlesby using Linumusitatissimum Mucilage	Latin American Journal of Pharmacy	38 (12): 2463-72 (2019)	2362-3853	http://www.latamjpharm.org/	http://www.latamjpharm.org/resumenes/38/12/LAJOP_38_12_1_18.pdf
2019	146	Ms. M.H. Tapkir	Lique Solid Compact Drug Delivery System: A Review	World Journal of Pharmacy and Pharmaceutical Sciences	2019,8(10), 329-345	2278-4357	WJPPS - A Journal Following UGC Guidelines - Refereed Journal - Peer Reviewed Journal - World Journal of Pharmacy and Pharmaceutical Sciences	wjpps | ABSTRACT
2019	147	Ms. M.H. Tapkir	Nasal Drug Delivery: A Promising Approach for Brain Targeting	World Journal of Pharmacy and Pharmaceutical Sciences	2019,8(10), 477-491	2278-4357	WJPPS - A Journal Following UGC Guidelines - Refereed Journal - Peer Reviewed Journal - World Journal of Pharmacy and Pharmaceutical Sciences	wjpps | ABSTRACT

2018	148	Prof. Dr. S. N. Dhole	Design of telmisartan loaded nanoparticles mu three square factorial design approach	International Journal of Pharmaceutical and Phytopharmacological Research	2018, 8 (4), 53-62	ISSN 2250-1029 (Print)	home - International Journal of Pharmaceutical and Phytopharmacological Research (eijppr.com)	Design of Telmisartan Loaded Nanoparticles by Three Square Factorial Design Approach - International Journal of Pharmaceutical and Phytopharmacological Research (eijppr.com)
2018	149	Dr. V. S. Kashikar	Docking, synthesis, adme prediction and β-lactamase inhibitory activity of some 2-(5-h/ chloro-((piperazin-1-ylmethyl)- 2-oxoindolin-3-ylidene)-n-substituted hydrazinecarbothioamides	Inventi Impact: Med Chem	2018 (1), 10-15, Jan- Mar 2018	0976-3821	https://inventi.in/journal/impact/5/med-chem	https://inventi.in/journal/article/5/24281/Inventi%20Impact:%20Med%20Chem/Pharmaceutical
2018	150	Ms. V. S. Tambe	Formulation and Evaluation of Sustained release mucoadhesive microspheres of lornoxicam by using novel isolated polymer of fruit artocarpusheterophyllus	International Journal of Pharmaceutical Chemistry and Analysis	Jan-March 2018; Vol- 5, Issue-1, 43-51.		https://www.ijpca.org/	https://www.ijpca.org/journal-article-file/6370
2018	151	Ms. V. S.Tambe	Development and validation of absorption correction method for simultaneous estimation of paracetamol and nimesulide in bulk and combined tablet dosage form	Asian Journal of Pharmaceutical Analysis	2018, 8(1), 33-38	2231-5667 (Print)	https://ajpaonline.com/AboutJournal.aspx	https://ajpaonline.com/AbstractView.aspx?PID=2018-8-1-6
2018	152	Mr. O. M, Bagade	An investigation into formulation and processing strategies to derive microspheres obtained from ionic gelation technique	Asian Journal of Pharmaceutical Science and Technology	2018, 8(1), 28-37	e-ISSN 2248-9185 Print- 2248-9177	http://www.ajpst.com/	http://www.ajpst.com/view_content.php?quat=1&year=2018#
2018	153	Dr. S. D. More, Ms. M. C. Upadhye	Comparitive qualification of flavonoid content and antioxidant potential of indigenous medicinal plants	Journal of Pharmacognosy and Phytochemistry	2018, 7(1), 343-345	2278-4136	https://www.phytojournal.com/	https://www.phytojournal.com/archives/2018/vol7issue1/PartE/6-6-296-434.pdf
2018	154	Dr. V.S. Kashikar	Development and validation of spectroscopic method for simultaneous estimation of pitavastatin calcium and metformin hydrochloride combination in bulk	Inventi Rapid: Pharm Analysis & Quality Assurance	Vol. 2018, Issue 2, 1-5, April- June 2018	0976-3813	https://www.inventi.in/journal/impact/136/InventiRapidPharmAnaQualAssur	https://www.inventi.in/journal/article/136/24911/Inventi%20Rapid:%20Pharm%20Analysis%20/Pharmaceutical

2018	155	Mr. H. P. Alhat	Analytical methods development & validation for simultaneous estimation of lopinavir & ritonavir in pharmaceutical formulation by simultaneous equation method using uv spectrophotometry	International research journal of pharmacy	2018, 9 (8), 57-62	ISSN 2230 –8407	http://www.irjponline.com/	https://www.irjponline.com/index.php/IRJP/article/view/1169/994

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Links to Redirecting to Number of Research papers published per teacher in the Journals notified on the UGC website during the last five years

Year	Sr. No.	Name of Faculty	Title of the Paper	Name of Journal	ISSN No.	Link landing to the research paper	Is it listed in UGC Care list	Link to the recognition in UGC CARE enlistment of the Journal/Digital Object Identifier (doi) number
2023	1	Shashikant Dhole, Nilesh Kulkarni	Development, Characterization and In Vitro - In Vivo Evaluation of Efinaconazole Loaded Niosomal Nail Lacquer for the Treatment of Onychomycosis	European Chemical Bulletin	2063-5346	European Chemical Bulletin (eurchembull.com)	YES Scopus	https://www.scopus.com/sourceid/21100898023#tabs=2
2023	2	Dr. Nilesh Kulkarni, Mr. Manojkumar Munde	A Concise Literature Review on Niosome Drug Delivery from Ancient to Recent	Asian Journal of Pharmaceutics	0973-8398	View of A Concise Literature Review on Niosome Drug Delivery from Ancient to Recent (asiapharmaceutics.info)	Yes Web of Science	https://mjl.clarivate.com:/search-results?issn=0973-8398&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal ,
2023	3	Dr. Nilesh Kulkarni, Dr. S N Dhole	Assessment and Outcome on Preparations, Characterization of Topical Targeted Nanosponge Based Drug Delivery: Critical Review	Asian Journal of Pharmaceutical and Clinical Research (AJPCR)	2455-3891	https://doi.org/10.22159/ajpcr.2023.v16i5.46809 , https://journals.innovareacademics.in/index.php/ajpcr/article/view/46809	Yes (Indexcopernicus and EMBASE)	Asian Journal of Pharmaceutical and clinical research | ICI Journals Master (indexcopernicus.com) , Embase-Jan-2024-journals-list.xlsx (live.com)
2023	4	Dr. Ms. R. L. Mhetre	Nanonization-Based Solubility Enhancement by Loaded Porous Starch Foam: Nifedipine Tablet Formulation	Journal Of Pharmaceutical Innovation	1872-5120	Nanonization-Based Solubility Enhancement by Loaded Porous Starch Foam: Nifedipine Tablet Formulation | Journal of Pharmaceutical Innovation (springer.com)	Yes (Web of Science, Scopus)	https://mjl.clarivate.com:/search-results?issn=1872-5120&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal,Scopus preview - Scopus - Journal of Pharmaceutical Innovation

2023	5	Dr. Mohini Upadhye	Impact of Hazardous Chemical compounds on Reproductive System Reported in Sanitary Products	Research Journal of Pharmacology and Pharmacodynamics	0975-4407	RJPPD - Impact of Hazardous Chemical compounds on Reproductive System Reported in Sanitary Products	YES	
2023	6	Ms. Rekha Bhalerao, Dr. Mohini Upadhye	A Review on Pharmacological Properties of Rubus fructicosus	International Journal of Ayurvedic Medicine	0976-5921	A Review on pharmacological properties of Rubus fructicosus. | International Journal of Ayurvedic Medicine (ijam.co.in)	Yes	https://mjl.clarivate.com:/search-results?issn=0976-5921&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2023	7	Hemant Alhat, Manojkumar Munde, Nilesh Kulkarni, VrushaliTambe	Comprehensive review on nanocrystal technology in pharmaceutical formulations	International Journal of Pharmacy and Pharmaceutical Sciences	Online ISSN: 0975-1491 Print ISSN: 2656-0097	View of COMPREHENSIVE REVIEW ON NANOCRYSTAL TECHNOLOGY IN PHARMACEUTICAL FORMULATIONS (innovareacademics.in)	Yes (Indexcopernicus and EMBASE)	International Journal of Pharmacy and Pharmaceutical Sciences | ICI Journal (indexcopernicus.com), Embase-Jan-2024-journals-list.xlsx (live.com)
2023	8	Dr. Manojkumar Munde, Dr. Nilesh Kulkarni	A novel validated stability indicating method for quantification of Empagliflozin in bulk and marketed formulation by HPTLC applying experimental design approach	Indian Drugs	0019462X	Issue's Article Details (indiandrugsonline.org)	YES Scopus	https://www.scopus.com/sourceid/22375#tabs=2
2023	9	Dr. Mohini Upadhye	Ayurvedic and Herbal Remedies for Neurological Disorders	International Journal of Creative ResearchThoughts	2320-2882	IJCRT2301310.pdf	Yes	International journal of creative research thoughts | ICI Journals Master L (indexcopernicus.com),
2023	10	Dr. Smita More	A Narrative Review on Drug Loaded Nanosponges as a Carrier for Drug Delivery	International Journal of Pharmaceutical Quality Assurance	0975 9506	Volume14,Issue1 - IJPQA	YES Scopus	https://www.scopus.com/sourceid/21100204506#tabs=2
2023	11	Dr. Vijaya Vichare, Dr. V S Tambe, Dr. S N Dhole	Identification of Oxidative Degradation Products of Dapsone in Presence of Adapalene by RP-HPLC–MS	Chromatographia	0009-5893	Identification of Oxidative Degradation Products of Dapsone in Presence of Adapalene by RP-HPLC–MS | Chromatographia (springer.com)	Yes (Web of Science, Scopus)	https://www.scopus.com/sourceid/23963#tabs=2, , https://mjl.clarivate.com:/search-results?issn=0009-5893&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal, Scopus preview - Scopus - Chromatographia

2023	12	Dr.VijayaVichare, Dr. S N Dhole	Molecular Docking Studies of Selected Phytoconstituents from Some Indigenous Medicinal Plants against Different Targets of Severe Acute Respiratory Syndrome Coronavirus 2	Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (JPDTSM)	2949-6594	Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (lww.com)		
2023	13	Shashikant Dhole,	Improved UV-Visible Spectrophotometric Analytical Method Development and Validation for Precise, Efficient and Selective Quantification of Atorvastatin Calcium in Bulk Form	International Journal of Pharmaceutical Sciences and Nanotechnology	0974-3278	International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	YES Scopus	Scopus preview - Scopus - International Journal of Pharmaceutical Sciences and Nanotechnology
2023	14	Smita D. More,	A Review on Solid Lipid Nanoparticles as Nano Drug Delivery Transporters	Current Nanoscience	1875-6786	Journal - Current Nanoscience | Bentham Science (eurekaselect.com)	Yes (Web of Science, Scopus)	Scopus preview - Scopus - Current Nanoscience, https://mjl.clarivate.com:/search-results?issn=1573-4137,1745-8080,2694-2496,2043-6254,1535-7414,2196-2952,1529-7322,1573-4110,0011-3204,1567-1739&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-these-results
2023	15	VijayaVichare, Shashikant Dhole,	Simultaneous Estimation of Adapalene from Marketed Gel Formulation along with the Preservative Phenoxyethanol by UV-Visible Spectroscopy	Asian Journal of Pharmaceutical Research	2231-5691	Asian Journal of Pharmaceutical Research (asianjpr.com)		
2023	16	R. S. Shivarkar, N. S. Kulkarni, M. C. Upadhye	Formulation Development and Evaluation of a Polyherbal Suspension Containing Curcuma	Journal of Natural remedies	2320-3358	Journal of Natural Remedies (informaticsjournals.com)	YES (Scopus)	Scopus preview - Scopus - Journal of Natural Remedies

			longa, Ocimumsantum and Azadirechta indica with Improved Antimicrobial Activity.					
2023	17	ChaitaliDongaonkar, Nilesh Kulkarni and Shashikant Dhole	Delivery System for Improvement in Solubility of Poorly Soluble Drugs	Indian Journal of Natural Sciences	:0976 – 0997	Tamilnadu Scientific Research Organization (TNSRO) i (tnsroindia.org.in)	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=0976-0997&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2023	18	SwapnaliPharande	Design and Evaluation of Gastroretentive Mucoadhesive Tablet of Antihypertensive	**European Chemical Bulletin**	2063-5346	European Chemical Bulletin (eurchembull.com)	YES Scopus	https://www.scopus.com/sourceid/21100898023#tabs=2
2023	19	R. S. Shivarkar	Formulation of Novel Silver Nanoparticles (Snps) Using Fungal EndophyteMacrosporiumFasciculatum and Evaluation of Their Antimicrobial Potential	Journal of Chemical Health Risks	ISSN:2251-6727	Journal of Chemical Health Risks (jchr.org)	YES Scopus	Scopus preview - Scopus - Journal of Chemical Health Risks
2023	20	Nilesh S. Kulkarni, Shashikant N. Dhole, Rahul S. Shivarkar	Development of Fast-dissolving Oral Dosage Form as Tablet using Binder as VignaMungo Mucilage and Oral Film using Solvent Casting Technique: Comparative Study	Asian Journal of Pharmaceutics	1998-409X	Asian Journal of Pharmaceutics (AJP) (asiapharmaceutics.info)	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=0973-8398&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2023	21	Nilesh S. Kulkarni, Shashikant N. Dhole,	A Comprehensive Review on Novel Lipid-Based Nano Drug Deliver	Advanced Pharmaceutical Bulletin	2228-5881	https://apb.tbzmed.ac.ir/	Yes (Web of Science, Scopus)	Scopus preview - Scopus - Advanced Pharmaceutical Bulletin , https://mjl.clarivate.com:/search-results?issn=2228-5881&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal,
2023	22	Nilesh S. Kulkarni	A Review on recent approaches for the use of	Current Indian Science	2210-3007	Journal - Current Indian Science | Bentham Science	Yes	NA

			different Analytical Techniques to Analyze some Calcium Channel Blockers and their Combinations with otherAntihypertensive Drugs				(Bentham Publisher)	
2022	23	Dr. Prajakta Kothawade, Dr.VrushaliTambe	A Comparative Molecular Docking Study of Crocetin With Multiple Receptors for the Treatment of Alzheimer's Disease	Biomedical and Biotechnology Research Journal (BBRJ)	print: 2588-9834, online: 2588-9842	Search Results : Biomedical and Biotechnology Research Journal (BBRJ) (lww.com)	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=2588-9834&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2022	24	Ms. RutujaAher	Formulation and Characterization of Buccal patches of Oxaceprol	Research Journal of Pharmacy And Technology	0974-360X 0974-3618	RJPT - Formulation and Characterization of Buccal Patches of Oxaceprol (rjptonline.org)	Yes Scopus	https://www.scopus.com/sourceid/21100197160#tabs=2
2022	25	Ms. Rutuja Aher	Development and Characterization of Tenofovir Dixoproxil Fumarate Loaded Nanoparticles	Asian Journal of Organic & Medicinal Chemistry (AJOMS)	2456-8937		YES	
2022	26	Ms. RutujaAher	Cosmetic Hydrogel under eye patch: Review	International Journal for Research Trends and Innovation (IJRTI)	2456-3315	IJRTI2208260.pdf	Yes	
2022	27	Ms. RutujaAher	Role of chlorophyll in cosmeceuticals: an overview	International Journal for Research Trends and Innovation (IJRTI)	2456-3315	IJRTI2208263.pdf	YES	
2022	28	Ms. RutujaAher	A Review: Retinol-Infused Products by Microsponge Technology	International Journal for Research Trends and Innovation (IJRTI)	2456-3315	IJRTI2209004.pdf	Yes	
2022	29	Ms. RutujaAher	Tretinoin A Peptide In Anti-Aging Therapy: An Overview	International Journal for Research Trends and Innovation (IJRTI)	2456-3315	IJRTI2209025.pdf	YES	
2022	30	Ms. BhagyashreeParande	Formulation and evaluation of herbal anti-acne emulgel of BerberiesAristata	International Journal for Research Trends and Innovation (IJRTI)	2456-3315	https://ijrti.org/papers/IJRTI2208130.pdf	Yes	
2022	31	Ms. BhagyashreeParande	Diversified outlook on Pharmacognosy and Pharmacological activities of	World Journal of Pharmacy and	2278-4357	1656573316.pdf (storage.googleapis.com)	YES	

			BerberiesAristata:ADelinated Review	Pharmaceutical Sciences (WJPPS)				
2022	32	Ms. BhagyashreeParande	Niosomes As Novel Drug Delivery System	International Journal for Research Trends and Innovation (IJRTI)	2456-3315	https://ijrti.org/papers/IJRTI2206176.pdf	Yes	
2022	33	Ms.PallaviKakade	Evaluation of Antihypertensive Activity of Punica Granatum Linn in high fat diet and Sreptozotocin Induced Diabetes in Rats	international Journal of Innovative Research and Technology	2349-6002	IJIRT156668_PAPER.pdf	YES	
2022	34	Ms. Neve TD	Development and Validation of UV spectrophotometric method for Macitentan bulk drug and formulation	International Journal of Pharma Research and Technology	0975-5357	Home (ijprt.com)	YES	
2022	35	Ms. Neve TD	Enhancement of Dissoluion Profile of Torsemide by solid dispersion technique	International Journal of Pharma Research and Technology	0975-5357	Home (ijprt.com)	Yes	solid despersion technique.pdf
2022	36	Shashikant N. Dhole	ANTI-DIABETIC AND WOUND HEALING POTENTIAL OF JASMINUM GRANDIFLORUM	World Journal of Pharmaceutical Research	2277-7105	WJPR - Abstract	YES	
2022	37	Shashikant N. Dhole	DEVELOPMENT AND EVALUATION OF ANTIFUNGAL SOAP WITH HERBAL ANTIBACTERIAL PROPERTIES	European Journal of Molecular & Clinical Medicine	2515-8260	EJMCM	Yes	
2022	38	Dr.VrushaliTambe	Novel stability indicating RP-HPLC Method for estimation of Clobazam and its related Substances in Oral Suspension	Indian Drugs	0019462X	https://www.indiandrugsonline.org/issuesarticle-details?id=MTM3Ng==	Yes Scopus	https://www.scopus.com/sourceid/22375#tabs=2
2022	39	Dr.VrushaliTambe	Knowledge, Attitude and Practices Study on Hand Hygiene among the Children Aged 12-17 Years	Journal of Coastal Life Medicine	2309-5288	Knowledge, Attitude & Practices Study on Hand Hygiene among the Children Aged 12-17 Years. | Journal of Coastal Life Medicine (jclmm.com)	Yes (Indexcopernicus)	Journal of Coastal Life Medicine | ICI Journals Master List (indexcopernicus.com)
2022	40	Dr. Nilesh Kulkarni, Dr. S N Dhole	Oral Fast Dissolving Films Containing Lyophilized Labetalol HCL with Hydroxy	International Journal of Pharmaceutical Sciences	0974-3278	A Oral Fast Dissolving Films Containing Lyophilized Labetalol HCL with Hydroxy Propyl β-Cyclodextrin/ Soluplus: Formulation Development, In Vitro	Yes Scopus	https://www.scopus.com/sourceid/21101050125#tabs=2

			Propyl β-Cyclodextrin/ Soluplus: Formulation Development, In Vitro Evaluation	and Nanotechnology		Evaluation | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)		
2022	41	Dr. Nilesh Kulkarni, Ms. Priyanka Shinde	An occular Route of Administration for Drugs through Novel Approach of self- microemulsifying Formulation- Asystematic review	Asian Pacific Journal of Health Sciences	2350-0964	An Ocular Route of Administration for Drugs through Novel Approach of Self-microemulsifying Formulation – A Systematic Review | Asian Pacific Journal of Health Sciences (apjhs.com)	Yes (Indexcopernicus)	Asian Pacific Journal of Health Sciences | ICI Journals Master List (indexcopernicus.com)
2022	42	Dr. Mohini Upadhye	Verbena Officinalis (Verbenaceae): Pharmacology, Toxicology and Role in Female Health	International Journal of Ayurvedic Medicine (IJAM)	0976-5921	Verbena officinalis (Verbenaceae): Pharmacology, Toxicology and role in female health | International Journal of Ayurvedic Medicine (ijam.co.in)	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=0976-5921&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2022	43	Dr. Mohini Upadhye, Sonali Chintamani	Antimicrobial Activities of the different fractions from Momordica Dioica Roxb Fruit	International Journal of Research and Analytical Reviews	2349-5138	http://ijrar.org/viewfull.php?&p_id=IJRAR22C1098	YES	
2022	44	Dr. Vijaya Vichare	Development of new Validated HPTLC Method for simultaneous estimation of Canagliflozin and Metformin in Tablet Formulation	Research Journal of Pharmacy and Technology	0974-3618	RJPT - Development of new Validated HPTLC Method for simultaneous estimation of Canagliflozin and Metformin in Tablet Formulation (rjptonline.org)	Yes Scopus	https://www.scopus.com/sourceid/21100197160#tabs=2
2022	45	Dr. Vijaya Vichare	Development and Validation of Chemometric-Assisted Spectrophotometric Method for the Simultaneous Estimation of Aceclofenac, Paracetamol, and Chlorzoxazone with Impurities	Biomedical and Biotechnology Research Journal	25889842	Development and Validation of Chemometric-Assisted Spectroph... : Biomedical and Biotechnology Research Journal (BBRJ) (lww.com)	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=2588-9834&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2022	46	Dr. Vijaya Vichare, Dr. S N Dhole	Cytotoxicity Testing of Tinospora Cordifolia Extracts against Human Kidney Cancer Cell Line	International Journal of Pharmaceutical Sciences and Nanotechnology	0974-3278	Cytotoxicity Testing of Tinospora cordifolia Extracts against Human Kidney Cancer Cell Line | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	Yes Scopus	https://www.scopus.com/sourceid/21101050125#tabs=2
2022	47	Dr. Raksha Mhetre	Formulation and Appraisal of innovative Acyclovir emulsion	Neuroquantology	1303-5150	Formulation and Appraisal of innovative acyclovir emulsion | Neuroquantology	Yes Scopus	https://www.scopus.com/sourceid/11600154151#tabs=2

2022	48	Dr. Raksha Mhetre	Design, Docking, In Silico ADME prediction of novel indole based Benzamide scaffolds targeting for estrogen receptor Alfa in 2 domain for effective anticancer treatment	Journal of pharmaceutical negative results	2229-7723	Design, Docking, Insilco ADME Prediction Of Novel Indole Based Benzamide Scaffolds Targeting For Estrogen Receptor Alfa In Af-2 Domain For Effective Anticancer Treatment | Journal of Pharmaceutical Negative Results (pnrjournal.com)	Yes (Scopus)	https://www.scopus.com/sourceid/21100216519
2022	49	Dr. Raksha Mhetre, Dr. S N Dhole	Formulation and evaluation of Naproxen Orodispersible mini tablets for Paediatric use	International Journal of Pharmaceutical Sciences and Nanotechnology	0974-3278	Formulation and Evaluation of Naproxen Orodispersible Tablets | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	Yes Scopus	https://www.scopus.com/sourceid/21101050125#tabs=2
2022	50	Dr. Vijaya Vichare, Ms. BhagyashreeParande, Dr. S N Dhole	A Review on Anticancer Potential of Berberis aristata and Berberine with Focus on Quantitative Methods	Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (JPDTSM)	2949-6594	Search Results : Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (lww.com)	Yes	
2022	51	Amruta Shinde	DEVELOPMENT AND EVALUATION OF BOVINE COLOSTRUM INTERMEDIATEPRODUCT	THE JOURNAL OF ORIENTAL RESEARCH MADRAS	0022-3301		Yes	
2022	52	Amruta Shinde	DESIGN AND EVALUATION OF DOSAGE FORM CONTAINING PREBIOTICS AND PROBIOTICS	THE JOURNAL OF ORIENTAL RESEARCH MADRAS	0022-3301		Yes	
2022	53	Dr. Ms. V.S. Tambe	Development And Validation Of Liquid Chromatography Method For Simultaneous Estimation Of Miconazole And Clobetasol And Characterization Of Hydrolytic Degradation Products Using Liquid Chromatography With Tandem Mass Spectrometry	Indian Journal of Pharmaceutical Sciences	0250-474X	Development and Validation of Liquid Chromatography Method for Simultaneous Estimation of Miconazole and Clobetasol and Characterization of Hydrolytic Degradation Products using Liquid Chromatography with Tandem Mass Spectrometry (ijpsonline.com)	Yes (Web of Science, Scopus)	https://www.scopus.com/sourceid/22392#tabs=2 , https://mjl.clarivate.com:/search-results?issn=0250-474X&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal

2022	54	Dr. Ms. M.C. Upadhye	Biopolymers: A comprehensive review	Open Access Research Journal of Science and Technology	2782-9960	Biopolymers: A comprehensive review | Open Access Research Journal of Science and Technology (oarjst.com)	Yes	
2022	55	Dr. Ms. M.C. Upadhye, Dr, Ms. R. R. Pujari	Antidiabetic Potential of Ficus glomerata Roots with a Special Emphasis on Estimation of Bioactive Compounds by a Novel Validated HPTLC Technique	Indian Journal of Pharmaceutical Education and Research,	0019-5464	Antidiabetic Potential of Ficus glomerata Roots with a Special Emphasis on Estimation of Bioactive Compounds by a Novel Validated HPTLC Technique | Indian Journal of Pharmaceutical Education and Research (ijper.org)	Yes (Web of Science)	https://www.scopus.com/sourceid/19200156909#tabs=1 , https://mjl.clarivate.com:/search-results?issn=0019-5464&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2022	56	Mr. M. K Munde, Dr. Mr. N. S. Kulkarni, Dr. Ms. V. S. Vichare,	Review on forced degradation study of statins	Asian Journal of Pharmaceutical Analysis	2231-5675	Asian Journal of Pharmaceutical Analysis (ajpaonline.com)	Yes	
2022	57	Dr. Ms. V. S. Vichare, Dr. Ms. V.S. Tambe, Dr. Prof. S. N. Dhole	Inherent stability testing of empagliflozin in the presence of metformin HCl by HPTLC and characterization of degradation products of empagliflozin by LC–ESI–QTOF–MS/MS	Journal of Planar Chromatography	1789-0993	Inherent stability testing of empagliflozin in the presence of metformin HCl by HPTLC and characterization of degradation products of empagliflozin by LC–ESI–QTOF–MS/MS | JPC – Journal of Planar Chromatography – Modern TLC (springer.com)	Yes (Web of Science, Scopus)	https://mjl.clarivate.com:/search-results?issn=0933-4173&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal , https://www.scopus.com/sourceid/24059
2022	58	Dr. Ms. V. S. Vichare, Dr. Ms. V.S. Tambe, Dr. Prof. S. N. Dhole	Characterization of Oxidative Degradation Product of Canagliflozin by LC-MS/MS	Advances in Pharmacology and Pharmacy	2332-0036	hrpub.org/journals/article_info.php?aid=12082	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=2332-0036&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2022	59	Mr. M. K Munde, Dr.N.S.Kulkarni	Novel Validated Stability Indicating Analytical Method For Quantification of Empagliflozin in Bulk and Marketed Formulation by RPHPLC Applying	Indian Drugs	0019-462X	Issue's Article Details (indiandrugsonline.org)	Yes Scopus	https://www.scopus.com/sourceid/22375#tabs=2

			Experimental Design Approach					
2022	60	Dr. Ms. R.L. Mhetre, Mr. R. R. Chanshetti, Dr. Prof. S. N. Dhole	Optimisation Of Cilnidipine Nanoparticles Using Box-Behnken Design In-Vitro Toxicity And Bioavailability Assessment	Materials Technology	1753-5557	Optimisation of cilnidipine nanoparticles using box-behnken design: in-vitro, toxicity and bioavailability assessment: Materials Technology: Vol 37 , No 11 - Get Access (tandfonline.com)	Yes (Web of Science, Scopus)	https://mjl.clarivate.com:/search-results?issn=1066-7857&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal,Scopus preview - Scopus - Materials Technology
2022	61	Dr. Ms. R. L. Mhetre, Mr. R. R. Chanshetti, Dr. Prof. S. N. Dhole	Tailoring Of Antihypertensive Drug Loaded Nanoparticles Invitro Toxicity Bioavailability Assessment	BioNanoScience	2191-1630	Tailoring of Antihypertensive Drug-Loaded Nanoparticles: In Vitro, Toxicity, and Bioavailability Assessment | BioNanoScience (springer.com)	Yes (Web of Science, Scopus)	https://mjl.clarivate.com:/search-results?issn=2191-1630&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal, Scopus preview - Scopus - BioNanoScience
2022	62	Ms. A.S .Gadakh, Ms. P. P. Taru, Ms. D. R. Kad	Dashamoola: A Systematic Overview	Gis Science Journal	1869-9391	131-GSJ7004.pdf - Google Drive, VOLUME 9 ISSUE 4 2022 – Gis science journal	Yes	
2022	63	Ms. R. S. Aher	Development And CharacterisationOf Intra canazole loaded Emulgel	Turkish Journal Of Physiotherapy And Rehabilitation	2651-4451		Yes	https://mjl.clarivate.com:/search-results?issn=2651-4451&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal,
2022	64	Dr. Ms. S.D. More	Review article TDDS	World journal of pharmacy and pharmaceutical sciences	2278 – 4357	wjpps | ABSTRACT,	Yes	
2021	65	Dr. Ms. M.C. Upadhye, Ms. S. Chintamani	Review on phytochemistry and pharmacological aspects of euphorbia hirtalinn. (family-euphorbiaceae)	World Journal of Pharmaceutical Research	2277-7105	https://www.wjpr.net/abstract_show/18297		
2021	66	V. Kashikar	Phytochemical Nanocarrier: A Green Approach towards Cancer Therapy	Journal of Pharmaceutical Research International	2456-9119	https://journaljpri.com/index.php/JPRI/article/view/5874		

2021	67	Dr. Nilesh S. Kulkarni	Insight on development and evaluation of nanosponge drug delivery for improved therapeutic effectiveness	Asian Journal of Pharmacy and Technology	2231-5705	https://ajptonline.com/AbstractView.aspx?PID=2022-12-2-8		
2021	68	Mr. M. K Munde	A Review on HPLC Method Development and Validation for Gliptin Class: New Oral Antidiabetic Agents	Research Journal of Pharmaceutical Dosage Forms and Technology	0975-4377.	https://rjpdft.com/AbstractView.aspx?PID=2022-14-1-13		
2021	69	Dr. Ms. V.S. Tambe, Mr. R.R. Chanshetti	Bioactivity Enhanced Isolated CarpaineFromCarica Papaya Leaves For Platelet Stimulating Activity	Indian Journal of Pharmaceutical Sciences	0250-474X	Bioactivity Enhanced Isolated Carpaine from Carica papaya Leaves for Platelet Stimulating Activity (ijpsonline.com)	Yes (Web of Science, Scopus)	https://mjl.clarivate.com:/search-results?issn=0250-474X&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal, Scopus preview - Scopus - Indian Journal of Pharmaceutical Sciences,
2021	70	Dr. Ms. V. S. Tambe	Validated Stability Indicating RP-LC Method For Propylthiouracil with LCMS studies of Forced Degradation Products and Simulataneous Estimation of Its Impurity,	International Journal of Pharmaceutical Sciences and Research	0975-8232	A VALIDATED STABILITY-INDICATING RP-LC METHOD FOR PROPYLTHIOURACIL WITH LC-MS STUDIES OF FORCED DEGRADATION PRODUCTS AND SIMULTANEOUS ESTIMATION OF ITS IMPURITY | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	Yes	
2021	71	Dr. Prof. S.N. Dhole	Enhanced Pharmacological Efficacy of Berberine Hydrochloride Loaded Lipid Based Pellets For The Treatment Of Metabolic Diseases	Biomedical & Pharmacology Journal	2456-2610	Enhanced Pharmacological Efficacy of Berberine Hydrochloride Loaded Lipid Based Pellets for the Treatment of Metabolic Diseases – Biomedical and Pharmacology Journal (biomedpharmajournal.org)	Yes Scopus	https://www.scopus.com/sourceid/19700174924#tabs=2
2021	72	Dr. Ms. R. L Mhetre, Dr.S.N.Dhole	Formulation And Optimization Of Chlorthalidone Loaded Nano-Particles By Antisolvent Precipitation Using Box-Behnken Design	International Journal Of Pharmaceutical Sciences And Research	9074-3278	FORMULATION AND OPTIMIZATION OF CHLORTHALIDONE LOADED NANO-PARTICLES BY ANTISOLVENT PRECIPITATION USING BOX-BEHNKEN DESIGN | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	Yes	
2021	73	Ms. M. C. Upadhye	A review on viral infections including special magnitude on synthetic and herbal remedies	International Journal Of Modern Pharmaceutical Research	2319-5878	IJMPR | Abstract (ijmpronline.com)	Yes	

2021	74	Dr. Ms. R. L Mhetre, Dr. N. S. Kulkarni, Dr.S.N.Dhole	Natural and Modified Excipients in Novel Drug Delivery System: A Review	Research Journal of Pharmaceutical Dosage Forms and Technology.	0975-4377	Research Journal of Pharmaceutical Dosage Forms and Technology (rjpdft.com)	Yes	
2021	75	Dr. Ms. R. L Mhetre, Dr.S.N.Dhole	Patent review on nanosponge: targeted drug delivery system	J. Global trends Pharm. Sci,	2230-7346	:: Journal of Global Trends in Pharmaceutical Sciences :: (jgtps.com)	Yes	
2021	76	Ms. M. H. Tapkir	Colocasia Esculenta Starch: Novel Alternative Disintegrant For Pharmaceutical Application	Indian Drugs	0019-462X	Issue's Article Details (indiandrugsonline.org)	Yes Scopus	https://www.scopus.com/sourceid/22375#tabs=2
2021	77	Dr. N. S. Kulkarni, Mr. M.K.Munde, Dr.S.N.Dhole,	A Comprehensive Review on Application of Microwave Irradiation for Preparation of Inclusion Complexes with Cyclodextrins	Research Journal of Pharmacy and Technology.	0974-360X	RJPT - A Comprehensive Review on Application of Microwave Irradiation for preparation of Inclusion Complexes with Cyclodextrins (rjptonline.org)	Yes Scopus	https://www.scopus.com/sourceid/21100197160#tabs=2
2021	78	Dr. N. S. Kulkarni,	A Review on Applications of Hydroxy Propyl Methyl Cellulose and Natural polymers for the development of modified release drug delivery systems.	Research Journal of Pharmacy and Technology.	0974-360X	RJPT - A Review on Applications of Hydroxy Propyl Methyl Cellulose and Natural polymers for the development of modified release drug delivery systems (rjptonline.org)	Yes Scopus	https://www.scopus.com/sourceid/21100197160#tabs=2
2021	79	Dr. N. S. Kulkarni, Dr.S.N.Dhole	A Systematic Review on Oral Drug Delivery as a Fast Dissolving Film to Improve Therapeutic Effectiveness.	Research Journal of Pharmacy and Technology	0974-360X	RJPT - A Systematic Review on Oral Drug Delivery as a Fast Dissolving Film to Improve Therapeutic Effectiveness (rjptonline.org)	Yes Scopus	https://www.scopus.com/sourceid/21100197160#tabs=2
2021	80	Dr. Ms. S. D. More, Dr.S.N.Dhole	A Review On Microparticulate Drug Delivery System	Bull.Env.Pharmacol.Lifesci	2277-1808	Bulletin of Environment, Pharmacology and Life Sciences (bepls.com)	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=2277-1808&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2021	81	Ms. R. S Aher	Development and Characterization of Itraconazole Loaded Emulgel	Turkish Journal of Physiotherapy and Rehabilitation	2651-446X		Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=2651-4451&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-

								link&utm_campaign=search-results-share-this-journal,
2021	82	Dr. Prof. S.N. Dhole	Niosomes: A Promising Drug Delivery System in Transdermal Drug Delivery (TDDS	Journal of Pharmaceutical Research International	2456-9119	Niosomes: A Promising Drug Delivery System in Transdermal Drug Delivery (TDDS) | Journal of Pharmaceutical Research International (journaljpri.com)	Yes (Web of Science)	https://www.webofscience.com/wos/author/record/O-8551-2015
2021	83	Dr. Ms. V.S. Tambe	Plant Phyto-Constituents As Antibiotic Adjuvants A Systematic Review And Bibliometric Analysis	Journal Of Pharmaceutical Research International	2456-9119	Plant Phyto-constituents as Antibiotic Adjuvants: A Systematic Review and Bibliometric Analysis | Journal of Pharmaceutical Research International (journaljpri.com)	Yes (Web of Science)	https://www.webofscience.com/wos/author/record/O-8551-2015
2021	84	Prof. Dr. S. N. Dhole, Mr. O.M.Bagade	A Concise Insight on Pulsatile Drug Delivery System: An Outlook Towards Its Development	International Journal of Pharmaceutical sciences and Nanotechnology	9074-3278	A Concise Insight on Pulsatile Drug Delivery System: An Outlook towards its Development | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	Yes Scopus	https://www.scopus.com/sourceid/21101050125#tabs=2
2021	85	Ms. A. S. Gadakh	Ayurveda A Promising Tool For The Eradication Of Covid-19	International Journal Of Pharmaceutical Sciences And Research	0975-8232	AYURVEDA A PROMISING TOOL FOR THE ERADICATION OF COVID-19 | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	Yes	
2021	86	Prof. Dr. S. N. Dhole, Mr. O. M. Bagade	An Updated Overview on Mucoadhesive Buccal Drug Delivery System	Research Journal of Pharmacy and technology	0974-360X	https://rjptonline.org/AbstractView.aspx?PID=2021-14-8-87	Yes Scopus	https://www.scopus.com/sourceid/21100197160#tabs=2
2021	87	Mr. H. P. Alhat, Mr. S.V.Joshi	Validated HPTLC Method For Simultaneous Determination Of Lopinavir And Ritonavir In Tablet Dosage	European Journal Of Pharmaceutical And Medical Research	2394-3211	https://www.ejpmr.com/home/abstract_id/7993	Yes	
2021	88	Mr. R. R. Chanshetti	Leaves of Stereospermumsuaveolens DC Exhibit Anti-inflammatory and Anti-arthritic Potential Action in Experimental Animals	Journal of Pharmaceutical Research International	**2456-9119**	Leaves of Stereospermumsuaveolens DC Exhibit Anti-inflammatory and Anti-arthritic Potential Action in Experimental Animals | Journal of Pharmaceutical Research International (journaljpri.com)	Yes (Web of Science)	https://www.webofscience.com/wos/author/record/O-8551-2015
2021	89	Dr. Ms. V.S. Tambe	A Review In-Vivo And In-Vitro Testing Models For Antiallergic Formulations	World Journal Of Pharmacy And Pharmaceutical Sciences	2278 – 4357	wjpps | ABSTRACT	Yes	
2021	90	Dr. Ms. V.S. Tambe	A Review Role Of Dietary Supplementation In Covid-19 Pandemic	World Journal Of Pharmacy And Pharmaceutical Sciences	2278 – 4357	wjpps | ABSTRACT	Yes	

2021	91	Dr. Ms. V.S. Tambe, Dr. Ms. V.S. Vichare	Simultaneous Analysis of Eprosartan and Hydrochlorothiazide In Tablet Formulation By High-Performance Thin Layer Chromatography With Ultraviolet Absorption Densitometry	International Journal Of Pharmaceutical Chemistry And Analysis	2394-2789	Simultaneous analysis of eprosartan and hydrochlorothiazide in tablet formulation by High-Performance thin layer chromatography with ultraviolet absorption densitometry - Int J Pharm Chem Anal (ijpca.org)	Yes	
2021	92	Dr. Mr. N.S. Kulkarni, Dr. Ms. M.C. Upadhye, Dr. Prof. S. N. Dhole	Development And Evaluation of Floating Microspheres Of Sumatriptan Succinate Using Ethyl Cellulose And Mucilage Extracted FromVigna Mungo	Journal Of Pharmaceutical Research International	2456-9119	Development and Evaluation of Floating Microspheres of Sumatriptan Succinate using Ethyl Cellulose and Mucilage Extracted from Vigna Mungo | Journal of Pharmaceutical Research International (journaljpri.com)	Yes (Web of Science)	https://www.webofscience.com/wos/author/record/O-8551-2015
2021	93	Dr. Ms. S.D. More, Dr. Prof. S.N. Dhole	Formulation And Evaluation Of Oral Fast Dissolving Deliveray For Rosuvastin	International Journal of Biology, Pharmacy and Allied Sciences	2277–4998	International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=2277-4998&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2021	94	Dr. Ms. S.D. More	A REVIEW ON BLACK FUNGUS/MUCORMYCOSIS	World journal of pharmacy and pharmaceutical sciences	2278 – 4357	wjpps | ABSTRACT	Yes	
2021	95	Dr. Ms. V. S. Vichare	Development Of Validated RP-HPLC Method For Estimation Of Empagliflozin And Metformin In Combined Formulation	Journal Of Pharmaceutical Research International	2456-9119	Development of Validated RP-HPLC Method for Estimation of Empagliflozin and Metformin in Combined Formulation | Journal of Pharmaceutical Research International (journaljpri.com)	Yes (Web of Science)	https://www.webofscience.com/wos/author/record/O-8551-2015
2021	96	Dr. V S. Vichare	Production and Analysis of Lip Balm using Herbal Resources	Journal Of Pharmaceutical Research International	2456-9119	Production and Analysis of Lip Balm using Herbal Resources | Journal of Pharmaceutical Research International (journaljpri.com)	Yes (Web of Science)	https://www.webofscience.com/wos/author/record/O-8551-2015
2021	97	Dr. Ms. P. B. Kothawade	Novel Niacin Receptor Agonists A Promising Strategy For The Treatment Of Dyslipidemia	Mini Reviews In Medicinal Chemistry	1389-5575	Novel Niacin Receptor Agonists: A Promising Strategy for the Treatment of Dyslipidemia | Bentham Science (eurekaselect.com)	Yes (Web of Science, Scopus)	https://mjl.clarivate.com:/search-results?issn=1389-5575&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal,

								https://www.scopus.com/sourceid/24797#tabs=2
2021	98	Ms. S.A. Koli	Evaluation Of The Effect Of Chrysin In Renal Ischemia Reperfusion Induced Renal Failure In Wistar Rats	International Journal Of Analytical And Experimental Model Analysis	0886-9367	https://drive.google.com/file/d/1Qg05CY6sobc64caYCyp5C3ptoij3iD1z/view?usp=sharing	Yes	
2021	99	Ms. P.G. Kakade,	Exploration Of Antidiabetic Potential Of Aerial Parts Of Abutilon Indium Linn In Streptozotocin - Nicotinamide Induced Diabetes In Rats	The International Journals Of Analytical And Experimental Model Analysis	0886-9367	https://drive.google.com/file/d/1aOJK5R82exBf1XJNLV5Mu8pfP345oW6t/view?usp=sharing	Yes	
2021	100	Rohini R. Pujari	Exploration of Elephant Foot Yam (Amorphophallus paeoniifolius) Starch: An Alternative Natural Disintegrant for Pharmaceutical Application	Indian Journal of Pharmaceutical Education and Research	2581-5423	https://www.ijper.org/sites/default/files/IndJPhaEdRes-55-1s-209.pdf	Yes (Web of Science, Scopus)	https://www.scopus.com/sourceid/19200156909#tabs=1 , https://mjl.clarivate.com:/search-results?issn=0019-5464&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2020	101	Ms. M.C. Upadhye, Dr. Ms. R.R. Pujari	Antidiabetic activity of Ficusglomerata roots	Current bioactive compounds	1875-6646	Antidiabetic Effects of Ethanolic Extract of Ficus glomerata (L.) Roots | Bentham Science (eurekaselect.com)	Yes (Web of Science, Scopus)	https://www.scopus.com/sourceid/5800173401 , https://mjl.clarivate.com:/search-results?issn=1573-4072&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2020	102	Ms. M.C. Upadhye, Dr. Ms. R.R. Pujari	Pharmacognostic, phytochemical and antioxidant activity of Ficusglomerata	Current bioactive compounds	1875-6646	Pharmacognostical, Phytochemical and Antioxidant Studies of Indigenous Medicinal Plant | Bentham Science	Yes (Web of Science, Scopus)	https://www.scopus.com/sourceid/5800173401 , https://mjl.clarivate.com:/search-results?issn=1573-4072&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal

2020	103	Dr. Ms. V.S. Tambe	Direct chiral HPLC-MS/MS method for determination of R-Lacosamide in human plasma	Pharmaceutical Chemistry Journal	1573-9031	Direct Chiral HPLC-MS/MS Method for Determination of R-Lacosamide in Human Plasma | Pharmaceutical Chemistry Journal (springer.com)	Yes (Web of Science, Scopus)	https://mjl.clarivate.com:/search-results?issn=0091-150X&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal, https://www.scopus.com/sourceid/21086
2020	104	Dr. Ms. V.S. Tambe	Qualitative analysis of Carica papaya leaves tablet formulation and study of fragmentation pattern of Rutin	Indian drugs	0019-462X	Issue's Article Details (indiandrugsonline.org)	Yes	https://www.scopus.com/sourceid/22375#tabs=2
2020	105	Dr. Ms. V.S. Tambe	HPTLC Method Development for the Simultaneous Estimation of Ketorolac Tromethamine and Tramadol Hydrochloride from a Formulation	Acta Scientific Pharmaceutical Sciences	2581-5423	Acta Scientific | International Open Library | Journals Publishing Group	Yes	
2020	106	Ms. P. P. Taru	A Review on post covid -19 Redevelopment Plans	Pharmaceutical Resonance COVID-19 Special Issue	2581-6136			
2020	107	Mr. R.R. Chanshetti,	Anti-Inflammatory Potential Effect of Flavonoid Rich Ethyl Acetate Fraction of Methanolic Extracts of StereospermumSuaveolens DC (Bignoniaceae) Leaves in Experimental Animals	Pharmacology eJournal	-	Anti-Inflammatory Potential Effect of Flavonoid Rich Ethyl Acetate Fraction of Methanolic Extracts of StereospermumSuaveolens DC (Bignoniaceae) Leaves in Experimental Animals by Rahul Chanshetti, Deepti Bandawane :: SSRN	Yes	SSRN: https://ssrn.com/abstract=3537457 or http://dx.doi.org/10.2139/ssrn.3537457
2020	108	Ms. S.R. Chintamani	Extraction, identification, and screening of Brassica oleraceavat.italicaplenck (Broccoli) floret to be an alternative for nanoparticle formulation	Indian Journal of Pharmaceutical Education and Research	2581-5423	Extraction, Identification and Screening of Brassica oleracea var. italicaPlenck (Broccoli) Floret to be an Alternative for Nanoparticle Formulations | Indian Journal of Pharmaceutical Education and Research (ijper.org)	Yes (Web of Science, Scopus)	https://www.scopus.com/sourceid/19200156909#tabs=1 , https://mjl.clarivate.com:/search-results?issn=0019-5464&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2020	109	Ms. P.B. Kothawade	Novel nitrogen-containing heterocyclic compounds in	Journal of Research in Pharmacy	2630-6344	Journal of Research in Pharmacy (jrespharm.com)	Yes	https://mjl.clarivate.com:/search-results?issn=2630-

			GPR109A as an anti-hyperlipidemic: Homology modeling, Docking, dynamic simulation studies				(Web of Science, Scopus)	6344&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal, https://www.scopus.com/sourceid/21100928216,
2020	110	Prof. Dr. S. N. Dhole	Formulation and Evaluation of Sustained Release Colon Targeted Mesalamine Tablet.	Research Journal of Pharmacy and Technology	0974-360X	RJPT - Formulation and Evaluation of Sustained Release Colon Targeted Mesalamine Tablet (rjptonline.org)	YES (Scopus)	https://www.scopus.com/sourceid/21100197160#tabs=2
2020	111	Dr. N. S. Kulkarni	A comprehensive Review on Analytical method development and validation for SGLT-2 inhibitors by HPLC in its API and Dosage form.	Research Journal of Pharmacy and Technology..	0974-360X	RJPT - A Comprehensive Review on Analytical Method Development and Validation for SGLT-2 Inhibitors by HPLC in Its API and Dosage Form (rjptonline.org)	YES (Scopus)	https://www.scopus.com/sourceid/21100197160#tabs=2
2020	112	Dr. N. S. Kulkarni, Mr.M.K.Munde, Dr. S. N. Dhole	Improvement of Water Solubility and In Vitro Dissolution Rate of Deflazacort ByComplexation With βCyclodextrin Through Freeze Drying Process.	Indian Drugs.	N 1083-7450	Issue's Article Details (indiandrugsonline.org)	YES (Scopus)	https://www.scopus.com/sourceid/22375#tabs=2
2020	113	Dr. N. S. Kulkarni, Mr.M.K.Munde	A systematic review on development and evaluation of controlled release and fast dissolving formulations for Anti-diabetic drugs over past decade.	International Journal of Pharmaceutical Sciences and Research.	0975-8232	A SYSTEMATIC REVIEW ON DEVELOPMENT AND EVALUATION OF CONTROLLED RELEASE AND FAST DISSOLVING FORMULATIONS FOR ANTI-DIABETIC DRUGS OVER PAST DECADE | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	Yes (Web of Science)	A SYSTEMATIC REVIEW ON DEVELOPMENT AND EVALUATION OF CONTROLLED RELEASE AND FAST DISSOLVING FORMULATIONS FOR ANTI-DIABETIC DRUGS OVER PAST DECADE-Web of Science Core Collection
2020	114	Dr. N. S. Kulkarni, Dr. S.N. Dhole	Formulation and evaluation of gastro retentive floating microspheres: a systematic review.	International Journal of Pharmaceutical Sciences and Research.	0975-8232	FORMULATION AND EVALUATION OF GASTRO-RETENTIVE FLOATING MICRO-SPHERES: A SYSTEMATIC REVIEW | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	Yes (Web of Science)	FORMULATION AND EVALUATION OF GASTRO-RETENTIVE FLOATING MICROSPHERES: A SYSTEMATIC REVIEW-Web of Science Core Collection
2020	115	Dr. Ms. S. D. More, Dr.R.L.Mhetre	A Review On 3D Printing Technologies In Pharmaceutical Science	Bull.Env.Pharmacol.Lifesci	2277-1808	Bulletin of Environment, Pharmacology and Life Sciences (bepls.com)	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=2277-1808&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-

								link&utm_campaign=search-results-share-this-journal
2020	116	Dr. Ms. S. D. More, Dr. N. S. Kulkarni	A Review On Novel Approaches Of Mucoadhesive Oral Film Manufacturing Aspects	Bull.Env.Pharmacol.Lifesci	2277-1808	Bulletin of Environment, Pharmacology and Life Sciences (bepls.com)	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=2277-1808&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2020	117	Ms. M. C. Upadhye, Ms. P.P.Taru, Dr.S.N.Dhole	A review on *bryphyllumpinnatum* (lam) Oken.	Res. J. Pharmacognosy and phytochem	0975-2331	Research Journal of Pharmacognosy and Phytochemistry (rjpponline.org)	Yes	
2020	118	Ms. V. S. Vichare	Simultaneous Estimation Of Dapsone And Adapalene In Gel Formulation By Uv-Spectroscopy	International Journal Of Pharmaceutical Sciences And Research	0975-8232	SIMULTANEOUS ESTIMATION OF DAPSONE AND ADAPALENE IN GEL FORMULATION BY UV-SPECTROSCOPY | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	Yes	
2020	119	Ms. V. S. Vichare, Dr.S.N.Dhole	Simultaneous Estimation Of Dapsone And Adapalene In Gel Formulation By Derivative Spectroscopy	Current Trends In Pharmacy And Pharmaceutical Chemistry	2582-5062		Yes	
2020	120	Mr. M. K. Munde, Dr. N. S. Kulkarni	A Novel Validated Stability Indicating Analytical Method for Simultaneous Quantification of Metformin Hydrochloride and Empagliflozin in Bulk and Marketed Formulation by HPTLC using Box-Wilson Experimental Design Approach	International Journal Of Pharmaceutical Education And Research	01-5464	A Novel Validated Stability Indicating Analytical Method for Simultaneous Quantification of Metformin Hydrochloride and Empagliflozin in Bulk and Marketed Formulation by HPTLC using Box-Wilson Experimental Design Approach | Indian Journal of Pharmaceutical Education and Research (ijper.org)	Yes (Web of Science)	https://www.scopus.com/sourceid/19200156909#tabs=1 , https://mjl.clarivate.com:/search-results?issn=0019-5464&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2020	121	Mr. M. K. Munde, N. S. Kulkarni	Development and Validation of Novel Analytical Method for Empagliflozin and Metformin Hydrochloride in Bulk and Pharmaceutical Dosage Form by Four Different Simultaneous	Research J. Pharm. and Tech.	0974-360X	RJPT - Development and Validation of Novel Analytical Method for Empagliflozin and Metformin Hydrochloride in Bulk and Pharmaceutical Dosage Form by Four Different Simultaneous Estimation Approaches using UV Spectroscopy (rjptonline.org)	YES (Scopus)	https://www.scopus.com/sourceid/21100197160#tabs=2

			Estimation Approaches using UV Spectroscopy					
2020	122	Mr. O. M. Bagade, Dr.S.N.Dhole	An Influence of Lyophilization on Praziquantel Loaded Nanosponge's by using food protein as a stabilizer with effect of Statistical Optimization.	Research J. Pharm. and Tech.	0974-360X	RJPT - An Influence of Lyophilization on Praziquantel Loaded Nanosponge's by using food protein as a stabilizer with effect of Statistical Optimization (rjptonline.org)	YES (Scopus)	https://www.scopus.com/sourceid/21100197160#tabs=2
2020	123	Mr. O. M. Bagade, Dr.S.N.Dhole	A Corollary of Nanoporous Carrier Drug Delivery System: An Updated Perspective	International Journal of Pharmaceutical Sciences and Nanotechnology	9074-3278	A Corollary of Nanoporous Carrier Drug Delivery System: An Updated Perspective | International Journal of Pharmaceutical Sciences and Nanotechnology(IJPSN) (ijpsnonline.com)	YES (Scopus)	https://www.scopus.com/sourceid/21101050125#tabs=2
2020	124	Ms. S. R. Chintamani	Trends in Nanotechnology for the Treatment of Breast Cancer	Journal of Pharmaceutical Research International	2456-9119	Trends in Nanotechnology for the Treatment of Breast Cancer | Journal of Pharmaceutical Research International (journaljpri.com)	Yes	https://www.webofscience.com/wos/author/record/O-8551-2015
2020	125	Ms. S. R. Chintamani	Preparation Characterization AndEvaluation Of Green Synthesis Nanoparticle Of Hydro Alcoholic Floret Extract Of Brassica Oleracea Var ItalicaPlenck (Broccoli) Using Qbd Approach For Breast Tumor Cells T-47D Treatment	International journal of scientific & technology research	2277-8616		Yes	
2020	126	Ms. S. R. Chintamani	A Review On The Solubility Enhancement Techniques With Their Pros And Cons	Pensee	0031-4773		Yes	
2020	127	Ms. S. R. Chintamani	Role of Exotic Plants in Cancer	Pensee	0031-4773		Yes	
2020	128	Ms. S. S. Jadhav	Curcumin Potentiates Therapeutic Efficacy of Metformin: A Preclinical Study in STZ-NA Induced	Research journal of pharmacy and technology	0974-360X	RJPT - Curcumin Potentiates Therapeutic Efficacy of Metformin: A Preclinical Study in STZ-NA Induced Hyperglycemia in Wistar Rats (rjptonline.org)	Yes	https://www.scopus.com/sourceid/21100197160#tabs=2

			Hyperglycemia in Wistar Rats					
2020	129	Ms. P. B. Kothwade	GPR109A receptor (PM0083972)	PMDB data bank	-			
2020	130	Mrs. B. N. Atre	Disease Modifying Potential Of Wedelolactone Rich Fraction Of Eclipta Alba In Adjuvant Induced Arthritis In Rats By Inhibition Of Proinflammatory Cytokines.	International Journal Of Pharmaceutical Sciences And Research	0975-8232	DISEASE MODIFYING POTENTIAL OF WEDELOLACTONE RICH FRACTION OF ECLIPTA ALBA IN ADJUVANT INDUCED ARTHRITIS IN RATS BY INHIBITION OF PRO-INFLAMMATORY CYTOKINES | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)	Yes	Volume 15 (2024) | INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH (ijpsr.com)
2020	131	Ms. Parande B	Convulsant Plasma as a potential therapy for trating COVID 19 patients	Pharmaceutical Resonance COVID 19 Special issue 2020	2581-6136			
2020	132	KashikarVrushali	A HERBAL CREAM FOR ACNE VULGARIS	Indian Drugs	**0019-462X**	Indian Drugs Journal | Indiandrugsonline | Pharmaceutical Research Publication | IDMA	Yes	https://www.scopus.com/sourceid/22375#tabs=2
2019	133	Dr. V.S. Kashikar	Study of buckwheat (*Fagopyrum esculentum*) seed powder as a tablet binder	Indian Drugs	**0019-462X**	http://www.indiandrugsonline.org/issuesarticle-details?id=OTAx	Yes	https://www.scopus.com/sourceid/22375#tabs=2
2019	134	Ms. V. S. Vichare	Development and validation of UV-visible spectroscopic methods for simultaneous extimation of canagliflozin and metformin in pharmaceutical formulation	Asian Journal of Research in Chemistry	ISSN 0974-4150(Online)	Asian Journal of Research in Chemistry (ajrconline.org)	Yes	
2019	135	Dr. V. S. Kashikar	Development and validation of spectroscopic estimation by area under curve method of eperisone hydrochloride with aceclofenac	World Journal of Pharmacy and Pharmaceutical Sciences	ISSN: 2278-4357	wjpps | ABSTRACT	Yes	
2019	136	Dr. V. S. Kashikar	Development and validation of chromatographic estimation and forced degradation study of eperisone hydrochloride & ibuprofen	World Journal of Pharmacy and Pharmaceutical Sciences	ISSN: 2278-4357	wjpps | ABSTRACT	Yes	

2019	137	Dr. Prof. S. N. Dhole,	Multiparticulate floating drug delivery system of anagliptin: design and optimization for its efficacy in management of metabolic syndrome	International Journal of Applied Pharmaceutics	0975-7058	MULTIPARTICULATE FLOATING DRUG DELIVERY SYSTEM OF ANAGLIPTIN: DESIGN AND OPTIMIZATION FOR ITS EFFICACY IN MANAGEMENT OF METABOLIC SYNDROME | International Journal of Applied Pharmaceutics (innovareacademics.in)	YES (Scopus)	https://www.scopus.com/sourceid/19900192174
2019	138	Dr. Prof. S. N. Dhole,	Lipid-based floating multiparticulate delivery system for bioavailability enhancement of berberine hydrochloride	Journal of Applied Pharmaceutical Science	2231-3354	Lipid-based floating multiparticulate delivery system for bioavailability enhancement of berberine hydrochloride (japsonline.com)	YES (Scopus)	https://www.scopus.com/sourceid/21100236605
2019	139	Dr. Ms. S. D. More	Review on Nano Flare: A Novel Diagnostic Probe	Current Trends in Pharmacy and Pharmaceutical Chemistry	2582-5062		Yes	
2019	140	Dr. Ms. S. D. More, Dr. Ms. M.C. Upadhye	Formulation and Evaluation of Diclofenac Aqua Gel	American Journals of Pharmacy & Health Research	2321-3647	https://ajphr.com/ajphrfiles/uploaddir/AJPHR_707001.pdf , https://ajphr.com/archive/volume-7/july-2019-issue-7	Yes	
2019	141	Ms. V. S. Vichare	Study of intrinsic stability of mometasonefuroate in presence of salicylic acid by HPTLC and characterization, cytotoxicity testing of major degradation product of mometasonefuroate	Current Pharmaceutical Analysis	1875-676X	Study of Intrinsic Stability of Mometasone Furoate in Presence of Salicylic Acid by HPTLC and Characterization, Cytotoxicity Testing of Major Degradation Product of Mometasone Furoate | Bentham Science (eurekaselect.com)	Yes (Web of Science, Scopus)	https://mjl.clarivate.com:/search-results?issn=1573-4129&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal, https://www.scopus.com/sourceid/4700152426
2019	142	Dr. Mr. N.S. Kulkarni, Dr. Prof. S.N. Dhole	A Review on Hydrotropic Solubilization for Poorly Water-Soluble Drugs: Analytical application and Formulation development.	Research Journal of Pharmacy and Technology.	0974-3618	RJPT - A Review on Hydrotropic Solubilization for Poorly Water Soluble Drugs: Analytical Application and Formulation Development (rjptonline.org)	YES (Scopus)	https://www.scopus.com/sourceid/21100197160#tabs=2
2019	143	Dr. Mr. N.S. Kulkarni, Dr. Prof. S.N. Dhole	Characterization of Self-Microemulsifying Dosage Form: Special Emphasis on Zeta Potential Measurement	International Journal of Pharmaceutical & Biological Archives	09763333	Characterization of Self-Microemulsifying Dosage Form: Special Emphasis on Zeta Potential Measurement by Nilesh S. Kulkarni, Nisharani S. Ranpise, Devendra Singh Rathore, Shashikant N. Dhole :: SSRN, Characterization of Self-Microemulsifying Dosage Form: Special Emphasis on Zeta Potential Measurement | International	Yes SSRN	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3787937

						Journal of Pharmaceutical & Biological Archive (ijpba.info)		
2019	144	Dr. Mr. N.S. Kulkarni	Simultaneous Equation and Area Under the Curve Spectrophotometric Methods for 1Estimation of Ranolazine Hydrochloride Presence of its Base-induced Degradation Product: A Comparative Study	International Journal of Pharmaceutical & Biological Archives	09763333	Simultaneous Equation and Area Under the Curve Spectrophotometric Methods for Estimation of Ranolazine Hydrochloride Presence of its Base-induced Degradation Product: A Comparative Study by Dr. Rahul H. Khiste, Aishwarya S, Ambekar, Nilesh S. Kulkarni :: SSRN , Simultaneous Equation and Area Under the Curve Spectrophotometric Methods for Estimation of Ranolazine Hydrochloride Presence of its Base-induced Degradation Product: A Comparative Study | International Journal of Pharmaceutical & Biological Archive (ijpba.info)	Yes SSRN	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3787949
2019	145	Ujjwala Y. Kandekar, Rohini Pujari	Exploration of Mucoadhesive Microparticlesby using Linumusitatissimum Mucilage	Latin American Journal of Pharmacy	2362-3853	http://www.latamjpharm.org/resumenes/38/12/LAJOP_38_12_1_18.pdf	Yes (Web of Science)	https://mjl.clarivate.com:/search-results?issn=0326-2383&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
2019	146	Ms. M.H. Tapkir	Lique Solid Compact Drug Delivery System: A Review	World Journal of Pharmacy and Pharmaceutical Sciences	2278-4357	wjpps | ABSTRACT	Yes	
2019	147	Ms. M.H. Tapkir	Nasal Drug Delivery: A Promising Approach for Brain Targeting	World Journal of Pharmacy and Pharmaceutical Sciences	2278-4357	wjpps | ABSTRACT	Yes	
2018	148	Prof. Dr. S. N. Dhole	Design of telmisartan loaded nanoparticles mu three square factorial design approach	International Journal of Pharmaceutical and Phytopharmacological Research	ISSN 2250-1029 (Print)	Design of Telmisartan Loaded Nanoparticles by Three Square Factorial Design Approach - International Journal of Pharmaceutical and Phytopharmacological Research (eijppr.com)	Yes (Web of Science)	Abstracting & Indexing - International Journal of Pharmaceutical and Phytopharmacological Research (eijppr.com)
2018	149	Dr. V. S. Kashikar	Docking, synthesis, adme prediction and β-lactamase inhibitory activity of some 2-(5-h/ chloro-((piperazin-1-ylmethyl)- 2-oxoindolin-3-ylidene)-n-substituted hydrazinecarbothioamides	Inventi Impact: Med Chem	0976-3821	https://inventi.in/journal/article/5/24281/Inventi%20Impact:%20Med%20Chem/Pharmaceutical	Yes	
2018	150	Ms. V. S. Tambe	Formulation and Evaluation of Sustained release mucoadhesive microspheres	International Journal of Pharmaceutical Chemistry and Analysis		https://www.ijpca.org/article-details/6370	Yes	

			of lornoxicam by using novel isolated polymer of fruit artocarpusheterophyllus					
2018	151	Ms. V. S.Tambe	Development and validation of absorption correction method for simultaneous estimation of paracetamol and nimesulide in bulk and combined tablet dosage form	Asian Journal of Pharmaceutical Analysis	2231-5667 (Print)	https://ajpaonline.com/AbstractView.aspx?PID=2018-8-1-6	Yes	
2018	152	Mr. O. M, Bagade	An investigation into formulation and processing strategies to derive microspheres obtained from ionic gelation technique	Asian Journal of Pharmaceutical Science and Technology	e-ISSN 2248-9185 Print- 2248-9177	http://www.ajpst.com/view_content.php?quat=1&year=2018#	Yes	
2018	153	Dr. S. D. More, Ms. M. C. Upadhye	Comparitive qualification of flavonoid content and antioxidant potential of indigenous medicinal plants	Journal of Pharmacognosy and Phytochemistry	2278-4136	https://www.phytojournal.com/archives/2018.v7.i1.2519/comparative-quantification-of-flavonoid-content-and-antioxidant-potential-of-indigenous-medicinal-plants	Yes	
2018	154	Dr. V.S. Kashikar	Development and validation of spectroscopic method for simultaneous estimation of pitavastatin calcium and metformin hydrochloride combination in bulk	Inventi Rapid: Pharm Analysis & Quality Assurance	0976-3813	https://www.inventi.in/journal/article/136/24911/Inventi%20Rapid:%20Pharm%20Analysis%20/Pharmaceutical	Yes	
2018	155	Mr. H. P. Alhat	Analytical methods development & validation for simultaneous estimation of lopinavir & ritonavir in pharmaceutical formulation by simultaneous equation method using uv spectrophotometry	International research journal of pharmacy	ISSN 2230 –8407	http://www.irjponline.com/admin/php/uploads/3030_pdf.pdf	Yes	

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CRITERIA III

Key Indicator 3.3 - Research Publication and Awards

3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during 2023

Research Publication 2023

PES Modern college of Pharmacy (For Ladies), Moshi, Pune 412105.

RESEARCH PUBLICATION 2023

Year	Sr. No.	Name of Faculty	Title of the Paper	Name of Journal	Year, Vol, Page No, Issue	ISSN No.
2023	1	Shashikant Dhole, Nilesh Kulkarni	Development, Characterization and In Vitro - In Vivo Evaluation of Efinaconazole Loaded Niosomal Nail Lacquer for the Treatment of Onychomycosis	European Chemical Bulletin	2023, 12(04),	2063-5346
2023	2	Dr. Nilesh Kulkarni, Mr. Manojkumar Munde	A Concise Literature Review onNiosome Drug Delivery from Ancient to Recent	Asian Journal of Pharmaceutics	2023	0973-8398
2023	3	Dr. Nilesh Kulkarni, Dr. S N Dhole	Assessment and Outcome on Preparations, Characterization of Topical Targeted Nanosponge Based Drug Delivery: Critical Review	Asian Journal of Pharmaceutical and Clinical Research (AJPCR)	2023	2455-3891
2023	4	Dr. Ms. R. L. Mhetre	Nanonization-Based Solubility Enhancement By Loaded Porous Starch Foam: Nifedipine Tablet Formulation	Journal Of Pharmaceutical Innovation	2023, 18- 60-67.	1872-5120
2023	5	Dr. Mohini Upadhye	Impact of Hazardous Chemical compounds on Reproductive System Reported in Sanitary Products	Research Journal of Pharmacology and Pharmacodynamics	2023, 15 (03), 112-118.	0975-4407
2023	6	Ms. Rekha Bhalerao, Dr. Mohini Upadhye	A Review on Pharmacological Properties of Rubus fructicosus	International Journal of Ayurvedic Medicine	2023, 14 (11), 22-28	0976-5921
2023	7	Hemant Alhat, Manojkumar Munde, Nilesh Kulkarni, VrushaliTambe	Comprehensive review on nanocrystal technology in pharmaceutical formulations	International Journal of Pharmacy and Pharmaceutical Sciences	2023, 15 (4), 1-7	Online ISSN: 0975-1491 Print ISSN: 2656-0097
2023	8	Dr. Manojkumar Munde, Dr. Nilesh Kulkarni	A novel validated stability indicating method for quantification of	Indian Drugs	2023, 60 (6), 66-75.	0019462X

			Empagliflozin in bulk and marketed formulation by HPTLC applying experimental design approach			
2023	9	Dr. Mohini Upadhye	Ayurvedic and Herbal Remedies for Neurological Disorders	International Journal of Creative Research Thoughts	2023, 11 (1), c513-c524	2320-2882
2023	10	Dr. Smita More	A Narrative Review on Drug Loaded Nanosponges as a Carrier for Drug Delivery	International Journal of Pharmaceutical Quality Assurance	2023, 14 (1), 244-249.	0975 9506
2023	11	Dr. Vijaya Vichare, Dr. V S Tambe, Dr. S N Dhole	Identification of Oxidative Degradation Products of Dapsone in Presence of Adapalene by RP-HPLC–MS	Chromatographia	2023, 223-235.	0009-5893
2023	12	Dr.VijayaVichare, Dr. S N Dhole	Molecular Docking Studies of Selected Phytoconstituents from Some Indigenous Medicinal Plants against Different Targets of Severe Acute Respiratory Syndrome Coronavirus 2	Journal of Preventive, Diagnostic and Treatment Strategies in Medicine (JPDTSM)	2023; 2(1):p 24-32.	2949-6594
2023	13	Shashikant Dhole,	Improved UV-Visible Spectrophotometric Analytical Method Development and Validation for Precise, Efficient and Selective Quantification of Atorvastatin Calcium in Bulk Form	International Journal of Pharmaceutical Sciences and Nanotechnology	2023;16(5) :6966-75.	0974-3278
2023	14	Smita D. More,	A Review on Solid Lipid Nanoparticles as Nano Drug Delivery Transporters	Current Nanoscience	20 (5); 2024: 644 - 670 Published on: 24 July, 2023	1875-6786
2023	15	Vijaya Vichare, Shashikant Dhole,	Simultaneous Estimation of Adapalene from Marketed Gel Formulation along with the Preservative	Asian Journal of Pharmaceutical Research	2023; 13(3):206-9	2231-5691

			Phenoxyethanol by UV-Visible Spectroscopy			
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2023	20	Nilesh S. Kulkarni, Shashikant N. Dhole, Rahul S. Shivarkar	Development of Fast-dissolving Oral Dosage Form as Tablet using Binder as Vigna Mungo Mucilage and Oral Film using Solvent Casting Technique: Comparative Study	Asian Journal of Pharmaceutics	Oct-Dec 20: 23 • 17 (4) | 754-762	1998-409X
2023	21	Nilesh S. Kulkarni, Shashikant N. Dhole,	A Comprehensive Review on Novel Lipid-Based Nano Drug Delivery	Advanced Pharmaceutical Bulletin	2024;14(1):34-47. Epub 2023 Oct 14.	2228-5881
2023	22	Nilesh S. Kulkarni	A Review on recent approaches for the use of different Analytical Techniques to Analyze some Calcium Channel Blockers and their Combinations with otherAntihypertensive Drugs	Current Indian Science	2023; 1(1): 1-28	2210-3007

DEVELOPMENT, CHARACTERIZATION AND IN VITRO - IN VIVO EVALUATION OF EFINACONAZOLE LOADED NIOSOMAL NAIL LACQUER FOR THE TREATMENT OF ONYCHOMYCOSIS

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Running title: Efinaconazole Loaded Niosomal Nail Lacquer

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Abstract:

Objectives: The goals of the study were to develop, describe, and test the efinaconazole-loaded niosomes in Nail Lacquer so that they could be used to treat onychomycosis.

Methods: Using different ratios of non-ionic surfactants (Span 60 and Pluronic L121) and cholesterol, Efinaconazole niosomes were made using the probing sonication method. This was done to try to improve the poor penetration of topical medications into the skin and reduce the negative side effects that come with them. The niosomes that were made were tested for their size, how well they trapped drugs, and how well they released drugs in a test tube. The results showed that niosomes made with a ratio of 1:2 (Span 60: cholesterol) had smaller particle sizes and a high Entrapment Efficiency. Niosomal nail polish was made by using different polymers in a good way. The modified formulation was tested for stability, resistance to water, drug content, drug release in a test tube, antifungal effectiveness, and the ability to flow.

Results:Niosomes that had been loaded with efinaconazole were round and ranged in size from 95 to 135 nm. In vitro, the amount of drug that was released in 24 hours ranged from 25% to 86%, while the amount of drug that was trapped ranged from 40% to 90%. When efinaconazole niosomes were mixed with Span 60 and CHO in a ratio of 1:2, the results were promising and were used to make nail polish. Compared to the other formulations, the efinaconazole-loaded niosomal nail polish showed the best drug release (91.34 ±1.34), antifungal effectiveness, and smoothness. Most drugs that don't work well when taken by mouth can be put on the nails with nail polish. This method will make it easier for the medicine to get into the body through the nail. So, the created ENNL could be used as a system for putting drugs on the skin to treat onychomycosis.

Keywords: Efinaconazole, Niosomes, Nail Lacquer, Onychomycosis

PUBLICATION20230001

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REVIEW ARTICLE

A Concise Literature Review on Niosome Drug Delivery from Ancient to Recent

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Abstract

About 50% of medications/drugs have obstacle of poor solubility, poor oral bioavailability, due to enzymatic/gastric degradation in the gastrointestinal tract pH, high pre-systemic intestinal and hepatic metabolism, permeability, small absorption window, and short residence duration at the absorption location. Niosomal drug deliveries have specific advantages over conventional dosage form with respect to improvement in bioavailability. Niosomes are colloidal particles created when non-ionic surfactants self-assemble in an aqueous solution to form closed bilayer structures. The various methods are reported until today for the preparation of niosomes; ether injection method, thin film hydration method, sonication method, microfluidization, multiple membrane extrusion method, reverse-phase evaporation technique, transmembrane Ph. Gradient drug uptake process (remote loading), the bubble method, freeze-thaw method, emulsion method, and formation of niosomes from proniosome. The current review article focused on the preparation and evaluation of niosome drug delivery and its advantages over conventional drug delivery. The niosomal drug delivery was found to be best for solubility and bioavailability enhancement of poorly water-soluble drugs.

Key words: Non-ionic surfactant, particle size, thin film hydration

INTRODUCTION

Oral route of administration is accepted to be the most convenient route for development of oral drug delivery system.[1] About 50% of medications/drugs have obstacle of poor solubility, poor oral bioavailability, due to enzymatic/gastric degradation in the gastrointestinal (GI) tract pH, high pre-systemic intestinal and hepatic metabolism, permeability, small absorption window, and short residence duration at the absorption location.[2] A variety of approaches can be used to modify the solubilization of drug and its bioavailability. Varied methods often used include micronation, chemical modification, pH adjustment, solid dispersion, complexation, cosolvency, micellar solubilization, and hydrotrophy.[3] The vesicles can operate as drug reservoirs and shield the drug from acidic and enzymatic degradation in the gastrointestinal tract. Niosomal drug deliveries have specific advantages over conventional dosage form with respect to improvement in bioavailability.[4] Niosomes are colloidal particles created when non-ionic surfactants self-assemble in an aqueous solution to form closed bilayer structures.[5]

FORMULATION COMPOSITION OF NIOSOMES[6,7]

Due to their lower irritant potential, non-ionic surfactants are preferred over cationic, anionic, and ampholytic.[6] Niosomes have a bilayer structure that is comparable to that of a liposome; however, they have more advantages over liposomes. Niosomes are tiny with size ranging from 10 nm to 100 nm. Niosomes contain both hydrophilic and lipophilic components, that is, amphiphilic nature. Niosomes have

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Received: 13-01-2023
Revised: 20-03-2023
Accepted: 30-03-2023

PUBLICATION20230002

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ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 16, Issue 5, 2023

Online - 2455-3891
Print - 0974-2441

Review Article

ASSESSMENT AND OUTCOME ON PREPARATIONS, CHARACTERIZATION OF TOPICAL TARGETED NANOSPONGE BASED DRUG DELIVERY: CRITICAL REVIEW

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Received: 14 December 2022, Revised and Accepted: 10 February 2023

ABSTRACT

The pharmaceutical Industry, and most of the drugs which come from synthetic chemistry possess poor water solubility and approximately 70% of drugs fall under such category. To improve solubility, drug absorption and bioavailability are a critical lookout for the formulation scientist. The current research activity for the development of dosage forms is concentrated on the development of particulate carrier systems such as microspheres and liposomes. Nanosponge is being prioritized to control the delivery of drug/APIs/phytoconstituents to particular the skin targetting. The drug delivery to skin can be prevented through the development of nanosponge. Topical nanosponge preparation can be delivered in the form of local anesthetics, anti-fungal, anti-acne, anti-wrinkle, etc. drugs. The present study highlights the developmental stages for the topical targeted nanosponge drug delivery. The review covers a different method of preparation, and evaluation of topical nanosponge drug delivery systems.

Keywords: Topical targeted, Nanosponge, Particulate drug delivery.

 DOI: http://dx.doi.org/10.22159/ajpcr.2023v16i5.46809. Journal homepage: https://innovareacademics.in/journals/index.php/ajpcr

INTRODUCTION

The pharmaceutical industry, most of the drugs which come through synthetic chemistry possess poor water solubility, and approximately 70% of drugs fall under such category [1]. Improving solubility, drug absorption, and bioavailability is a task for the formulation scientist.

To overcome solubility, absorption and bioavailability issues topical route is preferred, and novel formulations such as nanosponge have been found beneficial. It is made up of microscopic particles having a few nanometers wide cavities in which drug substances can be encapsulated [2] and possess carrying capacity for hydrophilic and lipophilic drug molecules [3].

Conventional topical drug delivery systems such as gel, cream, and ointments are found to be less effective for permeation through the skin. Due to their low effectiveness and unpredictable drug release, traditional topical methods such as ointments and creams are associated with unpleasant side effects such as burning, contact dermatitis, and stinging sensations. The development of particulate carrier systems such as microspheres and liposomes is being prioritized to control the delivery of medications to particular skin regions. These systems are expected to regulate drug input rate, reduce drug absorption into the systemic circulation, and minimize undesirable effect. Several studies have demonstrated that nanoparticle carriers can replace liposomal carriers to provide better cutaneous distribution. Nanosponges an excellent choice for the producing of topical medicines because of their enhanced cosmetic qualities, improved safety, and product stability. Nanosponges can safely contain a variety of topical medications for controlled release [4]. The skin makes up 15% of the adult body weight, making the biggest organ in the body. Skin is composed of three layers, that is, The Epidermis, Dermis, and subcutaneous layers. The outermost layer the epidermis a stratified, squamous epithelium layer composed of keratinocytes and dendritic cells called keratinocytes. It showed the function to synthesizing keratin. Epidermis also contains other cell populations such as melanocytes, Langerhans cells, and Merkel cells.

Collagen, a fibrillar structural protein, makes the middle layer of the skin that is Dermis. The Dermis is fibrous, filamentous, and amorphous connective tissue. The panniculus is a subcutaneous tissue that include tiny lobes of fat cells known as lipocytes, are placed on top of the dermis. Subceutaneous tissue is the innermost layer of the skin. The fat cells begin to develop in the subcutaneous tissue. These fat cell lobules, also known as lipocytes, are divided by fibrous septa comprised of collagen and large blood arteries. The hormones leptin is produced by lipocytes that, regulates body weight by way of the hypothalamus. From that skin structure, the nanosponge can pass into body [5].

Nanosponges can hold drug molecules and deliver them to specific sites or organs in a controlled release manner. Topical nanosponge preparation can be provided in the form of local anesthetics, anti-fungal, anti-acne, and anti-wrinkle types for dosage form [6]. The methods for preparing the Melt method, ultra sound assisted method, and cross-linking method [7]. Topical nanosponge formulation can be formulated for drugs/APIs such as cyclosporin B, Indomethacin, and fenofibrate. Most drugs for the formulation of nanosponge belong to the biopharmac classification system (BCS) Class II drugs and the drugs which possess extensive first-pass metabolism [8]. The nanosponge has the advantage of improved skin penetration of drugs. Nanosponges forming 3-dimensional networks or scaffolds developed using a suitable polymer [9]. These polymers can degrade naturally and are mixed with a cross-linker in a solution to form nanosponge [10].

Objectives of Nanosponge dosage form development include:

1. To enhance the solubility of poorly soluble drugs.
2. To increase the bioavailability of the drugs.
3. To increase, prolong, and control release of a drug.

Advantages

1. Nanosponge acts like a self-sterilizer.
2. Nanosponges increase solubility of lipophilic drugs. e.g., Celecoxib [1]
3. They help to reduce side effects.
4. Nanosponges help to remove toxic substances from the body.
5. Nanosponges increase the bioavailability of the drug. e.g., Erlotinib hydrochloride [11].
6. It reduces dosing frequency.
7. Nanosponges protects the molecule from degrading. e.g., Doxorubicin [12].
8. Nanosponges release drugs in a controlled manner.
9. These are free-flowing substances.

PUBLICATION20230003

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- Original Article
- Published: 17 February 2022

Nanonization-Based Solubility Enhancement by Loaded Porous Starch Foam: Nifedipine Tablet Formulation

- Pratibha Milind Chaudhari,
- Paul Johnson,
- Raksha Laxman Mhetre &
- Antoine Al-Achi

Journal of Pharmaceutical Innovation (2022)Cite this article

Abstract

Background

Nifedipine (NIF) is a 1,4-dihydropyridine, calcium channel blocker, widely used in the treatment of cardiovascular diseases. NIF is poorly soluble in water at room temperature. Biodegradable porous starch foam (BPSF) has great potential as a solid dispersion carrier and can improve the solubility of poorly water-soluble drugs like NIF.

Objective

To formulate and evaluate tablet formulation of nifedipine-loaded biodegradable porous starch foam to improve the solubility of the drug.

Methods

The physical properties and the dissolution profile of NIF/BPSF mixtures and tablets were investigated. The BPSF was prepared by using a solvent exchange method, and NIF was loaded using an immersion/solvent evaporation method. The samples were characterized using differential scanning calorimetry (DSC), Fourier transform infrared spectroscopy (FTIR), powder X-ray diffraction (PXRD), and optical microscopy.

Results

PUBLICATION20230004

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PUBLICATION20230005

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Published online in http://ijam.co.in ISSN No: 0976-5921

International Journal of Ayurvedic Medicine, Vol 14 (1), 2023; 22-28

A Review on pharmacological properties of *Rubus fructicosus*

Review Article

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Abstract

Medicinal plants are an excellent source of physiologically active phytochemicals with long-recognized medicinal properties. *Rubus fruticosus* also known as blackberry plant. The parts are employed for their therapeutic benefits. The purpose of this study was to review the pharmacological characteristics of *R.fruticosus* and its associated phytochemicals. Its extractions have a significant impact on the phytochemical and pharmacological activities. In this review, the most useful phytochemicals include flavonoids, anthocyanins, tannins and phenolic compounds, which are acquired from the plant's components. The various pharmacological actions of plants are mostly caused by phytoconstituents produced in plant tissues. It has demonstrated antibacterial, antioxidant, anti-inflammatory, antiwrinkle, anxiolytic, SPF and other actions that may be helpful in the creation of future pharmaceutical products.

Key Words: *R.fructicosus,* Blackberry, Anti-inflammatory, Anticancer, Antioxidant, Antimicrobial.

Introduction

Rubus fructicosus commonly known as blackberry belonging to family *Rosaceae.* It contains roughly 700 species. It's widely known for its fruit which has medicinal, nutritional and beauty purpose. In English is generally called, covert or European blackberry or scald head or shrubby blackberry or Wild blackberry. In India, particularly in Hindi, it's known as Vilaayati Anchhu or kaalaa jaamun. It's known as Tût shawkî or' Ullayq in Arabic(1). Blackberry leaves have been traditionally used as an antimicrobial agent and for their healthy antioxidant effect. In Europe it used for treating diabetes. An extract of the leaves showed a hypoglycemic effect on diabetic rats, Juice, fruits is effective in condition of anemia. Leaves and roots of the plant are long- standing home remedy for anaemia, regulates menstruation, diarrhoea, and dysentery(5).The blackberry gave triterpene erosive and rubitic erosive described as 7 alpha - hydroxyursolic erosive. Blackberries are outstanding for their high nutritional substance of salutary fibre, nutrient C, nutrient K, and mineral manganese. The root contains saponins and tannins. Fruits are assembled for jam, bathos, wine, and alcohol (7). *Rubus fruticosus*; fruits, leaves, stems, and roots shows essential medical applications. *Rubus fruticosus* are well known for its antidiarrheal, antioxidant, anti-inflammatory, anticancer and other properties. Phenolic compounds are the major active component present in large number. The aroma compounds were identified as 2-heptanol, p-cymen-8-ol, 2-heptanone, 1-hexanol, α-terpineol, pulegone,1-octanol, isoborneol, myrtenol, 4-terpineol, carvone, elemicine, and nonanal in thornless evergreen blackberry(6). Cyanidin-3-glucoside, a natural product present in blackberries, possesses chemo-preventative and chemotherapeutic conditioning in experimental models(8). Ripened fruit when taken in combination with leaves of Achyranthes aspera is used in treating eye diseases(9). The ideal of this review is to explore the recent activities on anticancer, antidiarrheal, antioxidant, anti-inflammatory eventuality of *R.fruticosus* and identify its active fragments from which implicit the activity.

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Aim

Encourage research on *Rubus fructicosus* for its potential to treat a range of illnesses.

Objective

To enable research on *Rubus fructicosus* for its potential medical benefits.

Table no.1 Classification for Kingdom *Plantae* Down to Species *Rubus fruticosus* L. (10)

Rank	Scientific name and common
Kingdom	Plantae – Plants
Sub-kingdom	Tracheobionta – Vascular plants
Super division	Spermatophyta - Seed plants
Division	Magnoliophyta - Flowering plants
Class	Magnoliopsida - Dicotyledons
Subclass	Rosidae
Order	Rosales

PUBLICATION20230006

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International Journal of Pharmacy and Pharmaceutical Sciences

Print ISSN: 2656-0097 | Online ISSN: 0975-1491 Vol 15, Issue 4, 2023

Review Article

COMPREHENSIVE REVIEW ON NANOCRYSTAL TECHNOLOGY IN PHARMACEUTICAL FORMULATIONS

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Received: 07 Dec 2022, Revised and Accepted: 03 Mar 2023

ABSTRACT

Many techniques have been developed to overcome the bioavailability problem of poorly soluble drugs. The nanonization is one of the techniques in that micronized particle is converted in nanoparticle. Several processes are applied for nanocrystal production, including precipitation, milling, high pressure homogenization and combination method. The nanocrystal formulation is administered via various routes like oral, intravenous, intramuscular, pulmonary, ocular and dermal but due to safety, patient compliance and ease of administration, oral drug delivery is preferred. There are two basic ways to prepare drug nanocrystals like "bottom-up" and "top-down" technologies. The present literature provides an overview of the achievement in improving the bioavailability of the poorly soluble drug by using different methods.

Keywords: Nanocrystal, Bottom-up, Top-down, Poor solubility, Bioavailability

DOI: https://dx.doi.org/10.22159/ijpps.2023v15i4.47317. Journal homepage: https://innovareacademics.in/journals/index.php/ijpps.

INTRODUCTION

About 60 % of new drugs are poorly water-soluble and it is believed that approximately 40% of drugs under development currently have solubility issues. The drug's low solubility is a major hurdle that must be overcome in order to create extremely potent pharmaceutical formulations. Low solubility medications have poor oral bioavailability and variable absorption, which is especially important for pharmaceuticals of biopharmaceutical class 2 (BCS) [1].

In oral administration, the drug must be present at the site of absorption in the dissolved state to achieve its pharmacological activity. The poor oral bioavailability of drugs caused by their poor aqueous solubility has always been a difficult issue in pharmaceutical research. To increase a drug's solubility in water, a variety of strategies have been explored including salt formation, co-solvents, complexes with cyclodextrins and solid-state changes. A promising method to increase the apparent saturation solubility, dissolving rate and oral bioavailability of hydrophobic medicines like BCS Class II sometimes also with BCS Class IV pharmaceuticals. Drug nanocrystals are carrier-free submicron colloidal drug delivery systems with a mean particle size in the nanometre range, typically between 10 and 1000 nm, made up of pure medicines and the bare minimum of surface-active agents needed for stability [2].

A logical progression is "nanonization," or the reduction of micronized particles to nanoparticles. Many different nanonization techniques have been developed to improve the bioavailability and solubility rates of numerous drugs that are poorly soluble in water. These techniques include boosting surface area, altering crystalline morphologies and creating brand-new nanomaterials that can serve as controlled release carriers.

Surface stabilised crystalline nanoparticles with sizes ranging from 200 to 500 nm are known as drug nanocrystals. They improve the oral bioavailability of drugs with dissolution rate-dependent bioavailability by increasing the saturation solubility, dissolution rate and possibly mucoadhesion [3].

Drug nanocrystals are a versatile formulation approach that can be used to improve the pharmacokinetic and pharmacodynamic properties of poorly soluble drugs. NCs (nanocrystals) stand out not only among pharmaceuticals but also among other nanoparticles due to their ease of formulation and production scaling flexibility, as well as their inherent small particle size and large surface area [4, 5].

The production of nanocrystals is just one method of modifying the intrinsic properties of the raw material: when particle size is reduced to nanosized area, intrinsic properties such as solubility are altered in comparison to bulk-sized drug powders. The overall advantages of small particle size can be divided into three categories: (I) fast dissolution (ii) increased solubility and (iii) improved membrane adhesion. The most important effect achieved with drug nanocrystals is a faster dissolution rate due to the large surface area per mass solid. However, the role of stabilisers and their careful selection should not be ignored. The primary function of stabiliser is to protect inherently unstable drug nanoparticles from aggregation and/or Ostwald ripening following the production and storage of nanocrystalline formulations. However, many of the stabilisers used can help to maintain the supersaturated state *in vivo* reached after fast dissolution of nanocrystals or they can act as permeation enhancers [6].

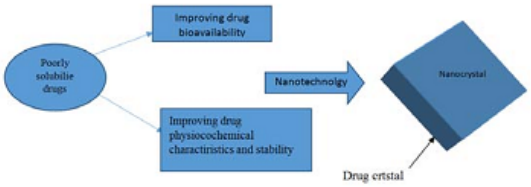

Fig. 1: Nanocrystal with surface modification

PUBLICATION20230007

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A NOVEL VALIDATED STABILITY INDICATING METHOD FOR QUANTIFICATION OF EMPAGLIFLOZIN IN BULK AND MARKETED FORMULATION BY HPTLC APPLYING EXPERIMENTAL DESIGN APPROACH

Manojkumar K. Munde[a,b]*, Nilesh S. Kulkarni[b], Ashim K. Sen[a] and Dhanya B. Sen[a]

(Received 12 June 2021) (Accepted 12 April 2023)

ABSTRACT

For the purpose of analyzing empagliflozin, a stability indicating high performance thin layer chromatographic method was developed. This method was optimized using design of experiment. In order to optimize the process, independent variables such as the proportion of isopropyl alcohol in the mobile phase, the duration of time that the chamber was saturated and the distance of mobile phase travelled were considered. On an aluminum plate that had previously been coated with silica gel, development was carried out with the assistance of twin trough glass chambers in ascending lines. The findings from these studies led to the selection of a mobile phase that had a composition of ammonium acetate (2 %), triethylamine and isopropyl alcohol in the ratio of 4:1:5 (V/V/V), and this mobile phase was utilized in the process of method development using central composite design approach. The saturation time was established at 10 minutes, and the ultraviolet detection was performed at a wavelength of 237 nm. The value 0.82 was discovered to be the retention factor (R_f) for empagliflozin. The method was linear, precise and accurate over the entire concentration range examined (100-600 ng band^{-1}), along with correlation coefficient value of 0.992. The proposed method is quick and selective, and a straightforward method of sample preparation and analysis for empagliflozin in its bulk and commercially available dosage forms. The stability of the drug was tested under a variety of different stress conditions in accordance with ICH guidelines, and the results obtained from the force degradations indicate that the developed method is appropriate for stability studies.

Keywords: Empagliflozin, method development, validation, DoE, HPTLC, Forced degradation study

INTRODUCTION

Empagliflozin (EN) is a drug that is used to treat type 2 diabetes and is an inhibitor of the sodium glucose cotransporter-2 (SGLT-2). SGLT-2 inhibitors, also known as gliflozins, are recently developed anti-hyperglycemic medications. EN reduces blood sugar levels by preventing the kidneys from reabsorbing glucose. EN (Fig. 1) is 1-chloro-4-(glucopyranos-1-yl)-2-(4-(tetrahydrofuran-3-yloxy) benzyl) benzene, according to its chemical structure[1,2]. The review of literature for EN with its analytical method should include the following procedures for pharmaceutical dosage form, either alone or in combination with metformin hydrochloride/linagliptin. Thorough review of the literature revealed numerous high performance liquid chromatography (HPLC)[3–17], high performance thin layer chromatography (HPTLC)[18–19] and spectrophotometry[20–23] methods for the analysis of EN. A high performance thin layer chromatography (HPTLC) method has been developed for estimating EN in formulations using the central composite design (CCD) approach. The method that has been suggested will prove useful for the quantification of EN in bulk as well as for marketed dosage form. Using a CCD strategy, the proposed work aimed to develop a high performance thin layer chromatography (HPTLC) analytical method that could indicate stability.

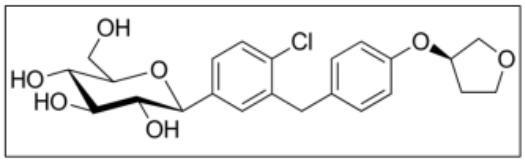

Fig. 1: Chemical structure of empagliflozin (EN)

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https://doi.org/10.53879/id.60.06.13038

PUBLICATION20230008

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www.ijcrt.org © 2023 IJCRT | Volume 11, Issue 1 January 2023 | ISSN: 2320-2882

IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Ayurvedic and Herbal Remedies for Neurological Disorders

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Abstract: Synthetic remedies for human brain disorders are premium characteristic long treatments, sometimes showing serious and necessary side effects with poor patient compliance. Therefore, the herbal and Ayurvedic treatments are preferred over synthetic remedies for a range of human brain disorders including, Alzheimer's disease, depression, anxiety, etc.

Ayurvedic system of medicine has traditionally been used in several neurological conditions. The accessibility, negligible prevalence of side effects and cost effectiveness of plant products offer considerable advantages. These days major attention is drawn towards the established traditional systems of herbal remedies for multiple brain disorders, generating positive hopes for the patients.

Ayurveda the ancient holistic knowledge of India is treating neurological conditions since its inception. Neurological problem in Ayurveda described substantially in the context of Vatavyadhi.

Ayurvedic treatments for neurological disorders will aim to rectify this Vata imbalance and bring the Vata dosha in balance with Pitta and Kapha dosha so as to exclude the complaint.

Recent advancement of Ayurvedic Clinical Research shows that so numerous incurable neurological problems can be successfully treated by Ayurvedic drugs and Panchakarma therapies.

Keywords: Alzheimer's, Depression, Anxiety, Insomnia, Migraine.

Objective: This review will indicate the quality of the documentation advocating the clinical effects of a number of generally used types of herbal medicines for neurological disorders.

Method: We conducted a review of literature to understand the biochemical and evidential bases for the usage of herbs in neurological disorders as follows: 1) Alzheimer's

2) Depression 3) Anxiety 4) Insomnia 5) Migraine.

Introduction:

Herbal drugs include a range of pharmacologically active components: in some cases, it is not well understood which ingredients are important for a remedial effect. The supporters of herbal drugs believe that isolated ingredients in the majority of cases have delicate clinical effects than whole plant extract, a claim that would obviously bear evidence in each case.

PUBLICATION20230009

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REVIEW ARTICLE

A Narrative Review on Drug Loaded Nanosponges as a Carrier for Drug Delivery

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Received: 06th January, 2023; Revised: 15th February, 2023; Accepted: 07th February, 2023; Available Online: 25th March, 2023

ABSTRACT

Long-term attempts to create efficient, targeted medication delivery systems have been delayed by the complexity of the chemical interactions required to build drug delivery systems. Colloidal nanosponges may be adapted to operate with hydrophilic or hydrophobic medicines. This implies that issues with medicine toxicity, reduced bioavailability, and widespread drug release might all be addressed. A nanosponge is a microscopic sponge that can navigate its way to the required location within a living organism. The drug is gently released as the patch clings to the skin of the afflicted region. The nanosponge's porous construction allows it to trap drug molecules and release them gradually. Perhaps the most exciting development in the pharmaceutical industry is the nanosponge drug delivery device (NSDDS). This review aims to give readers an in-depth look at how nanosponges are made, evaluated, and put to use in the medical field.

Keywords: Controlled release, Crosslinking, Nanosponges, Cyclodextrins.

International Journal of Pharmaceutical Quality Assurance (2023); DOI: 10.25258/ijpqa.14.1.42

How to cite this article: Salunkhe A, More S, Dhole S. A Narrative Review on Drug Loaded Nanosponges as a Carrier for Drug Delivery. International Journal of Pharmaceutical Quality Assurance. 2023;14(1):244-249.

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

Some have even said that nanotechnology is more revolutionary than the Industrial Revolution itself. In addition to nanoparticles, nanocapsules, nanospheres, nanosuspensions, nanocrystal, and nano-erythosomes have all been created thanks to nanotechnology. Nanoscale fabrication and modification techniques enable nanotechnology to produce unique materials and devices. At this time, nanomaterials are the subject of intensive study. In 1959, Caltech physicist Richard P. Feynman provided an informed opinion on the topic of nanomaterials. He argued that the key to the future of nanotechnology was to start small and work up from the nanoscale. Any substance with at least one dimension between 1 and 100 nm is considered a nanomaterial. Biocompatible materials, functionalized textiles, UV-protective coatings, and agents that speed up the killing of germs, carry medicines, transfer DNA, and immobilize enzymes are just some of the many products that make use of nanoparticles.[1]

For quite some time, the administration method of desired medications has been the focus of such efforts. Like other modern medicines, nanosponges may be injected or taken orally in the 21st century. Nanosponges were originally developed for topical (skin) medication administration (IV). A nanosponge, a contemporary material, consists of very small particles that are closely packed together. Many items can be stuffed into these little spaces. The microscopic particles may carry both hydrophilic and lipophilic drugs. Drugs and other chemicals that don't dissolve easily in water are stabilized in this manner. The nanosponges are likely to decompose in live organisms since they are constructed from a polyester network or a three-dimensional scaffold. These polyesters and a cross-linker are combined in a liquid form to create Nanosponges. Polyester is biodegradable. Therefore, it disintegrates when ingested. Toxic drug molecules are released when the framework of the nanosponges breaks down.[2]

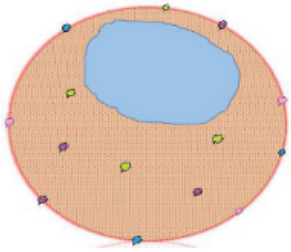

Figure 1: Nanosponges with a cavity for drug loading, structurally.

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PUBLICATION20220010

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Chromatographia
https://doi.org/10.1007/s10337-023-04234-7

ORIGINAL

Identification of Oxidative Degradation Products of Dapsone in Presence of Adapalene by RP-HPLC–MS

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Received: 10 November 2022 / Revised: 16 December 2022 / Accepted: 8 January 2023

Abstract
A simple stability indicating RP-HPLC method for the analysis of Adapalene and Dapsone in pharmaceutical gel formulation was developed and validated. A gradient elution was performed on an analytical column Phenomenex Kinetex C8 (150×4.6 mm, 5 micron) kept at 30 °C. Chosen mobile phase for the analysis was acetonitrile: water at the pH (2.5) adjusted by orthophosphoric acid. The detection wavelength was selected as 237 nm. The linear relation for Dapsone and Adapalene was found in the range of 50–150 µg/mL and 1–3 µg/mL, respectively. The detection limit values for Dapsone and Adapalene were found to be 2.19 µg/mL and 0.10 µg/mL, respectively. While, the quantitation limit values were 6.64 µg/mL and 0.30 µg/mL, respectively, for Dapsone and Adapalene. For the precision studies % RSD values were found to be less than 2. The specificity of the method was verified by subjecting both the drugs to acid, alkali, oxidative, thermal degradation and photo stability studies. The developed method was validated by reaching satisfactory results for linearity, specificity, precision, accuracy, robustness and system suitability. The forced degradation studies concluded that, Dapsone was liable to degradation under all tested conditions except dry heat, whereas Adapalene was liable to degradation under all tested conditions except oxidation. Two well-resolved degradation products were generated by the oxidative degradation of Dapsone. Both the degradation products were isolated by preparative TLC and characterized by LC–MS. From the MS data probable structures of degradation products were proposed. From the above study it was suggested that Dapsone should be protected from oxidation during storage.

Keywords Dapsone · Adapalene · Method development · Degradation product · Stability studies

Introduction

Dapsone (Di-4,4′-aminophenylsulfone) (Fig. 1) exhibits antibacterial activity against a variety of microorganisms, including *Mycobacterium leprae*, *Mycobacterium tuberculosis*, streptococci, pneumococci and has been widely used to treat leprosy and dermatitis herpetiformis. Dapsone has been recommended in the treatment of acne vulgaris [1]. Topical and oral formulations of Dapsone are commercially available. Topical formulation of Dapsone is available in the form of a 5% gel with brand name Aczone. Oral formulation of Dapsone is used less frequently than other sulfa medication antibiotics, many of which have side effects [2]. Dapsone shows adverse effects, such as mild haematolytic anaemia, gastric intolerance, nausea, vomiting, headache, paresthesia, mental symptoms and fever [3, 4]. Dapsone inhibits dihydrofollic acid synthesis by competing for the active site of dihydropteroate synthetase with para-aminobenzoate. Although the exact mechanism through which dapsone exerts its anti-inflammatory activity has yet to be fully elucidated, this agent interferes with the activation and oxidative damage of myeloperoxidase in neutrophils and inhibits the integrin-mediated adherence and chemotaxis of neutrophils [1]. Dapsone in combination with clofazimine is used in the treatment of leprosy [2, 5]. Dapsone by mouth was one of the first medications used to treat moderate to severe acne vulgaris. Dapsone is used in combination with pyrimethamine in the treatment of malaria. It is an official drug in IP [6], BP [7] and USP [8].

Adapalene is a topical third generation retinoid that is used to treat mild to moderate acne [9]. It helps so well in

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Published online: 06 February 2023

PUBLICATION20220011

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Original Article

Access this article online
Quick Response Code:
Website: www.jpdtsm.com
DOI: 10.4103/jpdtsm.jpdtsm_103_22

Molecular Docking Studies of Selected Phytoconstituents from Some Indigenous Medicinal Plants against Different Targets of Severe Acute Respiratory Syndrome Coronavirus 2

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Submitted: 01-Dec-2022
Revised: 20-Jan-2023
Accepted: 04-Feb-2023
Published: 13-Mar-2023

Abstract

BACKGROUND: COVID-19 is a transmissible disease and propagated through a new strain severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) since December 2019 emerged from Wuhan, China, and this infection has widespread globally that causes to declare public health emergency in the whole world by the WHO. In this article, an attempt was made to recognize natural phytoconstituents from various indigenous medicinal plants, in order to utilize as a source against COVID-19 infections by virtue of molecular docking. The main focus of the study was molecular docking analysis of forty phytoconstituents from plants such as *Tinospora cordifolia, Zingiber officinale, Azadirachta indica, Withania somnifera, Glycyrrhiza glabra,* and *Ocimum tenuiflorum* with four different targets of SARS-CoV-2.

AIM AND OBJECTIVE: The aim of the study is to determine binding affinity of phytoconstitutents against different targets of SARS CoV2.

MATERIALS AND METHODS: Molecular docking was performed using VLifeMDS® (version: 4.6. 08032021) and AutoDockTools.

RESULTS: Among forty phytoconstituents based on binding affinity, berberine and vicenin 2 showed the highest potential toward 3-chymotrypsin-like protease enzyme of SARS-CoV-2. Licorice and tinosporide had the potential to bind with the angiotensin-converting enzyme-2 of SARS-CoV-2. Rosmarinic acid also has a binding affinity toward papain-like protease (PLpro) enzyme of SARS-CoV-2. It has been also seen that isoorientin has ability to bind to RNA-dependent RNA polymerase of SARS-CoV-2.

CONCLUSION: Based on docking scores, the phytoconstituents from *T. cordifolia, Z. officinale, A. Indica, W. somnifera, G. glabra,* and *O. tenuiflorum* showed a good potential for binding to selected targets of SARS-CoV-2, and the antiviral activity of these plants can be scientifically supported by docking studies.

Keywords:
COVID-19, molecular docking, phytoconstituents, severe acute respiratory syndrome coronavirus 2

Introduction

The new public health pandemic COVID-19 is threatening to the world with the outbreak of novel coronavirus resulting in more than 4.5 million deaths worldwide.[1] It has been declared as a public health emergency by the WHO.[2] In December 2019, a new virus has been

How to cite this article: Vichare VS, Sutar SH, Rokade MP, Dhole SN, Choudhari VP. Molecular docking studies of selected phytoconstituents from some indigenous medicinal plants against different targets of severe acute respiratory syndrome coronavirus 2. J Prev Diagn Treat Strategies Med 2023;2:24-32.

PUBLICATION20220012

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Improved UV-Visible Spectrophotometric Analytical Method Development and Validation for Precise, Efficient and Selective Quantification of Atorvastatin Calcium in Bulk Form

DOI: https://doi.org/10.37285/ijpsn.2023.16.5

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ABSTRACT

Introduction: The quantification of atorvastatin calcium in bulk form has been created using an Ultra Violet (UV) Spectrophotometric technique.

Objective: In the present study, a novel UV-spectroscopic method for calcium quantification of atorvastatin in bulk form was developed and validated.

Method: Various ratios of methanol and distilled water were investigated during the development of the analytical procedure; nevertheless it was found that the drug/actives was soluble in methanol: water (50:50). Scanning in the 200-400 nm range revealed that the detection wavelength (max) with 10 µg/ml was 246 nm.

Published 2023-09-15

How to Cite
Bagade OM, Doke P, Dhole SN, Chaudhari PD. Improved UV-Visible Spectrophotometric Analytical Method Development and Validation for Precise, Efficient and Selective Quantification of Atorvastatin Calcium in Bulk Form. Scopus Indexed [Internet]. 2023 Sep. 15 [cited 2024 Apr. 17];16(5):6966-75. Available from: https://www.ijpsnonline.com/index.php/ijpsn/article/view/2410

PUBLICATION20220013

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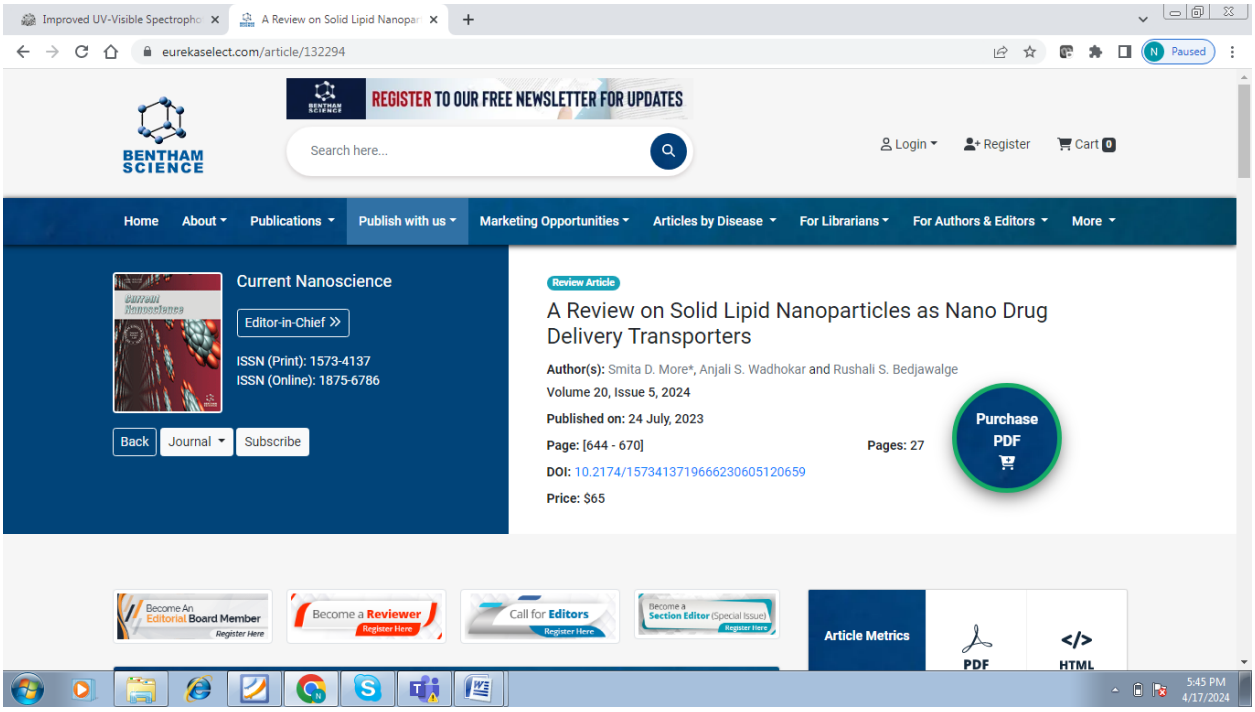

Current Nanoscience
Editor-in-Chief
ISSN (Print): 1573-4137
ISSN (Online): 1875-6786

Review Article

A Review on Solid Lipid Nanoparticles as Nano Drug Delivery Transporters

Author(s): Smita D. More*, Anjali S. Wadhokar and Rushali S. Bedjawalge
Volume 20, Issue 5, 2024
Published on: 24 July, 2023
Page: [644 - 670]
Pages: 27
DOI: 10.2174/1573413719666230605120659
Price: $65

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PUBLICATION20220014

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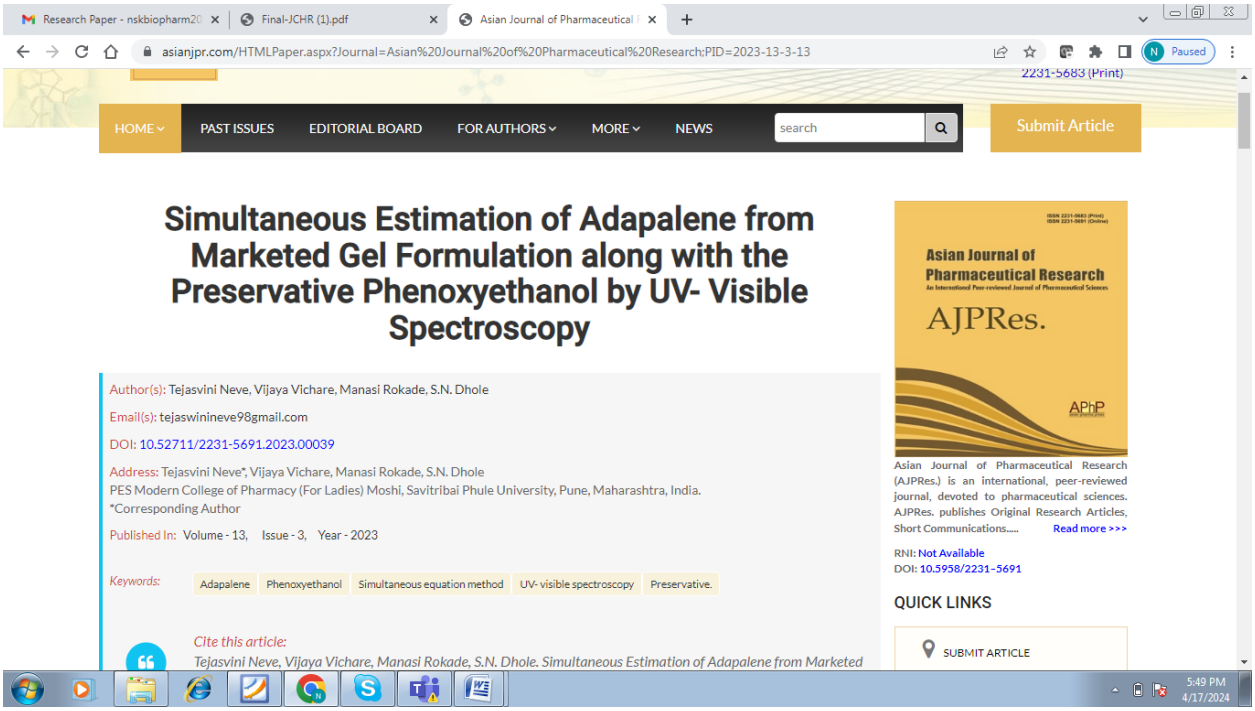

PUBLICATION202200015

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JOURNAL OF NATURAL REMEDIES
DOI: 10.18311/jnr/2023/33332

RESEARCH ARTICLE

Formulation Development and Evaluation of a Polyherbal Suspension Containing *Curcuma longa*, *Ocimum sanctum* and *Azadirachta indica* with Improved Antimicrobial Activity

R. S. Shivarkar[1,2*], S. B. Bhise[3], V. Rama Mohan Gupta[4], N. S. Kulkarni[1] and M. C. Upadhye[1]

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Abstract

A lack of global political will to mobilise resource to fight tuberculosis is major challenge in ending tuberculosis. The polyherbal formulations are best alternative, as they are economic, environmentally friendly and easily available than modern drugs. In present study, a polyherbal suspension with extracts of *C. longa*, *A. indica* and *O. sanctum* was developed and characterized. The developed suspension was found satisfactory with respect to odour, colour, taste, pourability, pH, viscosity, zero microbial count, particle size, percentage ease of disposability, aesthetic characteristic, sedimentation, zeta potential and does not show the crystal growth, polyherbal formulation exhibited significantly inhibited the growth of H37Rv and MIC is also comparable to those of standard agents.

Keywords: Antimicrobial, Polyherbal Formulation, Tuberculosis

1. Introduction

An estimated 10.6 million people became ill with Tuberculosis (TB) in 2021 compared with 10.6 million who died in 2020 from Tuberculosis as per WHO Report 2022. Relative to 2020, the incidence rate of TB increased by 3.6 in 2021 indicating a 2% decrease annualy[1].

Due to the incidence of Multi-Drug Resistant Tuberculosis (MDR-TB), there is an increase in the death rate in the world since 1980[2]. This situation is due to irregularity in TB treatment and current drug therapy failing to treat the disease. For treatment of MDR-TB second-line drugs have been used which showed side effects with only a 50% cure rate. Moreover, the first line and second line of drugs are costly[3]. Only two new drugs introduced such as Delamanid and Bedaquiline which are found unsafe clinically. Since 2015, there are new cases of MDR-TB and continuous addition of Rifampicin-Resistant TB (RR-TB) in patients with Rifampicin-Resistant TB (RR-TB)[4]. In the case of acquired drug resistance, only second-line drugs must be used but are found equally costlier. Therefore, for the control of TB, there is an immediate requirement for modern methods of drug treatment[5]. Folklore medicine especially natural drugs have proven its potency and found the best

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Article Received on: 21.03.2023 Revised on: 16.06.2023 Accepted on: 03.07.2023

PUBLICATION20220016

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Indian Journal of Natural Sciences www.tnsroindia.org.in ©IJONS

Vol.14 / Issue 79 / Aug / 2023 International Bimonthly (Print) – Open Access ISSN: 0976 – 0997

RESEARCH ARTICLE

Delivery System for Improvement in Solubility of Poorly Soluble Drugs

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Received: 26 Apr 2023 Revised: 07 June 2023 Accepted: 13 July 2023

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ABSTRACT

Most of the newly evolved drug applicants are lipophilic and poorly water-soluble. Enhancing the dissolution and bioavailability of those tablets is a prime mission for the pharmaceutical industry. Liquisolid method, that is primarily based totally at the conversion of the drug in liquid nation into an seemingly dry, non-adherent, loose flowing and compressible powder, is a unique and superior method to address the issue. The goal of this newsletter is to offer an outline of liquisolid method and summarize the development of its packages in pharmaceutics. Low cost, easy processing and notable potentials in commercial manufacturing are primary blessings of this method. In addition to the enhancement of dissolution price of poorly water-soluble tablets, this method is likewise a reasonably new method to correctly retard drug launch. Furthermore, liquisolid method has been investigated as a device to limit the impact of pH on drug launch and as a promising opportunity to traditional coating for the development of drug photostability in strong dosage forms. Overall, liquisolid technique is a newly evolved and promising device for boosting drug dissolution and maintaining drug launch, and its capacity packages in pharmaceutics are nonetheless being broadened.

Keywords: Liquisolid compact. Liquid vehicle. Carrier. Coating material.

PUBLICATION20220017

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Design and Evaluation of Gastroretentive Mucoadhesive Tablet of Antihypertensive

Swapnali S. Pharande[1], Prajakta S. Jagtap[2], Rupendra V. Doshi[2], Poonam S. Sable[3], Arti H. Chandanshive[4], Priti D. Mane-Kolpe[5], Amarja B. Mohite[6], Dipalee J. Vhankade[7], Priyanka B. Parekar[8]

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Abstract: For drug delivery due to the simplicity of administration, patient comfort and pliability in the preparation oral drug delivery administration has been the uppermost route. Gastroretentive mucoadhesive tablet of combination of two drugs like Valsartan and Hydrochlorothiazide were prepared by using direct compression technique. Mucoadhesion is a complicated occurrence that includes wetting, adsorption and interpenetration of polymer chains. The formulated tablet of several preparation was characterized during a entire mucoadhesion time, resiliency delay time and percent drug liberation. The several batches were formulated by using a direct compression method utilizing the diversity of mucoadhesive polymers like Carbopol 971, Eudragit RS 100 and exposed to several evaluation variables like in-vitro drug release outline, tablet post compression parameters and physical possessions. The formulated tablet granules are assessed before compression during various parameters such as bulk density, tapped density, angle of repose, compressibility etc. to check the flow possessions of granules. In assessment of Post Compression variables of Gastroretentive high density tablets also various parameters are studied like Weight variation(mg), Friability (%), Hardness(kg/cm^2), Thickness(mm), Drug Content of Valsartan (%), Drug Content of Hydrochlorothiazide (%) etc. The Gastroretentive Mucoadhesive tablet formulation shows best drug release pattern so it is considered as best formulation for the Gastroretentive sustained release drug delivery system. For the sustained release gastroretentive drug delivery system from the evaluation of all types of tablets it is concluded that the Mucoadhesive approach is the best. The stability study of optimized batch of mucoadhesive tablets shows that the formulation is stable.

Keywords: Mucoadhesion, gastroretentive, Valsartan, Hydrochlorothiazide etc.

Introduction

For various hours gastroretentive systems may persist in the gastric area and therefore it may remarkably extend an abdominal residence time of drugs. The bioavailability enhances when extend

PUBLICATION20220018

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Journal of Chemical Health Risks
www.jchr.org
JCHR (2024) 14(1), 2577-2581 | ISSN:2251-6727

Formulation of Novel Silver Nanoparticles (Snps) Using Fungal Endophyte Macrosporium Fasciculatum and Evaluation of Their Antimicrobial Potential

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(**Received**: 25 January 2024 **Revised**: 20 February 2024 **Accepted**: 25 February 2024)

KEYWORDS
Novel silver nanoparticles (SNPs), Fungal Endophyte, Antimicrobial activity.

ABSTRACT

There is an increasing commercial demand for nanoparticles due to their wide applicability in various areas such as electronics, catalysis, chemistry, energy, and medicine. Metallic nanoparticles are traditionally synthesized by wet chemical techniques, where the chemicals used are quite often toxic and flammable. In this work we have investigated extra cellular biosynthesis of novel silver nanoparticles using fungal extract of recently isolated novel endophytic fungus *Macrosporium Fasciculatum*. The synthesis process was quite fast and silver nanoparticles were formed within minutes of silver ion coming in contact with the cell filtrate. UV–visible spectrum of the aqueous medium containing silver ion showed a peak at 420 nm corresponding to the plasmon absorbance of silver nanoparticles. Transmission electron microscopy (TEM) micrograph showed formation of well-dispersed silver nanoparticles in the range of 10–30 nm. The process of reduction being extra cellular and fast may lead to the development of an easy bioprocess for synthesis of novel silver nanoparticles. Development of reliable and eco-friendly process for synthesis of metallic nanoparticles is an important step in the field of application of nanotechnology. Further these biologically synthesized nanoparticles were found to be highly toxic against different bacterial and fungal species. The most important outcome of this work will be the development of cost effective, nanoparticles based medicines from *Macrosporium Fasciculatum*for the treatment of microbial diseases. This is for the first time that *A. alternate* fungal extract was used for the synthesis of novel silver nanoparticles.

INTRODUCTION

Increased industrialization and urbanization has damaged the environment by introducing a number of harmful and unwanted substances. These metal–microbe interactions have important role in several biotechnological applications including the fields of bioremediation, bio mineralization, bioleaching and microbial corrosion. The field of nanotechnology is one of the most active areas of research in modern material sciences. Nanoparticles exhibit completely new or improved properties based on specific characteristics such as size, distribution and morphology. Nanotechnology is a field that is burgeoning day by day, making an impact in all spheres of human life. New applications of nanoparticles and nano materials are emerging rapidly. Nano crystalline silver particles have found tremendous applications in the field of high sensitivity bio molecular detection and diagnostics, antimicrobials and therapeutics, catalysis and micro-electronics. However, there is still need for economic, commercially viable as well environmentally clean

PUBLICATION20220019

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ORIGINAL ARTICLE

Development of Fast-dissolving Oral Dosage Form as Tablet using Binder as *Vigna Mungo* Mucilage and Oral Film using Solvent Casting Technique: Comparative Study

Nilesh S. Kulkarni[1], Vidyaranee B. Ingle[1], Shashikant N. Dhole[1], Rahul H. Khiste[2], Rahul S. Shivarkar[1], Manoj K. Munde[3]

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Abstract

Aim: Oral route is the most common route of delivery which is used for drug administration. Oral solid dosage forms are the most preferred oral dosage forms as tablets and novel drug delivery as oral films. Sumatriptan succinate is a new generation anti-migraine agent; Oral bioavailability of sumatriptan succinate is low due to its severe first-pass metabolism. **Materials and Methods:** An attempt was made to develop fast-dissolving and disintegrating oral tablet and oral film for the sumatriptansuccinate to avoid first-pass metabolism. To develop a fast-dissolving tablet a natural mucilage powder extracted from *vigna mungo*. The tablet formulations were prepared using 2, 4, and 6% mucilage solution as a binder. Similarly, the oral films containing polyvinyl alcohol: soluplus or hydroxypropyl methyl cellulose: Soluplus were prepared by solvent casting method. The differential scanning calorimetry and fourier transform infrared spectroscopy was carried out for plain drugs, blend of drugs with mucilage, formed granules andoral film. The developed oral fast-dissolving tablet and oral fast-dissolving film formulations were evaluated for drug content, *In vitro* dissolution study. **Results and Discussion:** Tablets formulated with 2% mucilage (B1) binder require less disintegration time and 100% drug dissolution within 10 min. Film formulations containing HPMC K100M with soluplus containing 100 mg and 675 mg, respectively, resulted disintegration within 25 seconds and 96% of drug dissolution within 5 min. **Conclusion:** Hence, the fast-dissolving dosage form was successfully developed as film formulation as compared to tablets for the sumatriptan succinate.

Key words: First pass metabolism, mucilage, oral film

INTRODUCTION

Large advancements and developments in the region of pharmaceutical dosage forms have been seen over the last few decades. Solid dosage forms are most preferred oral solid dosage forms are popular and among them, tablets are mostly used. To avoid experiencing difficulty in swallowing oral solid medicament by geriatric and pediatric patients, patients who are suffering from illnesses that cause difficulty in swallowing, and bedridden patients. Advancement and development are also required to obtain faster and instant action of medicament and to overcome problems related to bioavailability. To overcome or minimize disadvantages some sort of modification is needed. International oral dosage form for gaining that desired effect for the intended onset of action

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Received: 01-08-2023
Revised: 09-11-2023
Accepted: 05-12-2023

PUBLICATION20220020

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Advanced Pharmaceutical Bulletin

Adv Pharm Bull, 2024, 14(1), 34-47
doi: 10.34172/apb.2024.012
https://apb.tbzmed.ac.ir

TUOMS PRESS

Review Article

A Comprehensive Review on Novel Lipid-Based Nano Drug Delivery

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Article info
Article History:
Received: February 28, 2022
Revised: February 21, 2023
Accepted: October 8, 2023
epublished: October 14, 2023

Keywords:
Novel Drug Delivery System, BCS classification, Liposome, Niosomes, Solid lipid nanoparticles, Nanochochleats

Abstract
Novel drug delivery system opens the doors towards nano/micro formulation strategies to overcome the challenges associated with the poorly soluble and permeable drugs. Lipid based nanoparticles are widely accepted that includes liposomes, niosomes and micelles which are FDA approved. Such lipid based drug delivery allows delivery for natural phytoconstituents, biopharmaceutical classification system (BCS) class II and class IV drugs are effectively delivered to improve its solubility, permeability and bioavailability. The article provides the recent advances and application of lipid based dosage form for improvement of therapeutic efficacy.

Introduction

Novel drug delivery system opens the doors towards Nano/ Micro formulation strategies to overcome the challenges associated with the biopharmaceutical classification system (BCS) class II and class IV drugs.[1] Such medication or drug delivery targets the drug at required site that too in low concentration and improves therapeutic efficiency. Novel drug delivery system includes microparticles, nanoparticles such as lipid based liposomes, niosomes, phytosomes, micelles, hydrogels, quantum dots, nanotubes, dendrimers etc.[2] Nanoparticulate drug delivery system have particle size which ranges between 1 to 100 nm. The drug movement across the barrier will get improved due to development of nanosized particulate system.[3] Nanomaterials have wide application in the treatment and diagnostic purpose.[4,5]

Currently lipid based dosage forms are popular that includes liposomes, niosomes, micelles etc which are FDA approved. Such lipid based drug delivery systems have found to be effective for natural phytoconstituents and inorganic particles like gold.[6] The advantages of lipid based novel drug delivery system are associated with the majority of drugs.

Reasons for application of novel drug delivery system for BCS class II and IV drugs.[7-11]

1. Poor solubility and poor permeability of drug.
2. Decrease in size of particle leads to increase in effective surface area which ultimately improves dissolution rate of poorly soluble drugs.
3. Nanomaterials are being used in many different biological and medical fields because they reframe optical, electrical, chemical and physical properties.
4. Increases mobility of particle that helps to increase bioavailability.
5. Nanomaterials have application in targeted and controlled delivery of biopharmaceuticals.
6. Due to nanosized structure, it can easily cross mucosal membrane whereas Microsystems has capacity to cross epithelial lining.
7. Increased drug therapeutics efficacy and reduced side effects.
8. Protection of drug from first pass metabolism and enzymatic degradation.

Solubility and permeability

Solubility is one of the key parameter that directly affects the activity and bioavailability of drug. The variety of factors that has influence on solubility of the drugs are pKa of drug, pH at gastrointestinal tract (GIT), presence of luminal pH.[12,13] Physiological and physicochemical factors have influence on drug solubility.[14,15]

Solubility depends on chemical, electrical, structural properties of the solute and interaction between solute solvent. The USP 38, European pharmacopoeia categorized solubility in seven different group.[16] Biopharmaceutics classification system was developed

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PUBLICATION20220021

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2210-3007/23

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REVIEW ARTICLE

A Review on recent approaches for the use of different Analytical Techniques to Analyze some Calcium Channel Blockers and their Combinations with other Antihypertensive Drugs

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[2]*Department of Pharmaceutics, Progressive Education Society's PES Modern College of Pharmacy (For Ladies), Moshi, Pune 412105, Maharashtra, India*

Abstract:

Background:

Diabetes, high cholesterol, and high blood pressure all considerably raise the risk of cardiovascular disease. When all three of these characteristics occur at once, a metabolic problem is postulated. A combination of antihypertensive, hypolipidemic, and anti-diabetic medications is frequently utilised to treat cardiovascular diseases. While statins (fluvastatin, simvastatin, *etc.*) are used to lower cholesterol levels, calcium channel blockers (*e.g.* amlodipine, efonidipine, and azelnidipine, *etc.*) are used to target the smooth muscles of the heart. Diuretics (*e.g.* chlortalidone, hydrochlorothiazide, *etc.*) and angiotensin II receptor antagonist (blockers) are also used to manage high blood pressure.

Objective:

The study aimed to review liquid chromatography and related high-performance (HPLC) techniques that have been developed and used for evaluating the above drugs, together with an overview of the research work published in various scientific and drugs-linked journals.

Results:

A basic critical investigation of the detailed published information has been completed and the current status of HPLC and related techniques as a percent measure of calcium channel blockers has been examined.

Conclusion:

This survey has explored several matrices, including pharmacological products and organic samples, as well as methods for examining direct calcium blockers in them. It also discusses the current state of calcium channel blocker stability investigations. Additionally, it offers scientific approaches for the concurrent estimate of angiotensin II receptor antagonism, diuretics, statins, and beta-blockers with calcium channel blockers.

Keywords: HPLC, Azelnidipine, Efonidipine, Cilnidipine, Calcium channel blockers (CCBs), Diabetes.

Article History	Received: February 22, 2023	Revised: August 21, 2023	Accepted: August 30, 2023

1. INTRODUCTION

Hypertension is a regular, ongoing, age-related problem, which frequently involves weakening cardiovascular and renal entanglements. Pulse is normally noted in blend with other cardiovascular factors. Hypertension is associated with other cardiovascular factors, for example, stomach weight, dyslipidemia, diabetes, hyperinsulinemia, and hyperuricemia, which are typical fundamental reasons. Hypertension progressively depends on computerized procedures of circulatory strain estimation. Antihypertensive medication treatment decreases the complications of hypertension. Historically, doctors have prescribed calcium channel blockers to manage hypertension and prevent angina. A common therapy option for hypertension is a group of medications known as dihydropyridine calcium channel blockers, which also include amlodipine, felodipine, and lacidipine.

Dihydropyridine calcium channel blockers (CCBs) act by loosening up vascular smooth muscle, widening veins and thus diminishing fringe obstruction. Benzothiazepines (such as

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DOI: 10.2174/012210299X250401231010114247, 2023, *1*, e2210299X250401

PUBLICATION20220022

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CRITERIA III

Key Indicator 3.3 - Research Publication and Awards

3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during 2022

Research Publication 2022

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RESEARCH PUBLICATION 2022

Year	Sr. No.	Name of Faculty	Title of the Paper	Name of Journal	Year, Vol, Page No, Issue	ISSN No.
2022	1	Dr.PrajaktaKothawade, Dr.VrushaliTambe	A Comparative Molecular Docking Study ofCrocetin With Multiple Receptors for the Treatment of Alzheimer's Disease	Biomedical and Biotechnology Research Journal (BBRJ)	2022, 6 (2), 230-242.	print: 2588-9834, online: 2588-9842
2022	2	Ms. Rutuja Aher	Formulation and Characterization of Buccal patches of Oxaceprol	Research Journal of Pharmacy And Technology	2022, 15 (12), 5512-5516.	0974-360X 0974-3618
2022	3	Ms. Rutuja Aher	Development and Characterization of Tenofovir Dixoproxil Fumarate Loaded Nanoparticles	Asian Journal of Organic & Medicinal Chemistry (AJOMS)	2022; 7 (1): 1599-1605.	2456-8937
2022	4	Ms.Rutuja Aher	Cosmetic Hydrogel under eye patch: Review	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (8), 1621-1636.	2456-3315
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2022	8	Ms.BhagyashreeParande	Formulation and evaluation of herbal anti-acne emulgel of BerberiesAristata	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (8), 763-772.	2456-3315
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2022	10	Ms.BhagyashreeParande	Niosomes As Novel Drug Delivery System	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (6), 1115-1121.	2456-3315
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			nn in high fat diet and Sreptozotocin Induced Diabetes in Rats	Research and Technology		
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2022	15	Shashikant N. Dhole	DEVELOPMENT AND EVALUATION OF ANTIFUNGAL SOAP WITH HERBAL ANTIBACTERIAL PROPERTIES	European Journal of Molecular & Clinical Medicine	2022	2515-8260
2022	16	Dr. Vrushali Tambe	Novel stability indicating RP-HPLC Method for estimation of Clobazam and its	Indian Drugs	2022, 59 (11), 65-72	001946 2X

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2022	23	Dr. Vijaya Vichare	Development and Validation of Chemometric-Assisted Spectrophotometric Method for the Simultaneous Estimation of Aceclofenac, Paracetamol, and Chlorzoxazone with Impurities	Biomedical and Biotechnology Research Journal	2022, 6 (3), p458-465.	25889842
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2022	27	Dr.RakshaMhetre, Dr. S N Dhole	Formulation and evaluation of Naproxen Orodispersible mini tablets for Paediatric use	International Journal of Pharmaceutical Sciences and Nanotechnology	2022, 15 (04), 6055-6060.	0974-3278
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2022	37	Mr. M. K Munde, Dr.N.S.Kulkarni	Novel Validated Stability Indicating Analytical Method For Quantification of Empagliflozin in Bulk and Marketed Formulation by	Indian Drugs	2022, 59(05),48-57	0019-462X

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			euphorbia hirtalinn. (family-euphorbiaceae)			
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Original Article

A Comparative Molecular Docking Study of Crocetin With Multiple Receptors for the Treatment of Alzheimer's Disease

Dhanashree Sharadchandra Kherade, Vrushali Sachin Tambe, Anupa Dnyaneshwar Wagh, Prajakta Bhushan Kothawade

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Abstract

Background: Crocetin, an active constituent derived from *Crocus sativus L.* and *Gardenia jasminoides*, has shown to have multiple pharmacological activities such as memory booster, anti-oxidants, anti-inflammatory, and neuroprotective actions. Clinical trials on Saffron extract and a preclinical trial of Crocetin for neurodegenerative diseases directs probable use of Crocin in Alzheimer's disease (AD). The Crocin metabolizes into Crocetin after administration. The affinity of Crocetin to different receptor for AD on the basis of molecular docking has not yet been investigated. The present study was aimed to identify the affinity of Crocetin with different receptors involved in Alzheimer's pathogenesis by docking. Autodock Tools (MGL Tools), PYMOL, AutoDock Vina, Discovery studio 2021 client and SwissADME were used. Molecular docking simulation showed significant binding affinity of Crocetin to various receptors. It was found to bind significantly with different receptors like Vitamin D receptor (binding energy-7.9 kcal/mol), Receptor for advanced glycation end products (binding energy-7.5 kcal/mol) and NOD-like receptor pyrin domain-containing-3 (binding energy-7.4 kcal/mol). The results obtained suggest the usefulness of Crocetin in AD. **Context:** In this study, we have investigated the binding affinity of Crocetin on different receptors related to AD by performing molecular docking studies. **Aim:** Determination of binding affinity of Crocetin with different receptors involved in AD. **Settings and Design:** Auto dock vina, Pymol, Discovery studio, Auto dock Tools, Chemsketch, Swiss ADME. **Methods:** Molecular docking. **Results:** The Crocetin was found to have significant binding affinity to different receptors such as Vitamin D receptor (binding energy-7.9 kcal/mol), receptor for advanced glycation end products (binding energy-7.5 kcal/mol), and NOD-like receptor pyrin domain-containing-3 (binding energy-7.4 kcal/mol). **Conclusions:** The present study focuses on docking of Crocetin with different receptors related to the treatment of AD. The Crocetin was found to have a significant binding affinity with different receptors like Vitamin D receptor (binding energy-7.9 kcal/mol), Receptor for advanced glycation end products (binding energy-7.5 kcal/mol), and NOD-like receptor pyrin domain-containing-3 (binding energy-7.9 kcal/mol) while it exhibits moderate binding with receptor-like peroxisome proliferator-activated ϒ receptor (binding energy-7.1 kcal/mol), cannabinoid receptors (binding energy-7.1 kcal/mol) and ryanodine receptor (binding energy-7.0 kcal/mol). It showed the best potential to be developed into an anti-Alzheimer's drug due to its binding with multiple targets. From drug likeliness properties it can be seen that Crocetin can be absorbed by the human body and does not violate the Lipinski rule. **Limitations of Study:** Theoretical predictions are just consultative and have to be carefully verified by *in vivo* experiments.

Keywords: Alzheimer's disease, binding energy, crocetin, docking, neurodegeneration, receptors, structure etc

Introduction

Alzheimer's disease (AD) is the type of neurodegenerative disease. It is categorized as a type of dementia. AD most often affects adults above the age of 65.[1] AD is associated with neuronal death throughout the brain which can be extensively enough that regions of the brain appear atrophied compared with the healthy brain. The reasons of the disease are not well understood. Amyloid beta-protein is found in the extracellular space around neurons in a healthy brain but in AD amyloid-beta and tau protein are found in misfolded state.[2]

Crocetin, a unique carotenoid with a short carbon chain, is an active compound of Saffron and *Gardenia jasminoides*.[3] However; crocetin has beneficial against AD but different

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DOI: 10.4103/bbrj.bbrj_6_22

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How to cite this article: Kherade DS, Tambe VS, Wagh AD, Kothawade PB. A comparative molecular docking study of crocetin with multiple receptors for the treatment of Alzheimer's disease. Biomed Biotechnol Res J 2022;6:230-42.

Submitted: 06-Jan-2022; **Accepted:** 20-Mar-2022; **Published:** 17-Jun-2022.

PUBLICATION202201

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Research J. Pharm. and Tech. 15(12): December 2022

ISSN 0974-3618 (Print)
0974-360X (Online)

www.rjptonline.org

RESEARCH ARTICLE

Formulation and Characterization of Buccal Patches of Oxaceprol

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ABSTRACT:

Background: Oxaceprol is an anti-inflammatory and antirheumatic agent. Buccal route has advantage over conventional mode of drug administration. It avoids hepatic first pass metabolism and improve patient compliance. The main objective of the present study is to formulate and evaluation of buccal patches of Oxaceprol to overcome drawbacks of conventional dosage forms. Buccal patches were prepared by solvent-casting method using HPMC K-15 and PEG as plasticizer. Oxaceprol was initially characterized for its preliminary studies such as organoleptic properties, melting point, solubility, UV Spectroscopy, and FTIR studies. Drug-excipients compatibility was confirmed by FTIR, DSC and assay of drug content. The formulations were prepared and evaluated for parameters like physical appearance, thickness, weight uniformity, % moisture loss, folding endurance, drug content uniformity. All prepared patches of drug were smooth and elegant in appearance. No visible cracks were observed. All formulations were uniform in weight, thickness, and drug content. The folding endurance was increased with an increased in polymer concentration. In vitro drug release of F6 batch was 93.78% at the end 8 hr. Oxaceprol buccal patches showed enhanced the bioavailability. Release exponent n value obtained from Kors Meyer- Peppa's equation was within 0.5 -1.0 which indicates anomalous release.

KEYWORDS: Oxaceprol, HPMC, Buccal Patches, PEG.

INTRODUCTION:

Oral route is the most preferred route for the drug delivery but it has several limitations. Buccal route is an attractive route of administration for systemic drug delivery and it leads direct access to the systemic circulation through the internal jugular vein bypasses drugs from the hepatic first pass metabolism provides high bioavailability[1,2,3]. Buccal mucosa is relatively permeable with rich blood supply and acts as an excellent site for the absorption of drugs. The buccal route of administration is recognized as one of the potential route for the local and systemic delivery of drugs.[4,7,8]

Received on 29.09.2021 Modified on 04.02.2022
Accepted on 08.04.2022
Research J. Pharm. and Tech 2022; 15(12):5512-5516.
DOI: 10.52711/0974-360X.2022.00930

The buccal cavity can easily accessible for medication, hence safe and well accepted by patients. Oxaceprol is anti-inflammatory drug, it undergoes extensive first pass metabolism and showed very low bioavailability (30%).

MATERIAL AND METHODS:

Oxaceprol was obtained as gift sample from Glenmark pharmaceutical. Sucralose, Potassium dihydrogen phosphate was obtained from Modern Science, Nashik.

Formulation of Buccal Patches of Oxaceprol:

Buccal Patches of Oxaceprol were prepared by solvent casting technique.[5,6]

- **Calculation of drug quantity for 20 ml solution:**

A glass Petri plate of 9cm in diameter was used as casting surface. Total area of surface was calculated and found to be,

Asian Journal of Organic & Medicinal Chemistry ISSN Online: 2456-8937
Vol. 7 No. 1 (January - March, Special Issue - III 2022) UGC CARE APPROVED JOURNAL

Development and Characterization of Tenofovir Dixoproxil Fumarate Loaded Nanoparticles

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ABSTRACT
Nanotechnology is the science and technology of precise manipulation in the materials, devices or systems at nano meter scale. Nanoparticulate drug delivery systems have gained a lot of attention because of their size-dependent properties. Nanoparticles have been extensively utilized in enhancing the oral bioavailability of different classes of drugs having low solubility, poor permeation and chemical instability. Tenofovir Disoproxil Fumarate is a nucleotide reverse transcriptase inhibitor, which is used for the treatment of HIV-AIDS, Hepatitis B. The main objective of study is to develop the Tenofovir Disoproxil Fumarate loaded polymeric nanoparticle. The rational for selection of Polymeric nanoparticles as the target approach to resolve the underlying problem of Tenofovir Disoproxil Fumarate like Enhancement of bioavailability of the incorporated drugs, particle size. Tenofovir Disoproxil Fumarate loaded polymeric nanoparticles were prepared by High pressure homogenizer method using Chitosan as polymer, Glacial acetic acid as a solvent, and sodium tri-polyphosphate (STPP) as a cross-linking agent. All the prepared formulation showed satisfactory organoleptic properties. No uncountable peaks were observed in FT-IR analysis which indicate purity of formulations. All formulation showed good flow property. SEM photograph indicate spherical structure with porous surface. The entrapment efficiency was found to be 85.53%±1.66. The drug excipient compatibility study did not show any changes in the physical properties. In-vitro drug release study showed that Tenofovir Disoproxil Fumarate nanoparticles retard the release up to 12 hrs. It was observed that the ultra-probe and hot homogenization method was a useful method for the successful incorporation of the poor water-soluble drug Tenofovir Disoproxil Fumarate with high entrapment efficiency.

Keywords: Tenofovir Disoproxil Fumarate, nanoparticles, Chitosan

INTRODUCTION

Nanotechnology is the science and technology of precise manipulation in the materials, devices or systems at nano meter scale (usually less than 100 nm). The last several decades have witnessed the emergence of nanomedicine as one of the major field of academic research providing direct benefit to human health through clinical and commercial development. The ever-growing field of development of nanoscale delivery systems for biotherapeutics represents a major sector of academic research and is beginning to contribute to the future progress in modern health care in terms of disease diagnosis, treatment, and prevention. Polymeric nanoparticles term generally use for those substance which has 100- 200 nm diameter particle size and the drug substance is incorporated by polymeric substance.[1,2] The ideal requirements for designing nano-particles delivery system are to effectively control particle size, surface character, enhancement of permeation, flexibility, solubility and release of therapeutically active agents in order to maintain the target and specific activity at a predetermined rate and time. Tenofovir Disoproxil Fumarate is a nucleotide reverse transcriptase inhibitor, which is used for the treatment of HIV-AIDS, Hepatitis B. Tenofovir Disoproxil Fumarate is practically soluble in water, soluble in methanol, very slightly soluble in dichloromethane. Tenofovir Disoproxil Fumarate is firstly hydrolysed in the intestinal walls by carboxylesterase after oral administration, and eventually hydrolysed by phosphodiesterase during its first passage through the liver to form Tenofovir. Tenofovir enters cells through organic anion transporters 1 and 3. Once inside the cell, Tenofovir is phosphorylated by adenylate kinase to form Tenofovir monophosphate (TFV-MP). A second conversion occurs by nucleotide diphosphate kinase to form Tenofovir diphosphate (TFV-DP) from TFV-MP. TFV- DP is the active antiviral agent that competes with the naturally occurring nucleotide counterpart deoxyadenosine 5-triphosphate to inhibit viral reverse transcriptase. The rational for selection of Polymeric nanoparticles as the target approach to resolve the underlying problem of Tenofovir Disoproxil Fumarate like Enhancement of bioavailability of the incorporated drugs, particle size.[3,4]

EXPERIMENTAL

Material: Pure Tenofovir Disoproxil Fumarate was obtained from Mylan laboratories ltd.

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COSMETIC HYDROGEL UNDER EYE PATCH: REVIEW

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ABSTRACT:

Hydrogels are a 3D cross-linked network of hydrophilic polymers that can retain a large amount of the water and can quickly absorb water hence showing the hydration property in the cosmetic field. Hydrogel is extremely versatile and environment friendly and multifunctional across a variety of industries. With the unique textured gel, Hydrogel eye patches are Beauty products. Hydrogels can be used for hygiene products, medical applications, smart wound healing, and drug delivery as sustained-release formulations. The marketed products of hydrogels are Hydroheal gel, Hyaluheal, Hydrogel eye patch, hydrogel face patch, hydrogel sunblock, etc. The main concerns with the eyes are the hyperpigmentation around the eyes, wrinkles, fine lines, and puffiness. Hydrogel eye patches work by targeting dark circles, wrinkles, and fine lines and help reduce puffiness. Eye patch and patches in addition can hydrate and nourishes the skin with the high-quality ingredient hydrogels. Your eyes are the most delicate part of your skin, with hydrogel formulas gently rejuvenating your skin without irritating. The purpose of this paper is to present a brief review of the basic concept of the hydrogels eye patch, eye patch, and its applications.

KEYWORDS: Hydrogel, Hydrogel Eye Mask, Eye patch, Skin Care, Rejuvenate.

INTRODUCTION:

As individuals mature, the skin loses its ability to renew itself. The skin within the space below the eyes is especially prone to the aging method as a result of its thinness. It may be a major cosmetic drawback, and plenty of people get treatment for this condition, however, there are few investigations relating to the cause and tiny analysis into the potential treatment of this condition. This condition affects people of a large variety of ages, both sexes, and all races. Moreover, it worsens with the aging method of skin sagging and altered hypodermic fat distribution. Cosmetic conditions that area unit neither health-threatening nor related to important morbidity however they may affect the individual's emotional well-being area unit gaining exaggerated attention.

As a result, it's common to develop wrinkles under the eyes over time. Superficial wrinkles are related to textural changes within the skin surface caused by intrinsic aging and photoaging of topographically defined areas. The fine lines of wrinkling is also discrete initially so, over time, become grouped and multidirectional. Causes of Wrinkles**- UV Rays-** If you don't use the required eye protection, the UV rays will start breaking the collagen in your skin. this may cause wrinkles and fine lines. Environmental pollution also can cause wrinkles. **Smoking-** This habit exposes the skin to extra oxidative stress, which breaks the collagen and elastin. This further restricts nutrients from reaching the blood vessels of the face as they get narrow restricting the bloo Grammar d circulation which causes wrinkles. **High Sugar Diet-** Food with high sugar content is low on antioxidants and may fasten the aging process resulting in fine lines and wrinkles under the eyes.

Infraorbital dark circle refers to conditions that present with relative darkness of the infraorbital eyelids. Infraorbital dark circles are a condition that can be a significant beauty concern for womanish cases. Although it's a condition that doesn't beget morbidity, it can impact the quality of life from the medical point of view. Having infraorbital dark circles makes you look tired, sad, or hungover. General fatigue, especially lack of sleep, worsens dark circles under the eyes.

The eyelids are the thinnest skin in the body, leading to being easy for the blood vessels to show through the skin causing a swollen and dark appearance called **puffy eyes.** Puffy eyes can be caused by several factors such as fluid retention due to high alcohol or salt intake, emotions especially crying, allergies, hormone changes, insufficient sleep, and other factors as well.

An understanding of the eye conditions associated with the delivery of the hydrogel treatment requires an understanding of the main parts of the eye and the function of each part.

The eye consists of two compartments; the anterior segment (which is the front of the eye) and constitutes 1/3 of Part while the opposite 2/3 of the part is the posterior 17 segment (which is the back of the eye). the attention is in direct contact with the environment and guarded by the eyelids, tear film, and also the cornea. The cornea could be a transparent layer that covers the front of the attention (iris, which is the colored a part of the eye); it's highly innervated tissue with no blood supply. It refracts and transmits light to the lens and retina. It depends on the bodily fluid for nourishment and removal of waste products. The front surface of the cornea is roofed with a tear film. The cornea consists broadly of three tissue layers each separated by a membrane. The cornea could be a complex barrier to the absorption of medicine into the attention. additionally to the cornea; tear turnover, nasolacrimal drainage, and reflex blinking made topical administration of medicines using eye drop is barely really apt to treat the periocular diseases.

PUBLICATION202204

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Role of chlorophyll in cosmeceuticals: an overview

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Abstract

Chlorophyll is the green pigment within the plant that helps to soak up sunlight and convert it into energy. it's believed that it's beneficial for the human body. These pigments are often differentiated into two types, chlorophyll and B. Algae are oxygenic photosynthetic organisms mainly found in aquatic environments and wetlands and are host to immense biodiversity, including aquatic animals, plants, and microalgae. Microalgae are an assorted group of both single-celled and multicelled microorganisms there are increasing trends in the usage of photosynthetic microorganisms including macro and microalgae in the field of cosmeceuticals by incorporating the bulk products extracted from the biomass into cosmetics formulations. Algae species contain a green-colored pigment recognized as chlorophyll. the main sources of chlorophyll are spirulina, Chlorella Vulgaris, green algae. Chlorella Vulgaris may be microalgae containing chlorophyll as an antioxidant, widely used as active ingredients within the cosmetic industry. Spirulina stands out as sustained bioactive microalgae with health-promoting factors and a very important active ingredient of natural cosmetics products currently it has been incorporated in topical skincare formulations, like moisturizing, anti-wrinkle, antiaging, antiacne, antioxidants, revitalizing, protecting alongside cleaning and shining action both for hair and skin, furthermore microalgae is employed by cosmetics formulators to promote healthy sunscreen protection to treat skin pigmentation disorder and to heal the wound. Nowadays, consumers prefer natural cosmetics because they aren't harmful to the skin. in this review, recent cosmetics formulations containing chlorophyll are revised by their ability to boost skin appearance and promote healthy-looking at the current emergency of the beauty industry, both the starting material and final chlorophyll-based cosmetics products are available in the market, and their current regulations, it's likely that in the coming year diversity quality and topical application, food supplements of the chlorophyll-based product will increase rapidly

Introduction

The term cosmeceuticals are a consolidation of cosmetics and pharmaceuticals encompassing the biologically active compound retaining therapeutic value. These are assorted various chemical compounds some of which are acquired from natural sources like plants, animals, algae, and minerals, while others are synthetic like sodium lauryl sulfate, PVP, and ethylparaben. recently researchers, have flipped their interest towards microalgae being the foremost supply of chlorophyll, for the preparation of herbal products such as food and cosmetics. Chlorophyll could be a naturally obtained pigment from algae, green algae spirulina Chlorella Vulgaris. This pigment can be differentiated into two types, chlorophyll A and B. it's been found that chlorophyll is beneficial for the treatment of skincare, haircare improves the skin snap and helps to get rid of wrinkles it provides oxygen to the exposed surface of algal species and prevents it from drying by moisturizing it. It also possesses an anti-inflammatory effect. it will increase procollagen and protein expression in photoprotector skin cells once taken in high doses algae are oxygenic photosynthetic organisms that are principally found in aquatic environments and wetlands. the utilization of algae as a photosynthetic organism is increasing day by day within the cosmeceuticals each macro and microalgae have used the extract of the biomass is incorporated in several cosmetic formulations The first reported scientifically pure algae culture was of chlorella Vulgaris which was grown by Dutch microbiologist M.J Beijerinck in 1890 Mainly green algae are the major source of chlorophyll there are lots of formulations of green algae is available in the market [spirulina supplements in tablet form are mainly seen in the market] at the present the demand for spirulina and chlorella based products is high and anticipated to increase at CAGR of 7.1% from 2017 to 2022 (USD 238.3). furthermore, algae are also a rich source of many other valuable compounds, such as several minerals and vitamins. the most commonly identified minerals are potassium, calcium, magnesium, selenium, iron, and zinc. among the vitamins, B vitamins are the most abundant. its presence confers to the algae properties of the DNA repairs, electron transfer, fatty acids synthesis, and one-carbon metabolism [4]

Aim

Role Of Chlorophyll in Cosmeceuticals: An Overview

Objectives

1. To succinctly review the recent progress of chlorophyll as cosmeceuticals
2. To study future aspects and present market scenario of chlorophyll infused skincare

To provide an integrated, synthesized overview of the current state of knowledge about the use of chlorophyll in skincare

Spirulina

Immunity after corona Everyone's immunity depends on food, lifestyle, and exercise. But due to overuse of chemical fertilizers and pesticides, climate change, and fertile soil erosion, there is a shortage of nutrients in food today. Moreover, the question is whether the hunger of the growing population can be met through sustainable agriculture. After in-depth discussions at the 1974 United Nations World Food Conference, many experts agreed that there is a food that could be the best alternative to satisfy the world's hunger in the future. Protein, vitamins, minerals, and antioxidants Spirulina is the name given to this versatile superfood,

PUBLICATION202205

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A REVIEW: RETINOL-INFUSED PRODUCTS BY MICROSPONGE TECHNOLOGY

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Abstract

Microsponges are at the leading edge of the rapidly developing novel drug delivery technology field. The microsponge-based drug delivery system is a unique technology for a controlled release system and enhanced drug deposition within the skin while minimizing transdermal penetration of topically active agents. Drug-loaded microsponge consists of microporous beads, typically 10-25 µm in diameter. When applied to the skin, the microsponge releases its active ingredient on a time mode and also in response to other stimuli like rubbing, pressure, temperature, pH, etc. Microsponge technology offers entrapment of active ingredients and is believed to contribute to reduced side effects, improved stability, increased elegance, and enhanced formulation flexibility. additionally, it's non-irritating, non-allergenic, non-mutagenic, and non-toxic. This technology is being employed currently in cosmetics, over-the-counter skincare, sunscreen, and prescription products [12]. Vitamin A is the most multifunctional vitamin within the anatomy and constitutes a gaggle of organic lipid-soluble compounds comprising retinol and its derivatives, mainly the retinol esters, retinyl palmitate, and retinyl acetate. Retinol is deeply involved in growth and maintenance thanks to its cellular contribution to cell proliferation and differentiation from early embryogenesis to adulthood. Topical retinoids are used for the clinical treatment of psoriasis, hyperkeratosis, acne, early aging, and photodamage. However, its high instability hence oil and water-soluble microsponge delivery of the retinol has been developed [16].

Keywords: Microsponges ,Controlled release, transdermal delivery, Biopharmaceutical delivery, Cosmeceuticals, Skin care.

Introduction

Several predictable and reliable systems are developed for systemic drugs under the heading of the transdermal delivery system using the skin as a portal of entry. It has improved the efficacy and safety of the many drugs that will be better administered through the skin. But TDS isn't practical for the delivery of materials whose final target is the skin itself. Controlled release of medication onto the epidermis with the reassurance that the drug remains primarily localized and doesn't enter the circulation in significant amounts, is a section of research that has only recently been addressed successfully. In recent years, there has been considerable emphasis given to the event of microsponge-based novel drug delivery systems, to switch and control the discharge behavior of the drugs. By incorporation into a carrier system, it's possible to change the therapeutic index and duration of the activity of the medication [9].

Microsponges are porous microspheres, biologically inert particles that are made of synthetic polymers, and also the particles serve to shield the entrapped drug compound from physical and environmental degradation. It consists of porous microspheres, each microsphere consisting of a myriad of interconnecting voids within a non-collapsible structure with an oversized porous surface. The porous sphere polymers vary in diameter from 5 to 300 microns. Their characteristic feature is the capacity to adsorb or "load" a high degree of active materials into the particle and onto its surface and it is delivered to the skin via controlled diffusion. Spherical particles composed of clusters of even tinier spheres are capable of holding fourfold their weight in skin secretions. Microsponge particles are extremely small, inert, indestructible spheres that do not undergo the skin. Rather, they collect within the small nooks and crannies of the skin and slowly release the entrapped drug, because the skin needs it. Although the microsponge size may vary, a typical 25 µm sphere can have up to 250000 pores and an enclosed pore structure like 10 ft long. These microscopic spheres are capable of absorbing skin secretions, therefore reducing the oiliness and shine of the skin. The microsponge system can prevent excessive accumulation of ingredients within the epidermis and also the dermis. Potentially, the microsponge system can significantly reduce the irritation of effective drugs without reducing their efficacy [9,18].

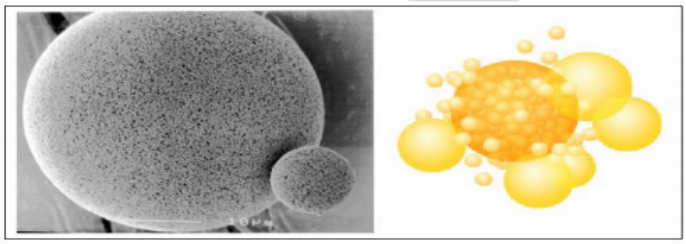

Figure 1: Porous microsphere [10]

PUBLICATION202206

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TRETINOIN A PEPTIDE IN ANTI-AGING THERAPY: AN OVERVIEW.

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Abstract:

Tretinoin is a naturally occurring acid of retinol. Tretinoin binds to and activates retinoic acid receptors (RARs), thereby including changes in gene expression that lead to cell differentiation, decreased cell proliferation, and inhibition of tumorigenesis. Retinoids such as tretinoin are an important regulator of cell reproduction, proliferation, and differentiation, and are used in the treatment of acne and photodamaged skin and to manage keratinization disorders such as ichthyosis, keratosis follicularis. Topical tretinoin modifies fine wrinkles and certain other features of human skin damaged by exposure to the sun, but histologic changes do not account for this improvement. In mice photodamage induced by ultraviolet light, effacement of wrinkles by tretinoin is correlated with dermal collagen synthesis but not with histologic changes. Tretinoin minimizes the appearance of wrinkles, bolsters skin's thickness and elasticity, slows down the breakdown of collagen which helps keep skin firm, and lightens brown spots by sun exposure. Retinoids were first introduced to the market in the early 1970s as an aid in acne-fighting drugs. Since then they have been used to treat psoriasis, warts, wrinkles, and blotchiness caused by sun exposure and aged skin. This study provides an overview of the market trends regarding the use of peptides in anti-aging products, providing meaningful data for scientists involved in the development of new peptides to identify opportunities for innovation in this area to achieve desired results in making skin healthy.

- **INTRODUCTION:**

Skin: Fig.1. structure of the skin.

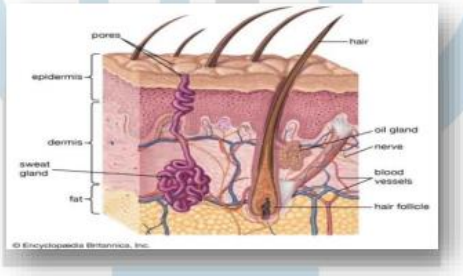
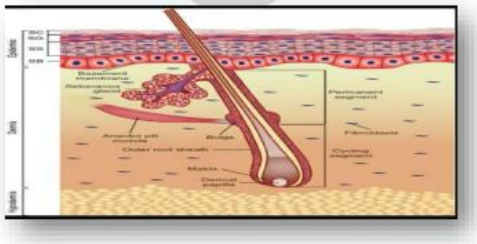


Fig.1. structure of the skin.

FIG 2: Verticle section of the skin



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© 2022 IJRTI | Volume 7, Issue 8 | ISSN: 2456-3315

FORMULATION AND EVALUATION OF HERBAL ANTI-ACNE EMULGEL OF BERBERIS ARISTATA

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ABSTRACT: Acne is commonly known as multifactorial chronic inflammatory disease of pilosebaceous units. Bacteria that contributes to causing acne are Propionibacterium acnes and Staphylococcus epidermidis Acne occurs at any age mainly in adolescents. Dermatologists are still finding successful treatments for acne. In the market, there are varierty of anti-acne topical preparation are available, such as topical creams, gels & patches. The herbal formulation has various advantages over synthetic formulation. So herbal drug Berberis aristata was found to be an efficacious and cost-effective anti-acne drug as compared to other drugs used in the treatment of acne. Therefore this drug was selected to formulate an anti-acne emulgel. In this present research work the Propolis used as a novel excipient have activities like anti-acne, anti-oxidant, and anti-inflammatory. Propolis has been used as an anti-oxidant in the formulation but it also shows the additional effect with the activity of Berberis Aristata. The present work shows the formulation of Berberis aristata emulgel by performing the 3 formulation development approaches. The optimized batch is selected based on its appearance, consistency, homogeneity, and drug release.

KEYWORD: Acne, Emulgel, Propolis, Berberis aristata, Herbal

Introduction [1-6]

Over the last decades, the treatment of ailments has been accomplished by the administration of a drug to the human body through oral, rectal, sublingual, or parental routes. The topical drug delivery system is used where this system fails to administer the drug The main advantage of the topical delivery system is to bypass first-pass metabolism. Topical drug delivery can be defined as a way to deliver medication that is applied to the skin to treat various ailments.

Dermatological products containing drugs applied to the skin are diverse in formulation and range in consistency from solid to liquid but semisolid products are the most popular. In cosmetics and pharmaceutical preparation the use of gel has been increased. As compared with creams and ointments the gel formulation delivers faster drug release. Regardless of the many advantages of gels difficulty in hydrophobic drug delivery is a major limitation so to overcome this limitation emulgel is prepared and with their use, even a hydrophobic drug can enjoy the unique properties of gels. Emulgels are a combined form of emulsion and gels, water-in-oil and oil-in-water types of emulsion mixed in gel to form emulgel. Direct (oil-in-water) system is used to entrap lipophilic drugs whereas hydrophilic drugs are enclosed/entrapped in a reverse system (water-in-oil). Emulsions have a high ability to penetrate the skin and are also easily washed off whenever pertinent. Emulgels for skin have several properties such as being easily spreadable, easily removable, greaseless, water-soluble, and thixotropic.

The skin is perhaps the most endangered part of our body. It is customary fact that gradually exposure of human skin to the external environment leads to many problems such as sunburn marks, acne, and pigmentation. Acne is a common disorder experienced in the age group of 15-25 years due to the high level of sebum production continued by the attack of *Propionibacterium acnes*. The proposed research work is designed to study the impact of herbal emulgel to combat acne. The work emphasizes the topical treatment of acne, based on reported scientific data on emulgel prepared from the different herbal extracts. The treatment modalities for acne are usually directed at lowering the *P. acnes* population, producing an anti-inflammatory effect, and decreasing the sebaceous gland activity. Usually, to treat acne antibiotics and hormones are applied, for various years. However, these agents often coexist with drug resistance and severe side effects.

In this state affairs, ethanolic extracts of propolis and root of B. aristata have been screened for the aforementioned anti-acne activity. Propolis is a novel excipient used in the formulation. It is a natural resinous mixture produced by honeybees. There are two types of topical delivery products available. They are external and internal. As their names indicate, the internal products are applied orally, vaginally, and rectally and external products are applied by spreading or spraying.

PUBLICATION202208

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WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.632
Volume 11, Issue 7, 567-580 Review Article ISSN 2278 – 4357

DIVERSIFIED OUTLOOK ON PHARMACOGNOSY AND PHARMACOLOGICAL ACTIVITIES OF BERBERIS ARISTATA: A DELINEATED REVIEW

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Article Received on
07 May 2022,

Revised on 27 May 2022,
Accepted on 17 June 2022

DOI: 10.20959/wjpps20227-22477

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ABSTRACT

In this era; where mankind is suffering from various non-communicable diseases (NCDs), also known as chronic like cardiovascular diseases, diabetes, respiratory diseases, cancers, etc. and communicable diseases (non-chronic) such as Ebola, flu, STDs, Tuberculosis, HIV/AIDS, covid, hepatitis A, the reason could be less immunity power, dietary habits, changing lifestyle and lack of mobility. The use of medicines for every single problem or chronic disease for a long time can expose the body to several harmful chemicals, that causes an undesirable effect on the other systems of the body, that is why various population are This review article involves the various properties of the Berberis aristata also known as Daruharidra, Indian Berberry tree turmeric, and its subsequent formulations which find use in treating quick healing of wounds, skin and eye infections, syphilis, ulcers, diabetes, diarrhoea, lowering cholesterol level, and for prevention and cure of the various ailment and infections. In the African and Asian countries, 80% population anticipated herbal medication for their primary health needs. Traditional medicines are why considered the form of alternative medicines. This article describes the particulars of the magical herb "Berberis Aristata" popularly known as "Daruharidra" by the end of this review one will be able to understand Cleary about the pharmacognosy, phytochemistry, constituents of the herb, cultivation, and collection, geographical sources, analytical studies, and uses of the Daruharidra, adulteration and substitution, formulations from literature, patent and marketed formulations.

PUBLICATION202209

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© 2022 IJRTI | Volume 7, Issue 6 | ISSN: 2456-3315

Niosomes as Novel Drug Delivery System

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***Abstract*: Niosomes are non-ionic surfactant based unilamellar or multilamellar bilayer vesicles upon hydration of non-ionic surfactants with or without incorporation of cholesterol. Niosomes are biodegradable, biocompatible, non-immunogenic, and exhibit flexibility in their structural characterization. Niosomes are easy to be formulated. Niosomes as drug carriers improve the bioavailability of a poorly absorbed drug. In some cases, the chances of breaking vesicles into gastric pH to overcome this problem polymer coating are the best way in recent years. This review article focused on developing an effective delivery system to achieve maximum effective concentration, the structure of Niosomes, advantages, and disadvantages, components of niosomes, different methods of formulation, purification, and evaluations of Niosomes.**

***Keywords*: Niosomes, Vesicles, Cholesterol, Non-ionic surfactant, Encapsulated efficiency, dialysis.**

I. INTRODUCTION:

Niosomes are novel drug delivery systems in which the drug is encapsulated into vesicles[1]. It is also called a vesicular drug delivery system. The first vesicular drug delivery system is liposomes. But liposomes have some disadvantages like stability issues, expensive, and toxicity[2]. To overcome these problems scientists shifted towards Niosomes. Niosomes are made up of non-ionic surfactants, and they have no toxicity just because of surfactant[3]. In addition to non-ionic surfactants, they are cholesterol, a hydration medium, and some charged molecules. Niosomes are non-ionic surfactant based unilamellar or multilamellar bilayer vesicles upon hydration of non-ionic surfactants with or without incorporation of cholesterol. Niosomes are biodegradable, biocompatible, non-immunogenic, and exhibit flexibility in their structural characterization. Niosomes are less toxic and active at the site[4]. Oral polymers like Carbopol 974, and Carbopol 971 are used for coating purpose[5]. In a few cases, chances for breaking vesicles into gastric media to overcome this problem polymer coating is the best way[6,7]. Because polymer show rigid and stable bilayer[8,9]. Niosomes as drug carriers improve the bioavailability of poorly absorbed drug[10]. Niosomes are proved to be a promising drug carrier because they can encapsulate different types of drugs within their multi-environmental structure.

II. ADVANTAGES AND DISADVANTAGES:

Table 1 : Advantages and disadvantages of Niosomes

Advantages	Disadvantages
Niosomes are less toxic and more compatible	Drug leakage from the entrapment
They can be used to encapsulate both hydrophilic as well as hydrophobic drugs	Hydrolysis of encapsulated drug which limiting the shelf life of the dispersion
They are osmotically active and stable	Aggregate formation of Niosomes
They can enhance the skin penetration of drug	Fusion
Easy to be formulated	Physical instability

PUBLICATION202210

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© September 2022| IJIRT | Volume 9 Issue 4 | ISSN: 2349-6002

Evaluation of Antihypertensive activity of Punica Granatum Linn. in High Fat Diet and Streptozotocin Induced Diabetes in Rats

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Abstract: Diabetes Mellitus is one of the most prevalent metabolic disorders charactrised with increased blood sugar level and improper primary metabolism. It is charactrised by alteration in metabolism of carbohydrate, fat and protein, which are caused by inappropriate secretion of insulin or insulin resistance. The number of people with diabetes is increased due to population growth, aging, urbanization and increasing prevalence of obesity and physical inactivity (Firdous et al., 2016).

Type 1 it is also called as Insulin Dependent Diabetes Mellitus (IDDM). It is due to failure of body for insulin production. It is often childhood disease so it is also called as Juvenile onset diabetes mellitus. In other words, it is a non-autoimmune, complex, heterogeneous and polygenic metabolic disease condition in which the body fails to produce enough insulin, characterized by abnormal glucose homeostasis. Its pathogenesis appears to involve complex interactions between genetic and environmental factors. It occurs when impaired insulin effectiveness is accompanied by the failure to produce sufficient ß-cell insulin (Shivasankar et al, 2011).

Type 2 it is also called as Non Insulin Dependent Diabetes Mellitus (NIDDM). In this type cells are unable for insulin usage. The other name of this type is adult onset diabetes mellitus (Soni, 2013). Type 2 diabetes is often, but not always, associated with metabolic abnormalities such as obesity, which itself can cause insulin resistance and lead to elevated blood glucose levels. Whereas type 2 diabetes is thought to be primarily heterogeneous and polygenic with low penetrance for the variants discovered, there exist monogenic types of non-autoimmune diabetes showing a Mendelian dominant pattern of inheritance, of which maturity-onset diabetes of the young (MODY) is the most common type 2 (Hertel, 2012).

1.INTRODUCTION

1.1 Diabetes mellitus

The terms "Diabetes" and "Mellitus" are derived from Greek. "Diabetes" denotes "a passer through a siphon" whereas the "Mellitus" denotes "sweet" (Piero et al., 2014). Diabetes represents a heterogeneous group of diseases characterized by changes in insulin secretion or action, resulting in chronic hyperglycemia and altered metabolism of carbohydrates, protein, and lipids (Vanessa E, et al, 2013). Chronicity of hyperglycemia is associated with long-term damage and failure of various organ systems mainly affecting the eyes, nerves, kidneys, and the heart (Chawla et al., 2016). A complex multifactorial disease increases the risk for macrovascular complications that are associated with cardiovascular diseases, mainly coronary artery disease, atherosclerosis, hypertension and stroke (Buraczynska et al., 2016).

1.2 Types diabetes mellitus

There are several forms of diabetes. Scientists are still defining and categorizing some of these variations and establishing their prevalence in the population. Types of diabetes include:

1.2.1 Type 1 diabetes (Insulin dependent diabetes mellitus):

It is much less common with only 5-10% of all diabetes cases being type 1. This type of diabetes usually present itself early in life though can occur at any age with some cases not being seen until the patient elderly (Simpson et al., 2014). Type 1 diabetes mellitus is a chronic autoimmune disease associated with selective destruction of insulin-producing pancreatic β-cells. The onset of clinical disease represents the end stage of β-cell destruction leading to type 1 diabetes mellitus (Ozougwu et al., 2013).

1.2.2 Type 2 diabetes (Non Insulin dependent diabetes mellitus):

Type 2 diabetes mellitus is chronic, progressive metabolic disease defined by the presence of hyperglycemia. It is characterized by hyperglycemia, decreased β cell numbers and maximal secretory

PUBLICATION202211

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WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 11, Issue 5, 1396-1406. Research Article ISSN 2277– 7105

ANTI-DIABETIC AND WOUND HEALING POTENTIAL OF JASMINUM GRANDIFLORUM

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Article Received on
23 Feb. 2022,
Revised on 15 March 2022,
Accepted on 05 April 2022
DOI: 10.20959/wjpr20225-23798

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ABSTRACT

The present study describes the anti-diabetic and Wound healing potential of ethanoloic extract of *Jasminum grandiflorum Linn. Leaves* on streptozocin induced diabetic rats and excision wound model to substantiate its folklore claim. The ethanolic extracts at two doses 100 and 200 mg/kg, p.o. prevented diabetes by Glucose oxidase method further studying its lipid profiles and anti-oxidant effects in rats. The wound healing potential of diabetic rats were confirmed by the excision wound model studies with surface epithelization and wound contraction. Pretreatment with ethanolic extract of *Jasminum grandiflorum Linn. leaves* significantly ($P < 0.05$) increased the anti-oxidant enzymes and lipid peroxidation index. Further in wound healing activity the epithelialization period was significantly ($p<0.01$; $P<0.001$) lower in 10% and 5 % ointment of EEJG as that wound induced group. The results showed that ethanolic extract of *Jasminum grandiflorum Linn. Leaves* had significant anti-diabetic and wound healing effects.

KEYWORDS: Anti-diabetic activity, Wound healing activity, ethanol, streptozocin Lipid profile studies, Jasminum grandiflorum Linn. Leaves.

INTRODUCTION

Diabetes is a metabolic disorder which is consequential to high blood glucose level, either because pancreas does not generate adequate amount of insulin or cells do not act in response to that insulin. The sedentary life style and obesity is the best known reason for diabetes. It becomes pandemic and the best known cause of mortality and morbidity (Leitner et al. 2017). Basically three types, i.e. type 1, type 2 and type 3 (gestational) of diabetes exist which

PUBLICATION202214

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European Journal of Molecular & Clinical Medicine

ISSN 2515-8260 Volume 09, Issue 07, 2022

DEVELOPMENT AND EVALUATION OF ANTIFUNGAL SOAP WITH HERBAL ANTIBACTERIAL PROPERTIES

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ABSTRACT

Herbal products have become increasingly important worldwide in medical and economic terms. Antifungal herbal antibacterial soap of Luliconazole were prepared & evaluated for dermal infection along with the addition of the oils and the extract of A*zadirachtaindica, Ocimum tenuiflorum, Aloe barbadensis miller, Santalum album.* The API used for the preparation of antifungal herbal antibacterial soap belongs to the antifungal class of azoles, inhibits the enzyme lanosterol demethylase, which is required for the production of ergosterol, which is a major component of the fungal cell membrane. It is mainly used in the treatment of skin infections such as athlete's foot, jock itch, and ringworm. The physicochemical parameters of formulations (Physical evaluation, pH, Foaming ability and foam stability) were determined. The results showed that the formulation have pH level nearly equal to skin pH, foaming index was excellent. The %drug release, % drug content, % solid content and microbial study was performed for API.

Keywords: Luliconazole, Herbal soap, Aloe Vera, Dermal infections

INTRODUCTION:

Luliconazole is an azoleantifungal that works by preventing the growth of the fungus. [1]

The skin diseases are common among all age groups and can be due to exposure towards microbes, chemical agents, biological toxin present in the environment, and also to some extend due to malnutrition [2]. Fungal infections are contagious and spread easily just close contact or sharing a comb or hairbrush with the infected person. They can be controlled in their initial stage by proper medications [1]. In this research the herbal medicated soap containing API, aloe vera gel, sandalwood oil, Neem oil, and Tulsi oil has shown the antibacterial and antifungal activity.

Sandalwood (*Santalum album)*

Sandalwood essential oil has many traditional uses. For centuries, East Indian sandalwood oil has been a popular ingredient in Ayurvedic medicine, the folk medicine of India. It's also

PUBLICATION202215

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PUBLICATION202216

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ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4

Journal of Coastal Life Medicine

Knowledge, Attitude & Practices Study on Hand Hygiene among the Children Aged 12-17 Years.

Received: 16 August 2022, **Revised:** 19 September 2022, **Accepted:** 24 October 2022

Keywords: COVID-19, India, pandemic, lockdown, hand hygiene'

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ABSTRACT

Introduction: The COVID-19 pandemic has demonstrated that good hand hygiene practices are crucial in controlling infections. Handwashing is one of the ways through which children can be kept safe from infections.

Objective: The primary objective of the research study was to determine the hand hygiene knowledge, attitude, and practices (KAP) of the respondents aged 12-17 years of the Maharashtra region. The study focused on comparing gender to understand who had a better knowledge regarding hand hygiene and comparing their attitudes.(1)

Method: A randomized survey was conducted among children aged 12 to 17 years old. A total of 108 respondents participated in the research study. A well-defined questionnaire determined respondents' KAP regarding hand hygiene. Statistical methods like the Chi-square test and Pearson Correlation test were performed to assess respondents' knowledge, attitude, and practices.

Results: Respondents had adequate hand hygiene knowledge, and COVID-19 has positively impacted respondents' attitude toward hand hygiene (P-value 0.30945509). However, respondents had a misconception regarding proper hand hygiene steps and practices. When correlating knowledge and practice, Pearson Correlation gave a value of -0.8842, indicating the correlation between Knowledge and Practices followed by the respondents was negative.

Conclusion: There was an adequate amount of knowledge about hand hygiene among respondents. The Chi-square analysis also indicated that girls' knowledge, attitude, and practices were better than boys. However, there was still a need to increase respondents' understanding of proper hand hygiene practices and procedures. On the positive side, COVID-19 has made respondents more aware of their hand hygiene practice.

JCLMM Volume 10 Issue 3 (2022) |147-164

PUBLICATION202217

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International Journal of
Pharmaceutical Sciences and Nanotechnology (IJPSN)
http://www.ijpsnonline.com

RESEARCH ARTICLE

Oral Fast Dissolving Films Containing Lyophilized Labetalol HCL with Hydroxy Propyl β-Cyclodextrin/ Soluplus: Formulation Development, In Vitro Evaluation

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How to cite this article: Nilesh Shrikant Kulnarni, Oral Fast Dissolving Films Containing Lyophilized Labetalol HCL with Hydroxy Propyl β-Cyclodextrin/ Soluplus: Formulation Development, In Vitro Evaluation, International Journal of Pharmaceutical Sciences and Nanotechnology. 2022, 15(3):

MS ID: 2320

https://doi.org/10.37285/ijpsn.2022.15.3.7

ABSTRACT

Introduction: Labetalol HCL is an antihypertensive drug used to treat high blood pressure in the long term management of angina. Labetalol HCL is readily absorbed after oral administration. Labetalol HCl undergoes considerable hepatic first-pass metabolism due to its lipid-soluble nature.

Objective: The drug has an absolute bioavailability of approximately 25%. To overcome extensive hepatic first-pass metabolism the oral fast-dissolving film for labetalol HCL need to be developed. Lyophilized inclusion complexes of Labetalol HCL were developed with the hydrophilic carrier as Soluplus a Polyvinyl acetate polyethene glycol graft copolymer and Hydroxy Propyl β-cyclodextrin.

Experimental: Lyophilized inclusion complexes of labetalol: Soluplus and labetalol HCL: HP-β-CD were prepared with 1:0.5 weight ratios. The prepared lyophilized inclusion complexes were evaluated for solubility estimation, drug content, and *In-vitro* dissolution study.

Results: The prepared inclusion complexes were characterized by Fourier transforms infrared spectroscopy and differential scanning calorimetry. Characterization of the lyophilized complex showed changed crystallinity of labetalol HCL. The fast dissolving oral film of labetalol HCL was prepared by solvent casting method by adding film-forming polymer as HPMC K 4M/ PVA in different proportions and Propylene Glycol was used as a plasticizer. The prepared batches of films were evaluated for weight variation, tensile strength, folding, endurance, disintegration time, surface pH, and drug content uniformity. All formulations prepared among F5 and F 7 showed a better result as compared to other formulations.

Conclusion: The study confirms the use of a lyophilized product containing Soluplus is best as that of HP-βCD for the preparation of fast dissolving film with HPMC/ PVA as film forming agent and propylene glycol as plasticizer respectively to improve dissolution rate and oral bioavailability of Labetalol HCl.

Keywords
Lyophilization, Oral Film, Bioavailability, Hydroxy Propyl β-cyclodextrin, Soluplus

Introduction

The oral route is the most preferred route of drug administration by manufacturers and medical practitioners due to the highest acceptability by patients. Fast dissolving

PUBLICATION202218

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ORIGINAL ARTICLE e-ISSN: 2349-0659 p-ISSN; 2350-0964

An Ocular Route of Administration for Drugs through Novel Approach of Self-microemulsifying Formulation – A Systematic Review

Nilesh S. Kulkarni*, Pratiksha Indore, Sonam Godase, Priyanka Shinde, Puja Prabhune

Abstract

Drug administration through ocular route is associated to treat the ophthalmic diseases; glaucoma, conjunctivitis, retinal disorder, and diabetic eye problems. Various ophthalmic formulations as nanoparticles, nanoemulsion, microemulsion, nanosphere, microsphere, and nanosuspension have been developed. Such novel formulations have ability to prolonged the contact time of dosage form on ocular surface and reduce the drug elimination. Microemulsion is the thermodynamically stable and clear dispersion of oil and aqueous phase stabilized by surfactant and cosurfactant with target droplet size up to100 nm. Self-microemulsifying drug delivery system (SMEDDS) approach is generally adopted to enhance bioavailability of poorly water-soluble drugs. SMEDDS is the appropriate system for ocular drug delivery as it improves the ocular drug retention, high ocular absorption, and extended duration of action. The surfactant/cosurfactant combination used in SMEDDS has capacity to improve drug permeation across the cornea. The review gives the highlights to understand the feasibility of SMEDDS as dosage form for ocular administration to increases or improve the bioavailability. Review highlights the developmental steps of SMEDDS for the ocular drug administration as novel dosage forms to improve patient compliance.

Keywords: Long chain triglycerides, Medium chain triglycerides, Ocular drug delivery, Pseudoternary phase diagram, Self-microemulsifying drug delivery system

Asian Pac. J. Health Sci., (2022); DOI: 10.21276/apjhs.2022.9.4.78

Introduction

Drug administration through ocular route is associated to treat the ophthalmic diseases; glaucoma, conjunctivitis, retinal disorder, and diabetic eye problems. The ophthalmic preparations are sterile, that is, free from foreign particles.

They are to be instilled in eye cavities. The nasolacrimal drainage, interaction of drug with lacrimal fluid, absorption of drug into lacrimal tissue, dilution with tears has influence on ocular bioavailability of drugs.[1]

Anatomic and Physiological Features of Eye

The human eye has the spherical shape with a diameter of 23 mm. The eye is an isolated, highly complex, and specialized organ for photoreceptor.

The eyeball is structurally divided into three layers.

1. The outer most layers which consist of the clear, transparent cornea, and white opaque sclera
2. In the middle layer, anterior part is iris, posterior is the choroid and ciliary body lies as intermediate part
3. Retina is the inner layer, it is an extension of the central nervous system.

The aqueous humor and vitreous humor have important role in the eye. The refractive element of the eye is Cornea. Cornea is composed of optically transparent tissues. The diameter of cornea is diameter that is about 11.7 mm with anterior surface radius that is about 7.8 mm with corneal thickness of 0.5–0.7 mm. The cornea is composed of epithelium bowman's membrane, stroma, descement's, and endothelium. The ciliary body adjusts the shape of cornea and lens. It focuses the light on retina. The receptors of retina convert nerve signal and allow them to pass to the brain. The blinking action compresses and releases the lacrimal sac. The created suction allows pull excess moisture from eyes surface. The drug gets entry inside the eye through cornea. The reason for entry of drug is associated with the structures of the cornea. Cornea consists of epithelium – stroma – endothelium, such a sandwitch structure is equivalent to a fat-water-fat composition. Hence, penetration/diffusion of non-polar compound across cornea depends on oil/water partition coefficient value.[2]

The permeability of lipophilic drugs is higher across corneal epithelium. Stroma has water-soluble (hydrophilic) nature as it forms 90% of corneal tissue. The endothelium is responsible for moisturizing the cornea. This lipophilic and hydrophilic structure is an effective barrier for the permeability of hydrophilic and lipophilic drugs. Hence, bioavailability improvement is major step need to be taken for development of novel dosage form. There are the various formulations/dosage forms that have been developed for the delivery of drug to the ophthalmic delivery. The ocular delivery improves the precorneal residence time of the drug. New formulation such as nanoparticles, nanoemulsion, microemulsion,

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How to cite this article: Kulkarni NS, Indore P, Godase S, Shinde P, Prabhune P. An Ocular Route of Administration for Drugs through Novel Approach of Self-microemulsifying Formulation – A Systematic Review. Asian Pac. J. Health Sci., 2022;9(4):414-418.

Source of support: Nil

Conflicts of interest: None

Received: 11/02/2022 **Revised:** 11/03/2022 **Accepted:** 19/04/2022

PUBLICATION202219

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Published online in http://ijam.co.in ISSN No: 0976-5921

International Journal of Ayurvedic Medicine, Vol 13 (2), 296-304

Verbena officinalis (Verbenaceae): Pharmacology, Toxicology and role in female health

Review Article

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Abstract

Verbena officinalis Linn (Verbenaceae), the common verbena or vervain, a traditional herb with immense cultural and medicinal significance in the European, Greek, American, Roman and Egyptian countries. Phytochemical analysis suggests the presence of iridoid glycosides, secoiridoid glycosides, phenylethanoid glycosides, flavones, pentacyclic triterpenoids, monoterpenes, sterols and their derivatives. Owing to the presence of these phytochemicals, wide range of pharmacological activities such as antibacterial, antiviral, antifungal, antidiarrheal, antitumour, antidepressant, anxiolytic, gastroprotective and hepatoprotective, etc are reported. Literature survey highlights the distinct role of *Verbena officinalis* in treating dysmenorrhoea, vaginitis, endometriosis, premenopausal night sweating, herbal tonic for pregnant women and lactating mothers and its use as emmenagogue. The review aims to promote studies on *Verbena officinalis* for its therapeutic role in female reproductive health and other ailments. The scientific databases used for compilation of the data were Google scholar, Pubmed the data made available specifically from 2010 to 2022.

Key Words: Ethnomedicine, Female health, Phytochemicals, Toxicity, *Verbena officinalis,* Verbenaceae.

Introduction

Needless to say, plants have immense medicinal properties and used in therapeutics since millennium. Traditional medicine systems, namely Ayurvedic, Unani, Siddha, Aromatherapy, Bach Flower remedies have been using medicinal plants extensively. Plant-based remedies are more acceptable in the public because of its likeliness to be safer than synthetic drugs (1). *Verbena officinalis* Linn, Verbenaceae is herbaceous perennial plant, with its origin in the Europe. *Verbena officinalis* has tiny purple flowers and slightly hairy, diamond shaped green, aromatic leaves. Verbena has been used since millennium in Traditional Chinese, American, European medicine systems. Phytoconstituents include iridoid glycosides, terpenoids. phenylethanoid glycosides and sterols. Pharmacological activities owing to the presence of phytoconstituents include anti-inflammatory, antinociceptive, neuroprotective, gastroprotective, wound healing, anti-tumour, antimicrobial activities and many have been reported in scientific literature.

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Aim

To promote studies on *Verbena officinalis* for its therapeutic role in female reproductive health and other ailments.

Objectives

· To promote studies on *Verbena officinalis* for its therapeutic role.
· To compile all database of *Verbena officinalis* and make it available to researchers to explore its therapeutic effects.

Vernacular names

Vervain, Bon Kariata, Herb of grace, pigeon's grass, Bhekpadee, Tharophijub, Pitta maree (2). L. – vervain Species: *V. officinalis* (3).

Geographical location

Verbena officinalis is found in the Asian, European, American continent as well as grown in China and Japan. In India, it is distributed in the north-eastern territory, mainly in Manipur, Assam, Meghalaya (4, 5, 6).

Cultivation and collection

The herb can be cultivated using seeds, root and stem cuttings. Seed propagation involves sowing seeds in late March. *Verbena officinalis* grows well in sandy

© 2022 IJRAR July 2022, Volume 9, Issue 3 www.ijrar.org (E-ISSN 2348-1269, P- ISSN 2349-5138)

IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

Antimicrobial activities of the different fractions from *Momordica dioica roxb* fruit

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ABSTRACT –

The present study was designed to screen the antimicrobial activity of *Momordica dioica roxb.* The coarse material of *Momordica dioica* was extracted with ethyl alcohol 95% using Soxhlet extraction method. And the ethyl alcohol extract will be subjected to fractionation by using different solvents like petroleum ether, diethyl ether, ethyl acetate, n-butanol, and water. The microorganisms used for antimicrobial activity were E. coil, S. aureus, and P. asparagus. the results revealed that the extracts of *Momordica dioica* fruits are effective against E. coli, S. aureus, and P. asparagus.

KEYWORDS: *Momordica dioica* fruits, antimicrobial activity, Aqueous extract, Ethyl acetate extract, Microorganisms.

INTRODUCTION:

Momordica dioica fruits belonging to family *Cucurbitaceae* are useful in various diseases and disorder like diuretic, alexiteric, stomachic, laxative, hepatoprotective, and have anti venum property. It is also used to cure asthma, leprosy, excessive salivation, anti-inflammatory in case of snake bite, elephantiasis. Used in fever, mental disorders, digestive disorders, and heart diseases and to treat discharge from mucous membrane. Fresh fruit juice is prescribed for hypertension. [1,2]

Phytochemical screening in the presence of alkaloids, steroids, triterpenoids, flavonoids, glycosides, saponins, triterpenes, of urisolic acid and saturated fatty acids, ascorbic acid, vitamin A, thiamine, riboflavin, niacin, lectins, ascorbic acid, carotenes, oleanolic acid, saturated fatty acid. [3]

The present study was carried out to evaluate the antimicrobial activity of different fractionation of solvents like petroleum ether, diethyl ether, ethyl acetate, n-butanol, and water extract of the fruits of *Momordica dioica*. And petroleum ether, diethyl ether , n-butanol showed minimum activity as compared to the ethyl acetate and Aq.extract showed maximum activity.

PUBLICATION202221

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Original Article

Development and Validation of Chemometric-Assisted Spectrophotometric Method for the Simultaneous Estimation of Aceclofenac, Paracetamol, and Chlorzoxazone with Impurities

Rajshree Gunjal[1], Arti Gajbhar[2], Vijaya Vichare[3], Abhijeet Sutar[4], Minal Deshmukh[5], Vishnu Choudhari[6]

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Abstract

Background: Analysis of tertiary mixtures of analytes along with their impurities with simple and cost effective manner is always of interest. Utility of chemometric techniques are growing in pharmaceuticals, it improve speediness in the analysis and also provide analytical solutions with reduce the number of steps in the analytical method. In this study UV-Visible spectrophotometry coupled with principle component regression (PCR) and partial least square (PLS) multivariate methods was applied for estimation of three drugs in their formulation. **Method:** The calibration and validation sets were prepared in linear concentration range of three drugs and major impurities of paracetamol and aceclofenac. The series of sets were prepared using multilevel multifactorial design. Leave-One-Out (LOO) cross validation technique was employed to get essential number of Latent variables (LVs) that provides the greatest predictive ability. The developed method was studied for qualitative and quantitative analysis of titled drugs and validated as per regulatory guidelines. **Results:** The results showed the values of coefficient of determination (R2) for all drugs and impurities was higher than 0.99 indicating high acceptability. The obtained RMSE values were relatively low. Coefficient of determination and RMSE values indicate good accuracy and precision, respectively. **Conclusion:** Proposed method was successfully used for analysis of aceclofenac, paracetamol and chlorzoxazone in tablet dosage form and major impurities of aceclofenac, paracetamol in bulk.

Keywords: Aceclofenac, analytical method validation, chemometric, chlorzoxazone, impurities, paracetamol, partial least square, principal component regression, spectrophotometric

Introduction

Aceclofenac (ACF) is chemically, ([2-{2, 6-dichlorophenyl] amino} phenylacetooxy acetic acid) [Figure 1a], is a nonsteroidal anti-inflammatory agent with prominent anti-inflammatory and analgesic activities. ACF inhibits action of cyclooxygenase enzyme. Paracetamol (PAR) is chemically, N-acetyl-p-aminophenol [Figure 1b], it acts by blocking COX-2 mostly in the central nervous system.[1] Chlorzoxazone (CHX) is chemically 5-chloro-2-hydroxy benzoxazole [Figure 1c], it inhibits muscle spasm. This combination of three drugs is widely prescribed for the treatment of pain associated with the muscle spasm. Diclofenac-free acid (DFA) [Figure 1d] and p-aminophenol (PAP) [Figure 1e] are major impurities of ACF and PAR, respectively.

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Access this article online

Quick Response Code:

Website: www.bmbtrj.org

DOI: 10.4103/bbrj.bbrj_92_22

How to cite this article: Gunjal R, Gajbhar A, Vichare V, Sutar A, Deshmukh M, Choudhari V. Development and validation of chemometric-assisted spectrophotometric method for the simultaneous estimation of aceclofenac, paracetamol, and chlorzoxazone with impurities. Biomed Biotechnol Res J 2022;6:458-65.

Submitted: 13-Apr-2022; **Revised:** 18-May-2022; **Accepted:** 28-Jun-2022; **Published:** 17-Sep-2022.

PUBLICATION202223

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PUBLICATION202224

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NEUROQUANTOLOGY | OCTOBER 2022 | VOLUME 20 | ISSUE 11 |PAGE 6968-6980| DOI: 10.14704/NQ.2022.20.11.NQ66693
Ms. Sadhana Pawar et al / Formulation and Appraisal of innovative acyclovir emulsion

Formulation and Appraisal of innovative acyclovir emulsion

Ms. Sadhana Pawar[1], Mr. Pankaj Neje[1],Ms. SaimaShaikh,Ms. Shrishti Mukkirwar,Mr. Anand Kakde[1*],Dr. Raksha Mhetre[2]and Dr. Aniket Garud[1*].

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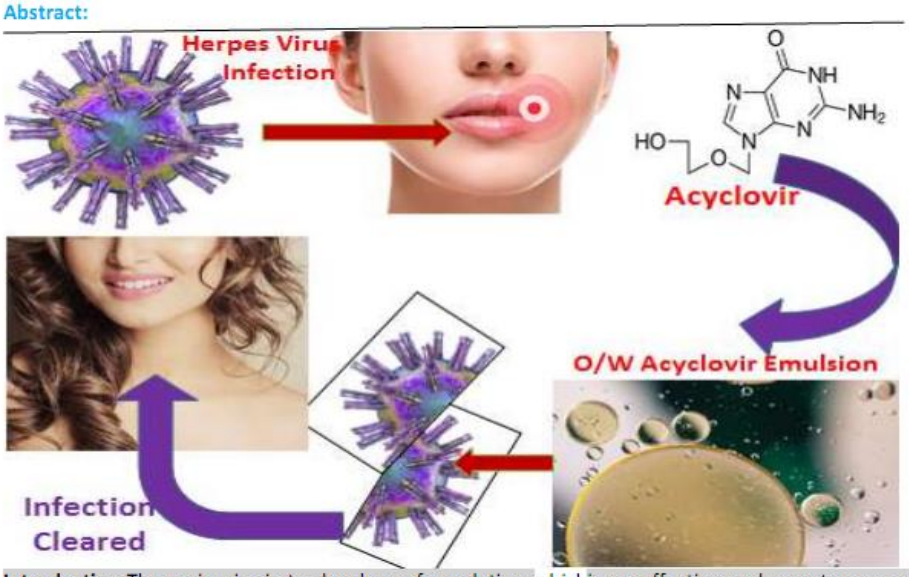
Abstract:



Introduction: The main aim is to develop a formulation whichis an effective and easy-to-use product with good penetration property and a safe, stable, efficacious, patient compatible product product like emulsion.for Oral Herpes or cold sores is an infection caused by Herpes Simplexis a viral disease that can lead to painful sores on the lips and mouth (oral herpes) and anogenital area (generally referred to as "herpes"). Herpes Virus (HSV) Type 1 was responsible for the former and Type 2 for the latter. The combination of ingredients in the formulation aids in good stability, better penetration property and quicker healing.

Materials and methods: For the treatment of Herpes Simplex Virus (HSV) types 1 and 2, acyclovir is an effective antiviral medication. The treatment of varicella-zoster virus infections is also helped by this medication. There are several acyclovir products available on the market, including tablets, ointments,

PUBLICATION202225

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Original Article

Design, Docking, Insilco ADME Prediction Of Novel Indole Based Benzamide Scaffolds Targeting For Estrogen Receptor Alfa In Af-2 Domain For Effective Anticancer Treatment

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DOI: 10.47750/pnr.2022.13.S05.443

Abstract

Aim: To discover some novel indole based benzamide scaffold and their screening through in silico approach.

Background: Designed 7-substituted -1-(4-(piperidine-1-yl methoxy)benzyl)-1H-indole-3-carboxamide derivatives targeting on ERα modulators, several interactions between the ligand and amino acid residues that would probably elicit fruitful modulation of the receptor using 4XI3 pdb of ERα.

Objective: Studied in silico novel molecules of 7-substituted -1-(4-(piperidine-1-yl methoxy)benzyl)-1H-indole-3-carboxamide derivatives and test their abilities to modulate ER-α through human cell line cultures as anti-breast cancer agent.

Method: Designed novel 7-substituted -1-(4-(piperidine-1-yl methoxy) benzyl)-1H-indole-3-carboxamide derivatives and in silico method involved to study their virtual screening for the receptor modulation by molecular docking studies using Auto-dock Vina in PyRx. To determine the binding interactions for best-fit conformations in AF-2 binding site of the ERα receptor studied using Discovery studio visualizer (DSV) and ADME predictions by Swiss ADMET.

Result : The result based on the docking studies, The designed ligands B73bi, B73axiv B73bvi ,B73av, B73avi, B73avi, B73axiv, B74ai B74ai and B74bxiv have shown better Binding Affinity than rest, as compare with the standard drug Bazedoxifene (Baz). The observed result explained the presence of substitution at 7^{th} position of the benzamide on indole scaffold containing alkyl, ester, amide, N,N diamine groups shows promising interactions like BZD. Therefore, B73aiii carrying halide (G Score= -10.3), B73av carrying methoxy benzoate (G Score = -9.9), B73axiv carrying ethoxy (G Score= -9.4) were found to interact suitably with the active amino acid residues in the targeted cavity where reported interaction with the standard to be involved.

Conclusion: The most promising substituted benzamide analogue on indole can be synthesized and evaluated to verify the ani-cancer activity for breast cancer.

Publication202226

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PUBLICATION202227

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Review Article

Access this article online
Quick Response Code:

Website: www.jpdtsm.com
DOI: 10.4103/jpdtsm.jpdtsm_9_22

A Review on Anticancer Potential of *Berberis aristata* and Berberine with Focus on Quantitative Methods

Manasi Rokade, Vijaya Vichare, Tejaswini Neve, Bhagyashri Parande, Shashikant Dhole

Abstract

Berberis aristata (BA) is a traditional herbal ayurvedic medicine widely used from ancient time and has various therapeutic effect. In this review, we had tried to emphasize on its pharmacognistic as well phytochemical parameters. We had aiming to focus on estimation of berberin in extract using different analytical techniques such as high-performance liquid chromatography, high-performance thin-layer chromatography from various parts of BA plant. It contains different isoquinoline alkaloids, namely berberine, palmitine, berbamine which are contributing in the pharmacological action of BA. As it has various pharmacological actions such as anti-bacterial, anti-diarrheal, anti-inflammatory, anti-pyretic, and anti-hemorrhagic. Along with that, it is also a potential anticancer agent as its methanolic extract showed potent activity against different cell lines such as breast cancer, colon cancer, cervical cancer cell lines. In this review, we had emphasized on phamacognosy, phytochemistry, and analysis for berberine content of BA along with its anticancer potential. A brief spotlight had also given on anticancer prospective of berberine.

Keywords:

Berberine, *Berberis aristata*, cancer, cell lines, high-performance liquid chromatography, high-performance thin-layer chromatography

Introduction

Berberis aristata (BA) usually known as "Indian Barberry," Daruhaldi, or tree turmeric is shrub that belongs to the family Berberidaceae with genus Berberis.[1] It is found in temperate and sub-tropical regions of Asia, Europe, and America. It is native to the Himalayas region of India and widely distributed in Sri Lanka, Bhutan, and hilly areas of Nepal. It is 1.8–3.6 m at elevation of 1000–3000 m in height.[2] It is extensively used in ayurvedic medicines from ancient times. Conventionally, it is used as anti-microbial, anti-bacterial, anti-pyretic, anti-hemorrhagic, anti-inflammatory, immunostimulant.[3] Available ayurvedic marketed formulations of BA are tablets, capsules, syrups which are useful in the treatment of malaria, bleeding, fever, jaundice, diabetes, skin and eye infection, hepatitis, diarrhea.[4]

Literature search strategy

The main focus of this article is to provide pharmacognosy and anticancer potential of BA. Evidences obtained from experimental, preclinical, and clinical studies are evaluated and presented in subject area.

The data mentioned below are taken from different sources such as Scopus, Web of science, Google scholar, Elsevier, ScienceDirect, PubMed using different terms, keywords, and title words during the search. The terms used in these searches were as follows: berberine, BA, analytical

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Submitted: 04-02-2022
Revised: 05-02-2022
Accepted: 06-02-2022
Published: 15-Jun-2022

How to cite this article: Rokade M, Vichare V, Neve T, Parande B, Dhole S. A review on anticancer potential of *Berberis aristata* and berberine with focus on quantitative methods. J Prev Diagn Treat Strategies Med 2022;1:67-75.

PUBLICATION202228

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Research Paper

Development and Validation of Liquid Chromatography Method for Simultaneous Estimation of Miconazole and Clobetasol and Characterization of Hydrolytic Degradation Products using Liquid Chromatography with Tandem Mass Spectrometry

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A reverse phase high performance liquid chromatography method was developed to estimate miconazole nitrate and clobetasol propionate simultaneously from a cream formulation. The developed method was validated as per International council for harmonisation guidelines. The proposed method was effectively applied for the characterization of degradation products formed under hydrolytic stressed conditions. The major degradants formed by hydrolysis of both the analytes were separated, identified and characterized. Both drugs were found susceptible to acid and base hydrolytic conditions while were stable under neutral hydrolysis. The liquid chromatography with tandem mass spectrometry studies were further carried out on stressed samples that provided the accurate masses of drug and their degradation products. The mass spectral data and fragmentation patterns were further explored to characterize the degradants and assign structures to them. Total nine degradants were characterized and the degradation pathways for both the drugs were proposed.

Key words: Miconazole nitrate, clobetasol propionate, degradation products, high performance liquid chromatography, liquid chromatography with tandem mass spectrometry, validation

The antifungal agent, Miconazole nitrate (MIC) is used to treat topical fungal infection because of its effective action against dermatophytes and *Candida albicans*. Clobetasol propionate (CLO), a super potent class I corticosteroid with anti-inflammatory, vaso-constrictive and anti-pruritic activity is a drug of choice to treat skin disorders like dermatoses, psoriasis and seborrhoea. The combination of CLO and MIC is used in various skin diseases like inflammatory skin conditions, itching, yeast infection of vagina and vulva and other conditions due to their synergistic effect[1].

An extensive literature indicates, High Performance Liquid Chromatography (HPLC) is widely used for estimation of MIC and CLO either alone[2-6] or in combination with another drugs[7-11] from formulation or biological fluid[12]. CLO is estimated using certain Ultraviolet (UV) spectrometry methods[13,14]. Few chromatographic methods based research articles on stability studies for the estimation of MIC alone[15,16] and in combination of MIC or CLO with another drug[17-20] have been reported. There also exist reports on simultaneous estimation of titled analytes in bulk sample and formulation by HPLC[21,22], High Performance Thin Layer Chromatography (HPTLC)[23] and UV spectrophotometry[24]. Thus, numerous methods have been published in the literature to estimate MIC and CLO in bulk, drug product as well as in bio samples. But, so far, there exists no report on the development

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Accepted 04 March 2022
Revised 07 August 2021
Received 01 April 2021
Indian J Pharm Sci 2022;84(2):268-280

PUBLICATION202231

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Open Access Research Journal of
Science and Technology
Journals home page: https://oarjst.com/
ISSN: 2782-9960 (Online)

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(REVIEW ARTICLE)

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Biopolymers: A comprehensive review

Mohini Chandrashekhar Upadhye *, Mohini Chetan Kuchekar, Rohini Revansiddhappa Pujari and Nutan Uttam Sable

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Open Access Research Journal of Science and Technology, 2022, 04(01), 013–018

Publication history: Received on 23 November 2021; revised on 29 December 2021; accepted on 31 December 2021

Article DOI: https://doi.org/10.53022/oarjst.2022.4.1.0070

Abstract

Biopolymers are compounds prepared by using various living organisms, including plants. These are composed of repeated units of the same or similar structure (monomers) linked together. Rubber, starch, cellulose, proteins and DNA, RNA, chitin, and peptides are some of the examples of natural biopolymers. Biopolymers are a diverse and remarkably versatile class of materials that are either produced by biological systems or synthesize from biological sources. Biopolymers are used in pharmaceutical industry and also in food industry.Naturally derived polymers are also used for conditioning benefits in hair and skin care. Biopolymers have various applications in medicine, food, packaging, and petroleum industries. This review article is focused on various aspects of biopolymers with a special emphasis on role of biopolymers in green nanotechnology and agriculture.

Keywords: Biopolymer; Pharmaceutical; Production; Polysaccharides; Cellulose; Lignocellulose

1. Introduction

Biopolymers are the polymers that are developed from living organisms. The name "Biopolymer" indicates that it is a bio-degradable polymer. Biopolymers have been present on earth for billions of years and are older than synthetic polymers such as plastics.

These polymers play an essential role in nature. They are extremely useful in performing functions like storage of energy, preservation and transmittance of genetic information and cellular construction.

Sugar based polymers, such as polyactides, naturally degenerate in the human body without producing any harmful side effects so, they are used for medical purposes. Starch based biopolymers can be used for creating conventional plastic by extruding and injection molding method. Biopolymers of synthetic nature are used to manufacture mats. Cellulose based biopolymers, such as cellophane, are used as a packaging material. These chemical compounds can be used to make thin wrapping films, food trays and pellets for sending fragile goods by shipping. Classification of biopolymers

There are 4 different categories, amongst first three categories are obtained from renewable resources -

- Polymers from biomass such as the agro-polymers from agro-resources (e.g.- starch, cellulose).
- Polymers obtained by microbial production, e.g.- polyhydroxy-alkanoates.
- Polymers conventionally and chemically synthesised, whose the monomers are obtained from agro-resources, e.g. - poly (lactic acid).

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PUBLICATION202232

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Original Article

Antidiabetic Potential of *Ficus glomerata* Roots with a Special Emphasis on Estimation of Bioactive Compounds by a Novel Validated HPTLC Technique

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ABSTRACT

Background: The data presented in this article for *Ficus glomerata* Linn. belonging to family Moraceace which is commonly found all over India. This study aimed towards the development and validation of high-performance thin-layer chromatography (HPTLC) method for simultaneous estimation of lupeol and quercetin from *Ficus glomerata* and correlate with its antidiabetic potential. **Methods:** The various fractions of ethanolic extract of *Ficus glomerata* root were prepared. The HPTLC analysis of quercetin and lupeol which are the important phytoconstituents responsible for various pharmacological actions was carried out at 525 nm. ICH guidelines were followed to validate this method for accuracy, precision and repeatability. **Results:** The linearity range of quercetin and lupeol were obtained as 400-2400 ng/spot and 1000- 5000 ng/spot respectively. Percent drug content was highest in diethyl ether fraction (quercetin 2531.8 ng and lupeol 1400 ng). The limit of detection value (LOD) obtained for quercetin and lupeol was 3.0793 and 3.1645 ng and the limit of quantification (LOQ) was 9.3314 and 9.5895 ng respectively. This method developed was accurate, precise and simple has shown higher resolution from other phytoconstituents present in the fractions. The method can be very effectively applied for analyzing the quality of herbal material and formulations containing *Ficus glomerata*. Antidiabetic activity of various fractions of ethanolic extract of *Ficus glomerata* roots was studied on alloxan-induced diabetic rats. Treatment with fractions was continued for 11 days. The effect of the fractions on glucose was analyzed. Diabetic rats treated with diethyl ether fraction exhibited a significant ($p<0.05$) decrease in glucose levels, indicating the potential use of *Ficus glomerata* in diabetes mellitus. **Conclusion:** As per the ICH guidelines, the HPTLC method used for simultaneous estimation of lupeol and quercetin was accurate, precise and specific. The method used for phytochemical standardization of various fractions of ethanolic extract of the roots of *Ficus glomerata* and correlated with its antidiabetic activity.

Key words: *Ficus glomerata*, HPTLC, Lupeol, Quercetin, Alloxan, Antidiabetic activity.

INTRODUCTION

Diabetes Mellitus (DM) is a dreadful metabolic disorder featured by enhanced blood glucose levels occurring due to marked impairment in metabolic processes due to defects in either secretion of insulin or response or both.[1] Insulin resistance, hyperglycemia and relative insulin deficiency are the major clinical manifestations observed in patients of both Type 1 and Type 2 forms of DM.[2] As of 2020, the worldwide prevalence of diabetes has been increasing constantly and about 500 million people are suffering from DM.[3,4] The pathologic indication of DM especially Type 2 DM comprehends both macrovascular and microvascular complications.[5] The chronicity of hyperglycemia results in injury to organ systems mainly the eyes, kidneys, nerves and heart.[6]

Submission Date: 25-11-2020;
Revision Date: 26-12-2021;
Accepted Date: 28-01-2022.

DOI: 10.5530/ijper.56.2.68

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www.ijper.org

PUBLICATION202233

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Asian Journal of Pharmaceutical Analysis. 12(2): April - June, 2022

ISSN 2231-5667 (Print)
2231-5675 (Online)
DOI:

Vol. 12 | Issue-02|
April - June| 2022

Available online at
www.anvpublication.org
www.asianpharmaonline.org

Asian Journal of Pharmaceutical Analysis
Home page *www. ajpaonline.com*

RESEARCH ARTICLE

Review on Forced Degradation Study of Statins

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ABSTRACT:

The degradation of new drug ingredients and drug products in more severe settings than accelerated conditions is referred to as forced degradation research. Forced degradation experiments were carried out to demonstrate the specificity of stability-indicating methodologies, providing insight into degradation pathways and drug degradation products, and assisting in the understanding of degradation product structures., identifying degradation products that could be spontaneously generated during storage and use of drugs and to facilitate improvement in manufacturing process and formulation corresponding with accelerated stability studies Statins, a type of lipid-lowering medication, are the most commonly prescribed and are an example of an unstable drug. In the presence of high temperatures and humidity, statins are susceptible to hydrolysis. As a result, the review discusses various studies of statin drug forced degradation studies. To describe the drug's intrinsic stability, the terms atorvastatin, Fluvastatin, pitavastatin, ruvastatin, simvastatin, and pravastatin are used. assist the selection of formulations and packaging as well as proper storage conditions.

KEYWORDS: Forced degradation study, Stress testing, stability study, Drugs stability, Statins.

INTRODUCTION:

The chemical stability of pharmaceutical drug molecules requires great center of attention due to its effect on the efficacy and safety of drug products[1] ICH [International conference on harmonization] and FDA [Food and Drug Administration] have guidelines which state the requirement of stability testing data for understanding various Environmental barriers and factors.[2] Forced deterioration is a technique in which a product's or material's natural degrading rate is accelerated by adding stress to it.

Stress testing, according to ICH recommendations, is used to find degradation outcomes that can help determine intrinsic molecular stability, develop degradation routes, and validate stability-indicating methodologies. ICH Guidelines for stability testing are ICH Q1A i.e. Stability testing of new drug substance, ICH Q1B: Photostability testing of new drug substance, ICH Q2: Validation of analytical procedure methodology[3]. Stress test should be consistent with product specific storage conditions, decomposition, manufacturing and normal use conditions in each case.[4] Based on good scientific understanding of the mechanism of decomposition of a product under typical condition the choice of force degradation should be selected. Decomposition of 10-15% is considered for validation of chromatographic purity test.[5] Stress factors suggested for forced degradation studies consist of acid or base hydrolysis, oxidation, thermal degradation, and photolysis.[6]

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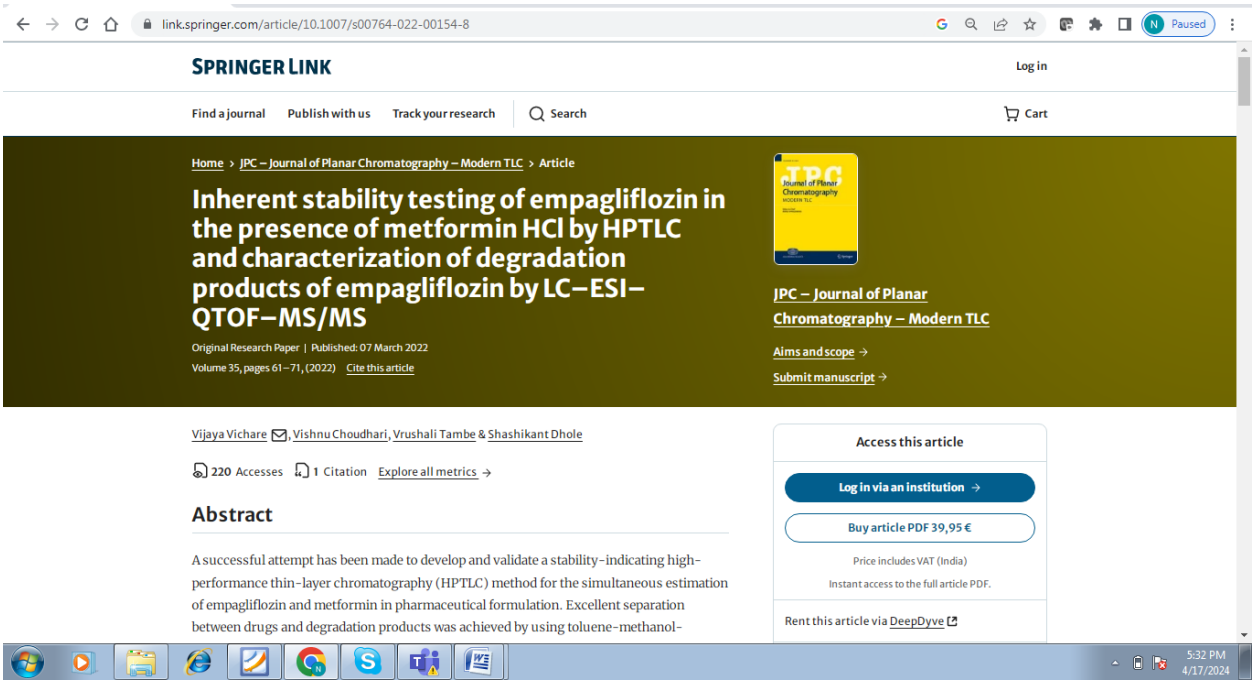

PUBLICATION202235

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Advances in Pharmacology and Pharmacy 10(3): 173-180, 2022
DOI: 10.13189/app.2022.100303
http://www.hrpub.org

Characterization of Oxidative Degradation Product of Canagliflozin by LC-MS/MS

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Received October 7, 2021; Revised February 23, 2022; Accepted March 15, 2022

Cite This Paper in the following Citation Styles

(a): [1] Vijaya Vichare, Vishnu Choudhari, Vrushali Tambe, Shashikant Dhole , "Characterization of Oxidative Degradation Product of Canagliflozin by LC-MS/MS," Advances in Pharmacology and Pharmacy, Vol. 10, No. 3, pp. 173 - 180, 2022. DOI: 10.13189/app.2022.100303.

(b): Vijaya Vichare, Vishnu Choudhari, Vrushali Tambe, Shashikant Dhole (2022). Characterization of Oxidative Degradation Product of Canagliflozin by LC-MS/MS. Advances in Pharmacology and Pharmacy, 10(3), 173 - 180. DOI: 10.13189/app.2022.100303.

Abstract Prior knowledge of chemical stability of drugs directs path for right selection of dosage form, excipients, storage conditions and packaging material. Literature survey revealed that, there are analytical methods reported for quantification and stability indication of Canagliflozin in bulk and formulation. But there is not much information available about the degradation products generated under different stability conditions. With this background, characterization of oxidative degradation product of Canagliflozin was successfully carried out by Liquid Chromatography-Mass Spectrometry (LC-MS/MS) studies. Degradation product was generated by forced degradation, according to International Conference on Harmonization (ICH) guidelines. Degradation product was separated from Canagliflozin by validated reverse phase (RP)-HPLC method using C18 column and Acetonitrile: Water pH 3.0 adjusted with 0.1% formic acid (70: 30, v/v) as mobile phase at a flow rate of 1mL/min. The developed RP-HPLC method was validated for different parameters as per ICH guidelines. The method was found to be linear in a range of 25-225 µg/mL. The developed method was found to be specific, accurate, precise, sensitive and robust. The marketed tablet formulation was analyzed by the developed method and the percent drug content was found to be 100.09 ± 1.96 % w/w. Separated degradation product was characterized by LC-MS/MS studies. From LC-MS/MS data probable structure of the degradation product was interpreted and the mechanism of degradation was proposed. The probable structure of degradation product was proposed as2-(4-Fluorophenyl)-5-({2-methyl -5-[3,4,5-trihydroxy-6-(hydroxymethyl)oxan-2-yl]phenyl} methyl) thiophene-1-one. The mechanism of degradation was proposed by S-oxidation of thiophene ring to form thiophene oxide. This information will help synthetic chemists to design a synthesis scheme for the oxidative degradation product, which can be used as a reference standard for impurity profiling. It is also suggested to protect CN from oxidative conditions for improved stability.

Keywords Canagliflozin, RP-HPLC Method, Oxidative Degradation, LC-MS/MS, Characterization

1. Introduction

Canagliflozin (CN) is a selective SGLT2 inhibitor approved by FDA for the treatment of type 2 Diabetes Mellitus [1]. 90% of glucose is reabsorbed by kidney through SGLT2. Inhibition of SGLT2 inhibits renal reabsorption of glucose and helps in maintenance of blood glucose levels in diabetes mellitus patients [2]. CN is chemically,2-{3-[5-(4-fluoro-phenyl)-thiophen-2-ylmethy l]-4-methyl-phenyl}-6hydroxymethyltetrahydro-pyran-3,4 ,5-triol [3] (Figure 1). It is not official in IP, BP and USP.

A NOVEL VALIDATED STABILITY INDICATING ANALYTICAL METHOD FOR QUANTIFICATION OF EMPAGLIFLOZIN IN BULK AND MARKETED FORMULATION BY RP-HPLC APPLYING EXPERIMENTAL DESIGN APPROACH

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(Received 23 June 2020) (Accepted 18 August 2020)

ABSTRACT

A stability indicating reversed-phase high-performance liquid-chromatographic method for analysis of empagliflozin was developed and validated as per the ICH guidelines. Statistical design of experiment was applied for optimization, where independent variables used were methanol proportions in mobile phase and flow rate. Experiment was carried out on an analytical reversed phase column Cosmosil C_{18} (250 x 4.6 mm, 5 µm). Based on the results obtained from these studies, suitable mobile phase with appropriate composition was selected and utilized for method development applying DoE approach. The mobile phase used was methanol: water (85:15 V/V). The flow rate was set at 0.8 mL min^{-1} and UV detection was carried out at 225 nm. The retention time of empagliflozin was found to be 4.259 min. The lower solvent consumption along with the short analytical run time (≤05 minute) provides a cost effective and environment friendly chromatographic procedure. The measured signal was shown to be precise, accurate and linear over the concentration range tested (10-50 µg mL^{-1}) with a correlation coefficient of 0.9999. Thus, the proposed methodology is rapid, selective and requires simple sample preparation steps and represents a good procedure for analysis of empagliflozin. Central Composite Design (CCD) was used for method development of empagliflozin. Two factors were selected with eight center points and response of empagliflozin was measured in terms of retention time which dependent on two factors namely, methanol content in mobile phase and flow rate. CCD was effective means in optimization of HPLC for analysis of empagliflozin in pharmaceutical formulation. The stability of the drug was examined over different stress conditions as per International Conference on Harmonization (ICH) guidelines. Results obtained from the force degradation studies indicated that the developed method is appropriate for stability studies.

Keywords: Method Validation, DoE, RP-HPLC, Forced degradation study

INTRODUCTION

Empagliflozin (EN) is a sodium glucose cotransporter-2 (SGLT-2) inhibitor, used in the treatment of Type-2 diabetes. SGLT-2 are newly developed anti-hyperglycemic agents and are also called as gliflozins. EN inhibits the reabsorption of glucose in kidney and lowers the blood glucose level. Chemically, EN (Fig. 1) is 1-chloro-4-(glucopyranos-1-yl)-2-(4-(tetrahydrofuran-3-yloxy) benzyl) benzene[1-2]. Literature review of empagliflozin in bulk and pharmaceutical dosage form alone or in combination with metformin or linagliptin revealed high performance liquid chromatographic methods[3-8]. The present work aims to develop and validate stability indicating RP-HPLC method for determination of EN by using design of experiment (DoE) in bulk and pharmaceutical formulations.

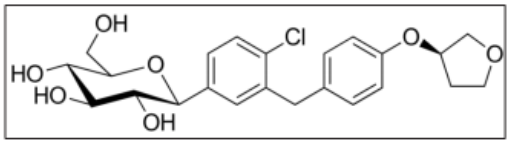

Fig. 1: Chemical structure of empagliflozin (EN)

MATERIALS AND METHODS

Drug and reagents

Analytical grade pure sample of empagliflozin was obtained as a gift from Lupin Ltd. Pune, Maharashtra, India The pharmaceutical dosage form used in this study was

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https://doi.org/10.53879/id.59.05.12595

PUBLICATION202237

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Optimisation of cilnidipine nanoparticles using box-behnken design: in-vitro, toxicity and bioavailability assessment

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&
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Received 17 May 2021, Accepted 24 Sep 2021, Published online: 06 Oct 2021

- https://doi.org/10.1080/10667857.2021.1988038

ABSTRACT

Cilnidipine is an antihypertensive drug with low solubility and poor bioavailability. This study aimed to formulate and optimise nanoparticles to improve the solubility, drug release and bioavailability of cilnidipine. The cilnidipine nanoparticles were prepared by the anti-solvent precipitation-ultrasound technology and optimised by a 3-factor, 3-level Box- Behnken design. Particle size and zeta potential of the cilnidipine nanoparticles were 60 ± 7.18 nm and -14.5 ± 4.12 mV, respectively. A greater value of pharmacokinetic parameters–maximum plasma concentration and area under curve has indicated better drug absorption in the form of nanoparticles. The value of half-life of cilnidipine nanoparticles (1.2 h) decreased compared to the drug (2.4 h),which concluded that, the increased absorption of cilnidipine nanoparticles. These findings reinforce that the formulation of nanoparticles is a new approach for solubility and bioavailability enhancement of cilnidipine.

PUBLICATION202238

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Published: 10 November 2021

Tailoring of Antihypertensive Drug-Loaded Nanoparticles: In Vitro, Toxicity, and Bioavailability Assessment

Raksha Laxman Mhetre, Vishal Bhanudas Hol, Rahul Chanshetty & Shashikant N. Dhole

BioNanoScience 12, 28–40 (2022) | Cite this article

72 Accesses | Metrics

Abstract

Telmisartan is an antihypertensive drug with low solubility and poor bioavailability. The goal of this study was to fabricate and characterize telmisartan nanoparticles to improve the dissolution and bioavailability of telmisartan. This study aims to tailor nanoparticles of telmisartan for the solubility and bioavailability enhancement by cost-effective technique. Telmisartan nanoparticles were prepared by antisolvent precipitation-ultrasonication technology using stabilizers and surfactants. The combination of hydroxypropyl methylcellulose-sodium dodecyl sulfate along with ultrasonication for 20 min was found to be effective for the stabilization of telmisartan nanoparticles. Stable nanoparticles of 52 nm particle size were obtained. Differential scanning calorimetry and powder X-ray diffraction studies confirmed that the crystallinity of the drug was reduced in the nanoparticles. Saturation solubility and dissolution were increased due to the reduction in particle size and the amorphous nature of the drug in the formulated nanoparticles. An acute oral toxicity study of telmisartan nanoparticles was performed and concluded that nanoparticles of telmisartan at selected doses are not toxic and do not show mortality at the administered dose. Significant values of pharmacokinetic parameters—maximum plasma concentration and area under curve—have indicated better absorption of drug in the form of nanoparticles. The value of half-life of telmisartan nanoparticles (12.73 ± 0.59 h) was decreased compared to drug (26.86 ± 2.0 h), which concluded the increased oral absorption of telmisartan nanoparticles. All these findings reinforce the fact that the formulation of telmisartan nanoparticles is a new approach for solubility and bioavailability enhancement of telmisartan.

PUBLICATION202239

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GIS SCIENCE JOURNAL ISSN NO : 1869-9391

DASHAMOOLA: A SYSTEMATIC OVERVIEW

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Abstract: Ayurveda is a science of life that has been around for thousands of years. According to Ayurveda, Dash means ten and Moola means Roots. Dashmoola contains ten roots of different ten plants which are taken in equal proportion. Generally it is considered as a combination of Brihat Panchamoola and Laghu Panchamoola. In the ten roots five roots are of trees and five roots are of shrubs. The roots of five trees are known as Brihat Panchmoola and the roots of shrubs are known as Laghu panchmoola. Brihat Panchmoola contains Bilva, Gambhari, Agnimantha, Patala, Shyonaka whereas Laghu Panchmoola contains Brahati, Gokharu, Kantakari, Prishniparni, Shalaparni The combination of these ten roots is used widely in Ayurveda which acts on Vata and Dosha and reduces its aggravation Nerves, muscles, bones, and joints are all linked to a variety of diseases. It's anti-inflammatory, antioxidant, and analgesic properties are all potent. In ayurvedic medicine, the polyhrebal combination is one of the most common ingredients used to prepare many forms of medicine used for treatment of various ailments, especially Vata Roga. The health benefits of Dashmoola are huge in number and the major issues among them include: Arthritis, asthma, headache, puerperal problems, parkinsons disease, gout, muscle spasm, lower back ache.

Keyword: Dashmoola, Gokharu, Bael, Shalaparni, Tridosha etc.

Turkish Journal of Physiotherapy and Rehabilitation; 32(3)
ISSN 2651-4451 | e-ISSN 2651-446X

Development and Characterization of Itraconazole Loaded Emulgel

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ABSTRACT:

Background: Itraconazole is an anti-fungal agent, practically insoluble in water and dilute acids, slightly soluble in ethanol (95%) and freely soluble in dichloromethane. Itraconazole shows low solubility across the physiological pH range result in incomplete absorption from the gastrointestinal tract and thus shows low in vivo bioavailability (55%). Emulgel of Itraconazole improve the solubility thereby its bioavailability.

Methods: In the present study emulgel was prepared by using Carbopol 934 to prepare gel , liquid paraffin was used as oil phase.Itraconazole first dissolved in dichloromethane and later added in aqueous phase. Both the oily and aqueous phases were separately heated to 70-80^0 C, then the oily phase was added to the aqueous phase with continuous stirring until room temperature to form emulsion. The obtained emulsion and gel base was incorporated with each other in 1:1 ratio with gentle stirring to obtain the emulgel

Result: All developed formulations of Itraconazole(F1-F6) were evaluated for the physiochemical parameters such as percentage yield, drug content, pH, viscosity, Spreadability, Extrudability. Viscosity studies of various formulations revealed that formulation F4 was good to compare to others. Formulation F4 shows good Rheological properties. Formulation F4 shows maximum drug release i.e. 96.09% at the end of 270 min.

Conclusion: Itraconazole showed enhance the bioavailability. Carbopol-934 significantly affects drug release and rheological properties of the gels. Formulation F4 is sufficient enough to treat the skin infections and can be further developed for scale-up

PUBLICATION202241

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WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.632
Volume 11, Issue 1, 248-272 Review Article ISSN 2278 – 4357

REVIEW ARTICLE TDDS

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Article Received on
03 Nov. 2021,
Revised on 23 Nov. 2021,
Accepted on 13 Dec. 2021
DOI: 10.20959/wjpps20221-20814

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ABSTRACT

Human skin is definatly available surface for drug delivery system with less side effect. Transdermal drug delivery system provide safety together with efficacy of drug, Steady drug plasma concentration, absence of first pass hepatic metabolism and this therapy in non-invasive. Main obstacle is outer most layer of skin, which is stratum corneum. Advantages of transdermal drug delivery route like intravenous, topical, oral, intramuscular etc. is that this patch provide medication in controlled release profile into the patient, generally through either body heat melting thin layers of medication embedded within the adhesive or through a porous membrane covering a reservoir of medication. This literary critisium is written to produce a coverage commentary of the recent advancements in TDD enhancement techniques. New Transdermal Drug Delivery System (TDDS) Technologies now ARE developed that's considered to be helpful in rate controlled delivery of drug that are difficult to administer. This present review explores the study on transdermal drug delivery system (TDDS).

INTRODUCTION

We the human civilization apply different substances or component on our skin for adornment, cosmetic or medication purpose. But skin never particularly studied as a particular route for drug delivery until the 20th century that the skin come to be used as route for drug delivery system. (Prausnitz and Langer, 2008).

A technique that provide drug absorption through skin in brought up transdermal drug delivery system. It's also called as patch. Pad uses specific membrane to manage the speed drug release from the drug reservoir. Biophysical, morphological and physicochemical property of the skin are taken into the consideration while designing patch or transdermal

PUBLICATION202242

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WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 11, Issue 1, XXX-XXX. Review Article ISSN 2277–7105

REVIEW ON PHYTOCHEMISTRY AND PHARMACOLOGICAL ASPECTS OF *EUPHORBIA HIRTA LINN.* (FAMILY-EUPHORBIACEAE)

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Article Received on
24 Oct. 2021,
Revised on 14 Nov. 2021,
Accepted on 05 Dec. 2021
DOI: 10.20959/wjpr20221-22549

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ABSTRACT

Medicinal herbs are the local heritage with global importance. The plant grows in open grass land roads side and pathways it also known as ASTHMA PLANT. Medicinal herbs have curative properties due to presence of various complex chemical substance of different composition, which are found as secondary plant metabolites in one or more parts of these plants. These plant metabolites according to their composition are grouped as alkaloids, glycosides, corticosteroids, essential oils etc. Euphorbia hirta, (family- Euphorbiaceae) is an herb found in many parts of the world. In Sanskrit it means "Dugadhika". According to the Doctrine of Signatures, the plant has a reputation for increasing milk flow in women, because of its milky latex, and is used for other female complaints as well as diseases of the respiratory tract. The plant has been reported asincrease in urine output, antidiarrheal, antispasmodic, anti-inflammatory, Antifungal, antibacterial, analgesic, antioxidant, antiasthmatic, antitumor, antimalarial, larvicidal. The review aims at describing the botanical description, phytochemical profile of plant.

KEYWORDS: Phytochemistry, Pharmacological aspects, Euphorbia hirta Linn.

INTRODUCTION

Euphorbia hirta L. is a medicinal, rhizomatous herb distributed in Southern Western Ghats of India and Northern East Coast of Tamil Nadu.[1] In East and West Africa extracts of the plant are used in treatment of asthma and respiratory tract inflammations. It is also used for coughs, chronic bronchitis and other pulmonary disorders in Malagasy. The plant is also widely used

PUBLICATION202243

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Journal of Pharmaceutical Research International

34(7A): 71-80, 2022; Article no.JPRI.88650
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Phytochemical Nanocarrier: A Green Approach towards Cancer Therapy

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2022/v34i7A36351

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/88650

Review Article

Received 20 November 2021
Accepted 29 January 2022
Published 31 January 2022

ABSTRACT

Phytochemicals serve as a promising and effective research area with a bright future. Researchers have faced a serious challenge in designing and developing an alternative, eco-friendly, biocompatible, and cost-effective strategy in a greener way due to the rising incidence of cancer, expensive treatment, various limitations in conventional therapy, and high toxicity of current anticancer drugs. Using a Novel drug delivery system for phytomolecules is expected to overcome the drawback of cancer treatment. The present review article is directed to supply an overview of Current cancer therapy via phytochemicals.

Keywords: Phytochemicals; nanoformulation; NDDS; cancer.

1. INTRODUCTION

According to WHO, Cancer is the second leading cause of death globally. Lung, prostate, colorectal, stomach, and liver cancer are the most common types of cancer in men, whereas breast, colorectal, lung, cervical, and thyroid cancer are the most common in women. Present anticancer therapy has lots of side effects and the disease has continued throughout the life until the medicines continuously going on. Several cancerous are there which are not completely cured by synthetic medicines. In this regard, complete curable treatment is urgently needed. There is a need to look for more efficacious agents with lesser side effects hence,

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PUBLICATION202244

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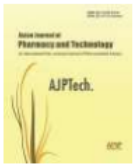
Asian Journal of Pharmacy and Technology. 12(2): April - June, 2022

ISSN 2231–5705 (Print)
2231–5713 (Online)
DOI:

Vol. 12 |Issue-02|
April – June | 2022

Available online at
www.anvpublication.org
www.asianpharmaonline.org

Asian Journal of Pharmacy and Technology
Home page *www.ajptonline.com*



RESEARCH ARTICLE

Insight on Development and Evaluation of Nanosponge Drug Delivery for improved Therapeutic effectiveness

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ABSTRACT:
Nanosponges are the recent advances in nanotechnology. Nanosponge delivery system was originally developed for topical drug delivery. Nowadays it can also be used for oral delivery of drugs using water soluble and bio erodible polymers. Nanosponges are porous structures with a size of about a virus (average diameter below 1µm). Due to small size and porous nature; nanosponges can bind to poorly soluble drugs and improves their bioavailability. These nanosponges can circulate within body and interact with specific target site. At target site start releasing the drug in a controlled manner. Various techniques are reported for the preparation of Nanosponges as melt method, solvent diffusion method, solvent method, ultrasound assisted method and sonication etc. Nanosponges are the target specific drug delivery which has lesser side effects. Major advantage of nanosponges as it improves solubility of poorly soluble drug and exhibits higher drug loading as compared to other nanocarriers. This review gives the highlights about the formulation methods, excipients used, evaluation of nanosponges and its benefits to overcome the undesirable properties of drug into desirable.

KEYWORDS: Controlled Delivery, Small Size, Improve Solubility, Nanosponge, Hydrogel.

INTRODUCTION:

Nanosponges are colloidal type of carriers which have been developed and proposed for delivery of drug. Nanosponges are tiny mesh like structures. They are spongy porous, spherical, small sized polymeric structures which release the drug in controlled and predictable manner. The average diameter of nanosponge is below 1µm.Nanosponges can enclose various types of molecules by forming inclusion and non-inclusion complexes. These particles are capable for caring both lipophilic and hydrophilic substances.

They are an innovative class of hyper crosslinked polymer based colloidal structures consisting of solid nanoparticles with colloidal and nanosized cavities. They contain inner hydrophobic cavity and external hydrophilic branching. The cross linker gets attached to certain portions of the polyester strand and form a frame structure. The pore size is controlled by using different type of polymer and cross linkers in different proportions. So, they are capable to providing solutions for several formulations related problems. Nanosponges have higher drug loading capacities compared to other nanocarriers. These small sized sponges can circulate around all over the body until interact with specific target site and stick on the surface and start releasing drug in a controlled manner. They are free flowing, self sterilising, cost effective and stable over range of pH 1-11 and temperatures up to 130°C. NSs holds a promising future in various pharmaceutical applications in the coming years like enhanced product performance and

PUBLICATION202245

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ISSN 0975-234X (Print)
0975-4377 (Online)
DOI: 10.52711/0975-4377.2022.00013

Vol. 14 | Issue-01|
January - March| 2022

Available online at
www.anvpublication.org
Research Journal of Pharmaceutical Dosage Forms and Technology
Home page www.rjpdft.com

REVIEW ARTICLE

A Review on HPLC Method Development and Validation for Gliptin Class: New Oral Antidiabetic Agents

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ABSTRACT:
Gliptin is the class of antidiabetic medicine also called as dipeptidylpeptidase-4. DPP-4 (dipeptidyl peptidase-4) inhibitors (or "gliptins") represent a class of oral anti-hyperglycaemic agents that inhibit the enzyme DPP-4, thus augmenting the biological activity of the "incretin" hormones (glucagon-like peptide-1 [GLP-1] and glucose-dependent insulinotropic polypeptide [GIP]) Sitagliptin, Saxagliptin, Alogliptin, Linagliptin, Vildagliptin are the Gliptin class inhibitor for the treatment of type 2 diabetes mellitus and they decrease the breakdown of the incretin hormones such as glucagon like peptide 1 (GLP-1). All together gliptins have a good oral bioavailability which is not significantly influenced by food intake. PK/pharmacodynamics characteristics, that is, sufficiently prolonged half-life and sustained DPP-4 enzyme inactivation, generally allow one single oral administration per day for the management of T2DM; the only exception is vildagliptin for which a twice-daily administration is recommended because of a shorter half-life DPP-4. This paper is an updated review, providing an analysis of both the similarities and differences between the various compounds known as gliptins, currently used in the clinic (sitagliptin, saxagliptin, alogliptin linagliptin and vildagliptin). This paper discusses the pharmacokinetic and pharmacodynamic characteristics of gliptins. In this review we complied analytical method development and determination of the Gliptin inhibitors. Table no.1, 2, 3, 4, 5, shows the analytical method development and validation of Sitagliptin, Saxagliptin, Alogliptin, Linagliptin, and Vildagliptin alone and with its combination by the HPCL method.

KEYWORDS: Sitagliptin, Saxagliptin, Linagliptin, Alogliptin, vildagliptin, Pharmacokinetic parameter, pharmacodynamics parameter, RP-HPLC.

INTRODUCTION:

Gliptin is also called as dipeptidylpeptidase-4 (ddp-4) inhibitors. Dipeptidylpeptidase-4(dpp-4) inhibitors offer new options for the management of type 2 diabetes. Glucagon increases blood glucose levels, and dpp-4 inhibitors decrease glucagon and blood glucose levels.

Received on 11.06.2021 Modified on 21.10.2021
Accepted on 28.12.2021
Res. J. Pharma. Dosage Forms and Tech.2022; 14(1):79-86.
DOI: 10.52711/0975-4377.2022.00013

The mechanism of dpp-4 inhibitors is to increase incretin levels (glp-1 and gip), which inhibit glucagon release, which in turn increases insulin secretion, reduce gastric emptying, and decreases blood glucose levels.[1] They work by blocking the action of dpp-4, an enzyme which destroys a group of gastrointestinal hormones called incretins. incretins help stimulate the production of insulin when it is needed (e.g. after eating) and decrease the production of glucagon by the liver when it is not needed (e.g. during digestion). They also slow down

PUBLICATION202246

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Approved by AICTE, New Delhi (F.No.06/07/MS/PHARMA/2004/047, DTE.Mumbai (2/NGC/2004/342)
Government of Maharashtra No. TEM/2004(235/04) TE-1, Pharmacy Council of India (32-347/2012-PCI),
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CRITERIA III

Key Indicator 3.3 - Research Publication and Awards

3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during 2021

Research Publication 2021

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PES Modern college of Pharmacy (For Ladies), Moshi, Pune 412105.

RESEARCH PUBLICATION 2021

Year	Sr. No.	Name of Faculty	Title of the Paper	Name of Journal	Year, Vol, Page No, Issue	ISSN No.
2021	1	Dr. Ms. V.S. Tambe, Mr. R.R. Chanshetti	Bioactivity Enhanced Isolated CarpaineFrom Carica Papaya Leaves For Platelet Stimulating Activity	Indian Journal of Pharmaceutical Sciences	2021,84(2), 268-280	0250-474X
2021	2	Dr. Ms. V. S. Tambe	Validated Stability Indicating RP-LC Method For Propylthiouracil with LCMS studies of Forced Degradation Products and Simulataneous Estimation of Its Impurity,	International Journal of Pharmaceutical Sciences and Research	2021, 21(1), 432-442	0975-8232
2021	3	Dr. Prof. S.N. Dhole	Enhanced Pharmacological Efficacy of Berberine Hydrochloride Loaded Lipid Based Pellets For The Treatment Of Metabolic Diseases	Biomedical & Pharmacology Journal	2021, 14(2), 993-1005	2456-2610
2021	4	Dr. Ms. R. L Mhetre, Dr.S.N.Dhole	Formulation And Optimization Of Chlorthalidone Loaded Nano-Particles By Antisolvent Precipitation Using Box-Behnken Design	International Journal Of Pharmaceutical Sciences And Research	2021, 12(1), 260-271.	9074-3278
2021	5	Ms. M. C. Upadhye	A review on viral infections including special magnitude on synthetic and herbal remedies	International Journal Of Modern Pharmaceutical Research	2021, 5(1), 20-23	2319-5878
2021	6	Dr. Ms. R. L Mhetre, Dr. N. S. Kulkarni, Dr.S.N.Dhole	Natural and Modified Excipients in Novel Drug Delivery System: A Review	Research Journal of Pharmaceutical Dosage Forms and Technology.	2021, 13(2), 147-152	0975-4377
2021	7	Dr. Ms. R. L Mhetre, Dr.S.N.Dhole	Patent review on nanosponge: targeted drug delivery system	J. Global trends Pharm. Sci,	2021, 12 (3), 9922 - 9931	2230-7346
2021	8	Ms. M. H. Tapkir	Colocasia Esculenta Starch: Novel Alternative Disintegrant For Pharmaceutical Application	Indian Drugs	2021, 58 (02), 41-53	0019-462X
2021	9	Dr. N. S. Kulkarni, Mr. M.K.Munde, Dr.S.N.Dhole,	A Comprehensive Review on Application of Microwave Irradiation for Preparation of Inclusion Complexes with Cyclodextrins	Research Journal of Pharmacy and Technology.	2021, 14 (02), 1131-1136.	0974-360X

2021	10	Dr. N. S. Kulkarni,	A Review on Applications of Hydroxy Propyl Methyl Cellulose and Natural polymers for the development of modified release drug delivery systems.	Research Journal of Pharmacy and Technology.	2021, 14 (02), 1163-1170.	0974-360X
2021	11	Dr. N. S. Kulkarni, Dr.S.N.Dhole	A Systematic Review on Oral Drug Delivery as a Fast Dissolving Film to Improve Therapeutic Effectiveness.	Research Journal of Pharmacy and Technology	2021,14(03), 1771-1778.	0974-360X
2021	12	Dr. Ms. S. D. More, Dr.S.N.Dhole	A Review On Microparticulate Drug Delivery System	Bull.Env.Pharmacol.Lifesci	2021, 10(3), 163-171	2277-1808
2021	13	Ms. R. S Aher	Development and Characterization of Itraconazole Loaded Emulgel	Turkish Journal of Physiotherapy and Rehabilitation	2021, 33 (3), 38620- 38635	2651-446X
2021	14	Dr. Prof. S.N. Dhole	Niosomes: A Promising Drug Delivery System in Transdermal Drug Delivery (TDDS	Journal of Pharmaceutical Research International	2021, 33(48B), 6-17	2456-9119
2021	15	Dr. Ms. V.S. Tambe	Plant Phyto-Constituents As Antibiotic Adjuvants A Systematic Review And Bibliometric Analysis	Journal Of Pharmaceutical Research International	2021,33(4), 335-351,	2456-9119
2021	16	Prof. Dr. S. N. Dhole, Mr. O.M.Bagade	A Concise Insight on Pulsatile Drug Delivery System: An Outlook Towards Its Development	International Journal of Pharmaceutical sciences and Nanotechnology	2021, 14 (5) 5577-5587	9074-3278
2021	17	Ms. A. S. Gadakh	Ayurveda A Promising Tool For The Eradication Of Covid-19	International Journal Of Pharmaceutical Sciences And Research	2021, 12(6), 3006-3009.	0975-8232
2021	18	Prof. Dr. S. N. Dhole, Mr. O. M. Bagade	An Updated Overview on Mucoadhesive Buccal Drug Delivery System	Research Journal of Pharmacy and technology	2021,14(8), 1495-	0974-360X
2021	19	Mr. H. P. Alhat, Mr. S.V.Joshi	Validated HPTLC Method For Simultaneous Determination Of Lopinavir And Ritonavir In Tablet Dosage	European Journal Of Pharmaceutical And Medical Research	2021, 8(3), 367-374	2394-3211
2021	20	Mr. R. R. Chanshetti	Leaves of Stereospermumsuaveolens DC Exhibit Anti-inflammatory and Anti-arthritic Potential Action in Experimental Animals	Journal of Pharmaceutical Research International	2021, 33(33A) , 164-175	**2456-9119**
2021	21	Dr. Ms. V.S. Tambe	A Review In-Vivo And In-Vitro Testing Models For Antiallergic Formulations	World Journal Of Pharmacy And Pharmaceutical Sciences	2021, 10 (8), 806-821	2278 – 4357

2021	22	Dr. Ms. V.S. Tambe	A Review Role Of Dietary Supplementation In Covid-19 Pandemic	World Journal Of Pharmacy And Pharmaceutical Sciences	2021, 10 (9), 804-827	2278 – 4357
2021	23	Dr. Ms. V.S. Tambe, Dr. Ms. V.S. Vichare	Simultaneous Analysis of Eprosartan and Hydrochlorothiazide In Tablet Formulation By High-Performance Thin Layer Chromatography With Ultraviolet Absorption Densitometry	International Journal Of Pharmaceutical Chemistry And Analysis	2021;8 (3): 123–128	2394-2789
2021	24	Dr. Mr. N.S. Kulkarni, Dr. Ms. M.C. Upadhye, Dr. Prof. S. N. Dhole	Development And Evaluation of Floating Microspheres Of Sumatriptan Succinate Using Ethyl Cellulose And Mucilage Extracted FromVigna Mungo	Journal Of Pharmaceutical Research International	2021, 33(43A), 24-36.	2456-9119
2021	25	Dr. Ms. S.D. More, Dr. Prof. S.N. Dhole	Formulation And Evaluation Of Oral Fast Dissolving Deliveray For Rosuvastin	International Journal of Biology, Pharmacy and Allied Sciences	2021, 10(10): 67-81	2277–4998
2021	26	Dr. Ms. S.D. More	A REVIEW ON BLACK FUNGUS/MUCORMYCOSIS	World journal of pharmacy and pharmaceutical sciences	2021, 10(12), 2106-2121	2278 – 4357
2021	27	Dr. Ms. V. S. Vichare	Development Of Validated RP-HPLC Method For Estimation Of Empagliflozin And Metformin In Combined Formulation	Journal Of Pharmaceutical Research International	2021,33(60A), 1-7	2456-9119
2021	28	Dr. V S. Vichare	Production and Analysis of Lip Balm using Herbal Resources	Journal Of Pharmaceutical Research International	2021,33(59A), 540-546	2456-9119
2021	29	Dr. Ms. P. B. Kothawade	Novel Niacin Receptor Agonists A Promising Strategy For The Treatment Of Dyslipidemia	Mini Reviews In Medicinal Chemistry	2021;21(17):2481-2496	1389-5575
2021	30	Ms. S.A. Koli	Evaluation Of The Effect Of Chrysin In Renal Ischemia Reperfusion Induced Renal Failure In Wistar Rats	International Journal Of Analytical And Experimental Model Analysis	2021, XIII(X),771-799	0886-9367
2021	31	Ms. P.G. Kakade,	Exploration Of Antidiabetic Potential Of Aerial Parts Of Abutilon Indium Linn In Streptozotocin - Nicotinamide Induced Diabetes In Rats	The International Journals Of Analytical And Experimental Model Analysis	2021, XIII(X),405-420	0886-9367

2021	32	Rohini R. Pujari	Exploration of Elephant Foot Yam (Amorphophallus paeoniifolius) Starch: An Alternative Natural Disintegrant for Pharmaceutical Application	Indian Journal of Pharmaceutical Education and Research	2021; 55 (1)Suppl, S209-S219.	2581-5423

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Research Paper

Bioactivity Enhanced Isolated Carpaine from *Carica papaya* Leaves for Platelet Stimulating Activity

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***Carica papaya* leaves are used in folklore medicine for the treatment of different types of thrombocytopenia associated with diseases and drugs. There are several scientific studies carried out on humans and animal models to confirm the efficacy of papaya leaves extract for the treatment of thrombocytopenia. In the present study, the alkaloid, carpaine extracted from papaya leaves was found to have platelet stimulating activity. Papaya leaves powder was extracted by microwave with a mixture of methanol: glacial acetic acid: water (180:2:1.6 v/v/v). The extract was treated with suitable solvent to obtain alkaloid fraction. From the total alkaloids, carpaine was further separated by preparative thin layer chromatography, purified and analyzed. Carpaine was complexed with beta-cyclodextrin and mixed with piperine. The complex was administered in thrombocytopenia induced rats. The results showed that bioavailability enhanced carpaine exhibits potent activity of increasing platelet count.**

Key words: Alkaloid, *Carica papaya* leaves, carpaine, platelet stimulating activity, thrombocytopenia

Carica papaya Linn. belonging to family Caricaceae has been used to treat the ailments like malaria, dengue and jaundice. It is used for anti-inflammatory, hypoglycemic, antifertility, abortifacient, hepatoprotective, wound healing, anti-malarial and immunomodulatory activity. Recently, its antihypertensive and antitumor activities have also been established[1]. Its young leaves are rich in flavonoids, alkaloids, phenolic compounds, cynogenetic compounds and carotenoids[2]. Leaves extracts from *Carica papaya* is generally used for patients with dengue fever. There are certain studies carried out to prove the use of *Carica papaya* leaves in thrombocytopenia[3-8]. The extract is available in the form of capsules, tablets and syrup. Although herbal medicines acceptance is increasing in global market, the concern is raised about its inconsistent composition. Hence, it is necessary to assess the activity of isolated phytoconstituents.

Carpaine (fig. 1) belongs to the class of macrolide analogues. It is one of the major alkaloid of papaya leaves which have been studied for its cardiovascular effects[9,10]. It slows the heart rate in humans and thus reduces blood pressure. It is reported to have anthelmintic action, anti-plasmodial[11] and anticancer activity[1,12,13]. Carpaine is isolated and identified from *Carica papaya* leaves with the content of 0.93 g/kg[14]. The identification of carpaine as active compound for anti-plasmodial activity has been reported. It is also reported to increase platelet count in rats[15]. In this study, an attempt was made to enhance carpaine extraction using microwave and to evaluate the antithrombocytopenic activity of *C. papaya* leaves extract, carpaine and its available marketed formulation.

MATERIALS AND METHODS

Reagents and chemicals:

All solvents (analytical grade) were purchased from Loba Chemie, (India). Dragondraffs reagent and Silica gel $60F_{254}$ plates were procured from Merck (Germany). Marketed tablet formulation containing 1100 mg of *Carica papaya* leaves extract was purchased from local market.

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Accepted 16 July 2021
Revised 11 September 2020
Received 03 February 2020
Indian J Pharm Sci 2021;83(4):723-731

Publication20211

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Ambekar et al., IJPSR, 2021; Vol. 12(1): 432-442. E-ISSN: 0975-8232; P-ISSN: 2320-5148

IJPSR (2021), Volume 12, Issue 1 **(Research Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 12 January 2020; received in revised form, 28 August 2020; accepted, 11 September 2020; published 01 January 2021

A VALIDATED STABILITY-INDICATING RP-LC METHOD FOR PROPYLTHIOURACIL WITH LC-MS STUDIES OF FORCED DEGRADATION PRODUCTS AND SIMULTANEOUS ESTIMATION OF ITS IMPURITY

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Keywords:

Propylthiouracil, Thiourea, Impurity, Stability Indicating, LC-MS

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ABSTRACT: A simple, precise, accurate, sensitive and robust stability-indicating HPLC method for simultaneous estimation of propylthiouracil and its impurity thiourea has been proposed. The separation was achieved on a C_{18} column (4.6 mm × 150 mm, particle size 5.0 µm) maintained at 45 °C with a mobile phase composed of water: methanol: acetonitrile (50:35:15 v/v/v) with 0.1% acetic acid and detection wavelength was 241 nm. In statistical analysis, the linear response in the range of 30 - 300 µg/ml for propylthiouracil and 0.3 - 30 µg/ml for thiourea with a correlation coefficient greater than 0.99 was obtained. In forced degradation studies, PTU was found to degrade under basic hydrolysis, oxidative and photo stress while found resistant to acid/neutral hydrolysis and thermal degradation. The probable structures of six major degradants generated under stress conditions were identified by LC-MS studies and the most likely degradation pathway was proposed from mass spectral data. The information presented herein could be very useful for the impurity profiling of drugs as well as can be employed to check the drug product quality during stability studies.

INTRODUCTION: Propylthiouracil (PTU) belongs to anti-thyroid drugs class called thion-amides, commonly used to treat hyperthyroidism, thyrotoxicosis and hyperthyroidism associated with pregnancy. It is a potent inhibitor of thyroid peroxidase enzyme and impairs the oxidation and organic binding of thyroid iodide thus blocks thyroid hormone synthesis [1]. PTU is cited in various Pharmacopoeia to have contaminated by impurity; thiourea (TU). Therefore, it was thought worth determining this impurity to ensure safety, efficacy and quality of the final formulation [2, 3].

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.12(1).432-42

This article can be accessed online on www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.12(1).432-42

Detailed literature indicated different methods *viz*; HPLC [3], titrimetry [2], potentiometry [2, 3] are available for quantification of PTU in bulk and formulation. Simultaneous estimation methods *viz*; voltammetry [4] and UPLC-MS/MS [5] with other anti-thyroid drugs are also reported in the literature.

Official TLC method to detect impurity; TU is a semi-quantitative method and lacks stability-indicating potential [2]. Two stability-indicating HPLC methods have been reported in the literature; one is applicable to bulk drug [6] and other is to tablet assay [7]. The reported stability-indicating method is applicable for assay but is not applicable to its impurity; TU. These methods do not involve the identification of degradation products and are not suitable for LC-MS studies. Other reported methods include the study of the effect of temperature on stability of extemporaneously

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Biomedical & Pharmacology Journal, June 2021. Vol. **14**(2), p. 993-1005

Enhanced Pharmacological Efficacy of Berberine Hydrochloride Loaded Lipid Based Pellets for the Treatment of Metabolic Diseases

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https://dx.doi.org/10.13005/bpj/2201

(Received: 20 February 2021; accepted: 22 June 2021)

Numerous researchers in past have reported the diversified therapeutic effects of Berberine hydrochloride (BERH) for the management of metabolic diseases, however due to poor systemic bioavailability these effects are dose dependant and desired effects were reported at high dose levels. The objective of present investigation is to evaluate and establish the enhancement in pharmacological efficacy of the designed BERH formulation at low oral dose level for the treatment of metabolic diseases constituting metabolic syndrome (MS). In the present investigation, BERH formulation in the dose level of (25 and 50mg/kg/day) was evaluated in cafeteria diet (CD) induced MS model in male Wistar rats for 42 days and compared with available marketed preparation in similar dose level using orlistat as reference drug. Among the studied dose level of BERH formulation the 25 mg/kg/day dose was adequate to produce significant reduction in calorie intake ($P < 0.01$), body weight, BMI, ($P<0.001$), organ weight viz. (stomach; $P<0.05$, liver; $P<0.001$, heart; $P<0.01$) and serum biochemical parameters ($P<0.001$). A significant improvement in lipid peroxidation ($P<0.001$), catalase (CAT), reduced glutathione (GSH) and superoxide dismutase (SOD) contents ($P<0.001$) was observed. The histopathological examinations indicated amelioration of liver, heart and pancreas tissues. The current study indicated significant glucose-lowering, hypophagic, anti-obesity, anti-hyperlipidemic and cardio protective activity of the BERH formulation even in much low oral dose level compared to previously reported studies. The observed behavior is attributed due to the enhanced bioavailability of BERH formulation which could be effectively used for metabolic diseases treatment.

Keywords: Berberine Hydrochloride; Bioavailability; Cafeteria Diet; Hyperlipidemic; Metabolic Syndrome; Obesity.

Urbanization, sedentary lifestyles, and changing diets are the characteristic factors of 21st century that leads to the concept of metabolic syndrome (MS). The MS includes clusters of metabolic abnormalities such as obesity, insulin resistance, dyslipidemia and hypertension which are observed together in patients. It is also related with higher possibility of cardiovascular disease and type 2 diabetes mellitus (T2DM) and consequential morbidity and mortality of individuals suffering with MS. Nowadays, MS is the most serious public health concern and clinical challenge which

Publication20213

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Mhetre et al., IJPSR, 2021; Vol. 12(1): 260-271. E-ISSN: 0975-8232; P-ISSN: 2320-5148

IJPSR (2021), Volume 12, Issue 1 (Research Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 29 December 2019; received in revised form, 02 April 2020; accepted, 10 October 2020; published 01 January 2021

FORMULATION AND OPTIMIZATION OF CHLORTHALIDONE LOADED NANO-PARTICLES BY ANTISOLVENT PRECIPITATION USING BOX-BEHNKEN DESIGN

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Keywords:

Chlorthalidone, Nanoparticles, Box-Behnken factorial design, Freeze drying, Solubility

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ABSTRACT: Chlorthalidone is a long-acting diuretic recommended for treatment of oedema associated with congestive heart failure. It is oral active diuretic mainly acting on distal convoluted tubule of nephron. Chlorthalidone is poorly soluble in water at room temperature. Nanoparticles have great potential as a carrier and can improve the solubility of poorly water-soluble drugs like chlorthalidone. The aim of the present study was to formulate and optimize the chlorthalidone nanoparticles using Box-Behnken factorial design approach. Effect of three independent variables (concentration of polymer, amount of surfactant and ultrasonication frequency) on two dependent variables such as particle size and dissolution of the drug was studied. The nanoparticles of chlorthalidone were formulated by anti-solvent precipitation-ultrasonication-freeze drying technology to improve its solubility and dissolution. The samples were characterized using Horiba nanoparticles analyzer, Zeta potential analyzer, Differential Scanning Calorimetry (DSC), Fourier Transform Infrared Spectroscopy (FTIR), Powder X-ray Diffraction (PXRD), and Field Emission Scanning Electron Microscopy (FESEM). The average particle size of 342.5 nm with a Polydispersibility index 0.158 was confirmed by dynamic light scattering. Differential scanning calorimetry and powder X-ray diffraction revealed reduced crystallinity of chlorthalidone. Freeze-dried nanoparticles were observed as spherical shape under field emission scanning electron microscopy. The value of zeta potential was -15.5 mV. *In-vitro* dissolution study by dialysis bag investigated improvement of dissolution rate. The stability of the developed nanoparticle was confirmed by the accelerated stability study of developed nanoparticles. These results showed an increase in the saturation solubility and drug release of chlorthalidone due to particle size reduction and amorphous nature of the drug.

INTRODUCTION: Bioavailability, as well as dissolution of poorly water-soluble drugs, can be improved by the preparation of nanoparticles. Use of novel carriers such as micronization, modifications in excipients, liposomal drug delivery system, and solid dispersion, among others, have shown improved solubility [1].

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.12(1).260-71

The article can be accessed online on www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.12(1). 260-71

Novel carriers have been thoroughly investigated for improving drug solubility. The improvement of solubility was achieved by selecting a carrier system, a proper method of preparation, and optimal drug-carrier ratios.

Moreover, the combination of excipients with other materials can improve the functions of a dosage form [2]. The water solubility of drugs greatly influences pharmacokinetic and pharmacodynamic properties [3]. Biopharmaceutical Classification System (BCS Classification) has been a critical tool for the development of the formulation of various drugs [4]. Based on the solubility and intestinal permeability of the drugs, the BCS categorizes

IJMPR 2021, 5(1), 20-23

International Journal of Modern Pharmaceutical Research
www.ijmpronline.com

ISSN: 2319-5878
IJMPR
Review Article
SJIF Impact Factor: 5.273

A REVIEW ON VIRAL INFECTIONS INCLUDING SPECIAL MAGNITUDE ON SYNTHETIC AND HERBAL REMEDIES

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Received on: 04/12/2020
Revised on: 24/12/2020
Accepted on: 14/01/2021

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ABSTRACT

This review describes the viral infection of the interactions between stress proteins and viral components have been described in a large variety of experimental models at different stages of the viral life cycle depending on the type of virus and host cell. viruses get more important perform and functions for humans, plants, animals, and the environment. viral infections cause of death worldwide. in addition to the viruses such as influenza, Ebola, HIV/Aids, Smallpox and Pneumonia, Herpes, Rotavirus and Chicken Pox are responsible for emergent epidemics that threaten global health. This article provides an overview of clinically available antiviral drugs for the primary care physician, with a special focus on pharmacology, clinical uses, and adverse effects, also gives a special emphasis on important herbs used for treating these infections.

KEYWORDS: Ebola, HIV/Aids, Smallpox and Pneumonia.

INTRODUCTION

This review discusses the most common respiratory and gastrointestinal viral pathogens which can be easily transmitted in environments. viral respiratory tract infections in lung transplant recipients may be severe. Most pathogens gain access to the host through surfaces of the body that are exposed to the surrounding environment and rife with resident microorganisms, termed microbiota. Microbiota play an integral role in modulating host health[1]These diseases can be treated by antiviral drugs or vaccines. herbal, dietary, complementary, and natural therapies have been used widely for prevention and treatment of viral infections

VIRUS

A virus is a very tiny germs agent that lives inside the living cells or host cells. Viruses are present in almost every ecosystem on earth. a microorganism is smaller than the bacterium that cannot be grow or reproduce apart from a living cell. Viruses get a bad rap but they also more important perform and functions for humans, plants, animals, and the environment. They are made of genetic material inside of a protein coating and viruses have fatty envelope covering. Viruses need living cells to replicate or reproduce. There are thousands of viruses some more common than others. Viruses are cause the familiar infectious diseases such as the common cold, flu, corona virus and warts. They also cause severe illnesses such as HIV/AIDS, smallpox, and Ebola, Pneumonia, Herpes, Rotavirus and Chicken pox.Tissues were studied by light microscopy, immunohistochemistry to detect viral antigens, in situ hybridization to detect viral RNA, and by viral titration.[2]

Types of viral infection

1. Respiratory Viral Infections, 2.Foodborne Viral Infections, 3.Viralskin Infection, 4.Sexually Transmitted Viral Infections, 5.Other Viral Infection.

1. **Respiratory viral infection:** The most common type of viral infection is the Respiratory Infection. Respiratory infection is affecting the throat, upper airways and lungs, nose. These viruses are the most spread by inhaling droplets containing virus particles.The disease burden from respiratory infection is greater than that of any other cause of disease (232). In 2002, 18% of mortality for children younger than 5 years of age was caused by respiratory infections.[3]
2. **Foodborne viral infection:** Viruses are one of the most common causes of food poisoning. The symptoms of these infections vary depending on the virus involved. Hepatitis-A, Norovirus, Rotavirus. Risk assessment for transmission of emerging viruses through the food chain should include consideration of all means by which food could post a hazard, that is not just consumption.[6]
3. **Viral skin infection:** Viral skin infections can be range from the mild to severe and produce a rash. For example, Molluscum contagiosum, Herpes simplex virus-1 (HSV-1), Varicella-zoster virus (VZV) The infected cell expresses the viral genes, which are able to induce cell growth, proliferation and prevent apoptosis. This review focuses on Epstein-Barr virus, human papilloma virus, hepatitis C virus, hepatitis B virus, human herpes virus 8 and human T-cell leukemia virus, since they have been already established as causative agents of human cancer.Cutaneous viral warts are discrete benign

Publication20215

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Research Journal of Pharmaceutical Dosage Forms and Technology. 13(2): April – June, 2021

ISSN 0975-234X (Print)
0975-4377 (Online)
DOI: 10.52711/0975-4377.2021.00026

Vol. 13| Issue-02|
April – June| 2021

Available online at
www.anvpublication.org
Research Journal of Pharmaceutical Dosage Forms and Technology
Home page *www.rjpdft.com*

REVIEW ARTICLE

Natural and Modified Excipients in Novel Drug Delivery System: A Review

Vidyaranee B. Ingle, Sandhya S. Potdar, Raksha L. Mhetre, Nilesh S. Kulkarni, Shashikant N. Dhole
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ABSTRACT:
Modification of existing natural excipients has gain special attention in pharmaceutical industry and excipient technology for development of novel dosage forms with added functionality with the use of single multiple functionality excipient rather than using different excipients. It involves mixing and physical modification of two or more excipient to obtain desired functionality. The current review discusses about the importance of modified excipients modification methods and various examples of co-processed excipients in the market.

KEYWORDS: Natural excipients, co-processed excipients.

INTRODUCTION:

Pharmaceutical Excipients:

An excipient is an innovative substance which is used to convert drug molecule into dosage form which is suitable for patient administration. Excipients are the major part of pharmaceutical dosage form as it is included for various purposes such as stabilization of dosage form for long period of time, for improving physical properties of active ingredient or for increasing the bulk of dosage form containing potent drug[1].

Excipients plays a vital role in the performance and quality of drug delivery system. Excipients maybe used for Enhancing thestability of dosage form i.e. drugs which are light sensitive or sensitive to some environmental conditions (antioxidant and UV absorber) Excipients which are used to modify drug release (disintegrants) For controlling the drug release from dosage form (polymers) For improving bioavailability (solubilizers) Excipients necessary for manufacturing technology (binders, glidants, fillers) Ideal properties of pharmaceutical excipients It should be pharmacologically inactive and compatible with active ingredient. It should be sterile and should not alter the pharmacological action of active ingredient. It should have physical and chemical stability. Be available at relatively lower cost with better quality.

Pharmaceutical Excipients are categorised into four different classes

1. Single entity excipient
2. Physical mixture of different excipients
3. New chemical entity
4. Coprocessed excipients

Received on 31.12.2020 Modified on 14.02.2021
Accepted on 16.03.2021
Res. J. Pharma. Dosage Forms and Tech. 2021; 13(2):147-152.
DOI: 10.52711/0975-4377.2021.00026

Pradnya H.Gadhire , J. Global Trends Pharm Sci, 2021; 12 (3): 9922 - 9931

ISSN- 2230-7346
Journal of Global Trends in Pharmaceutical Sciences

PATENT REVIEW ON NANOSPONGE: TARGETED DRUG DELIVERY SYSTEM

Pradnya H. Gadhire, Raksha L. Mhetre, Dr. Shashikant N. Dhole, Pratiksha S. Kadam

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ARTICLE INFO

Key words:
Nanosponge; International Patents issued in USA, Europe, Korea and India.

Access this article online
Website:
https://www.jgtps.com/
Quick Response Code:

ABSTRACT

Nanosponges are tiny mesh like novel class of hyper cross linked polymer based colloidal structures in which large variety of drug molecules encapsulated within its core. They are having the size of a virus with an average diameter below 1µm.Nanosponges are effective drug carriers which possess higher drug loading capacities compared to other nanocarriers. So they are useful to increase stability, solubility, bioavailability and delayed release of drug also it is helpful in solving toxicity problems of drugs. The nanosponges are able to load both hydrophilic and lipophilic drugs of various categories. Nanosponges are three dimensional network or scaffold with highly porous nature. It can deliver the drugs through various routes like oral, topical, parentral etc. and used as biocatalyst in the delivery of enzymes, proteins, vaccines and antibodies.

INTRODUCTION

Nanosponges are tiny mesh like novel class hyper cross linked polymer based colloidal structures in which large variety of drug molecules encapsulated within its core. They have been a proved spherical colloidal nature, reported to have a very high solubilization capacity for BCS class II (poorly soluble drugs) by their inclusion and noninclusion behavior. They have been recently developed and proposed for drug delivery. It can be solubilize poorly water soluble drugs and provide prolonged release as well as increasing drug bioavailability. Nansponges can load both hydrophilic and hydrophobic drug molecule because of their inner hydrophobic cavities and external hydroplilic branching, there by offering flexibility. They are more like a (3D) three dimensional network or scaffold. The backbone is a long length of polyester which is mixed in solution with small

Molecules called cross linkers that act as tiny grappling hooks to fasten different parts of the polymer together. It shows a marked advantage in comparison with the common nanoparticles. They are water soluble but does not breakup chemically in water. They also mix with water and use it as a transport fluid. They are used to mask the unpleasant odour and taste, to convert liquid substances to solids. The chemical linkers enable the nanosponges to bind preferentially to the target site. They are solid in nature and have been found to be safe for oral and invasive routes of administration and so that they could serve as a potential carrier for drug delivery system. The small shape of nanosponges enables the pulmonary and parentral delivery successfully. For oral administration, the complexes may be dispersed in a matrix of excipients, diluents, lubricants and anti-cacking agents suitable

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COLOCASIA ESCULENTA STARCH: NOVEL ALTERNATIVE DISINTEGRANT FOR PHARMACEUTICAL APPLICATION

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(Received 21 August 2018) (Accepted 04 January 2021)

ABSTRACT

Oral drug delivery system has always been the most prevalent route of administration and continuous efforts are made to improve the drug delivery by this route. Tablets are one of the most extensively used dosage forms and various excipients have been developed for their formulation. The purpose of the current research work was to isolate and study the physicochemical properties of the *Colocasia esculenta* starch and further compare its disintegration ability with maize starch. Starch was isolated from *C. esculenta* corms by aqueous extraction method and possesses characteristics that are typical of starches. It was further evaluated for the presence of other foreign matter and phytoconstituents. Results showed that the isolated sample was free from foreign organic matter and the total ash value was found to be 0.4%. Tablets were prepared by the wet granulation method by varying concentrations in the range of 2.5 to 10% w/w for both the starches. Pre and post-compression parameters were studied and were found to be within the pharmacopoeial limits. Disintegration tests showed that disintegration time decreases with increasing concentration of both the starches. At 10% w/w concentration, disintegration time was found to be lowest, hence it was selected as an optimized formulation Stability studies were performed on F4 batch and it was found to be stable. The determination of disintegration efficiency indicates that *C. esculenta* starch exhibits disintegrating potential.

Keywords: *Colocasia esculenta* starch, Phytochemical tests, disintegration efficiency

INTRODUCTION

The oral drug delivery system is considered as the most recognized route of administration as it has more patient compliance because of simplicity and painless dosage administration. Numerous novel dosage forms are emerging in the market, though conventional dosage forms still maintain an appreciable amount of reputation. Despite overwhelming advantages, oral dosage forms suffering from certain disadvantages such as stability and absorption of the drug in the gastrointestinal tract, difficulty in swallowing of large doses and unpalatable drugs, etc[1]. To achieve better advantages of the oral route of administration it is utmost need to improve the characteristics of conventional dosage form, which can be modified by using various excipients. Excipients play a vital role to ease the handling, modify drug release, enhance stability and bioavailability of drug[2]. Appropriate and rational use of excipients is a critical task of formulators to get safe and efficacious formulation. The development of inert and nontoxic excipient is important and challenging in pharmaceutical research. Many researchers are working on various excipients to enhance the properties of the final formulation. Excipients isolated from natural resources could also present a remarkable potential to be effectively used as a modifier. Moreover, natural excipients exhibit advantages over synthetic excipients, such as being nontoxic, biocompatible, non-polluting, cost-effective and easy local availability[3-10].

Fast disintegrating tablets are formulated by the use of conventional tablet excipients such as lubricants, glidants and bulking agents; besides, it contains disintegrants to enhance the disintegration potential. These are more suitable than conventional tablets by being dissolved in less time, hence faster in the bioavailability of drugs. Disintegrants are excipients used either alone or in combination with others to break the intact tablet into smaller particles upon contact with the gastrointestinal fluid that dissolves and ultimately drug absorption takes place quickly. Several substances, mainly of carbohydrate origin have been tried as disintegrants and certain synthetic disintegrants such as Croscarmellose sodium

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Publication20218

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Research J. Pharm. and Tech. 14(2): February 2021

ISSN 0974-3618 (Print)
0974-360X (Online)

www.rjptonline.org

REVIEW ARTICLE

A Comprehensive Review on Application of Microwave Irradiation for preparation of Inclusion Complexes with Cyclodextrins

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ABSTRACT:

Solubility of a drug is the rate limiting step for the absorption of drug. The drugs which shows poor solubility in gastrointestinal tract fails to show therapeutic response and results in poor bioavailability. To improve solubility of a drug various carriers are available amongst them cyclodextrin is most popular choice of excipient. Cyclodextrins are a family of cyclic oligomers containing α-(1-4) linked D-glucopyranose units in the chair conformation. The cyclodextrin features a cavity which is hydrophobic and hydrophilic exterior. The most common cyclodextrins have six, seven, and eight glucopyranose units known as α, β and γ- cyclodextrins respectively. The cavity is limited by hydroxyl groups of different chemical character. These dimensions allow the inclusion of several types of guest molecules/ drugs to form inclusion complexes. Because of host guest interaction, there is change in some properties of guest molecule. Various techniques are reported till today for the preparation of inclusion complex of cyclodextrins with drug to improve solubility as kneading, co-precipitation, solvent evaporation, spray drying, freeze drying and microwave irradiation. Microwave irradiation is an electromagnetic irradiation in frequency range of 0.3 to 300 GHz. Microwave irradiation chemistry is based on heating of materials by microwave dielectric heating effects. This phenomenon is material specific. The microwave irradiations have capacity to induce drying, polymeric crosslinkages/drug-polymer interaction and modify the crystal habit without the need for excessive heat, lengthy process and toxic reactants. Extensive literature survey revealed that Microwave irradiation technique has the capacity to improve the solubility of poorly water soluble drugs.

KEYWORDS: Cyclodextrin, Microwave irradiation, solubility, spray drying, lyophilization.

INTRODUCTION:

Microwave irradiation is an electromagnetic irradiation in frequency range of 0.3 to 300 GHz. All microwave ovens eighter domestic type or scientific microwave reactors operate at a particular frequency of 2.45 GHz, which is equivalent to a wavelength of 12.24 cm. It avoids interference with cellular phone frequencies and telecommunication. The energy of a microwave photon in frequency region of 0.0016 eV is lower as compared to the energy of Brownian motion and is also lacking physical strength to break chemical bonds. It is clear that microwaves cannot induce chemical reactions. Microwave irradiation is actually an electromagnetic irradiation in the frequency range of 0.3 to 300 GHz.

Received on 15.01.2020 Modified on 08.03.2020
Accepted on 05.05.2020
Research J. Pharm. and Tech. 2021; 14(2):1131-1136.
DOI: 10.5958/0974-360X.2021.00203.1

Research J. Pharm. and Tech. 14(2): February 2021

ISSN 0974-3618 (Print)
0974-360X (Online)

www.rjptonline.org

REVIEW ARTICLE

A Review on Applications of Hydroxy Propyl Methyl Cellulose and Natural polymers for the development of modified release drug delivery systems

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ABSTRACT:

This review summarizes applications of Hydroxy Propyl Methyl Cellulose along with Natural polymers for the development of modified release drug delivery systems. The HPMC was available in variety of grades which show different applications in drug delivery. The various grades of HPMC utilized for the variety of action e.g. Coating agent, Adhesion promoter, Targeted release of drug etc. The modified release drug delivery system one of the highly researched field in pharmacy. Even though it is researched and various modified release formulations available in market. The developing more safer approach for drug release is still area of research, which contain easier routes, safer excipients, highly specific target selective materials. Natural polymer show very less side effects as well as it achieves the desired release of drug, so they are the choice of majority of formulations. e.g. Guar gum, Chitosan and Xanthan gum used in various drug delivery systems. Guar gum Cefapodoxime proxetil floating tablet prepared Guar gum, Xanthan gum ophthalmic preparation. Chitosan used in waste water treatment and various biomedical fields like tissue engineering, buccal drug delivery, anticancer treatment etc. Pollulan nanocrystals were studied for the anticancer drug delivery. The review solely based on HPMC-Natural polymer application in Modified release of drug. The various grades of HPMC utilized for the variety of action.

KEYWORDS: HPMC, Natural polymer, Chitosan, Guar gum, Xanthan gum etc.

INTRODUCTION:

The oral solid unit dosage form, it is the most preferred route for administration of dosage form due to its patient compliance, ease of administration, optimal amount of drug is delivered, But still it need to be improved a lot (controlling the release, drug delivery at desired site, shielding of drug from biological fluid of body, avoiding the multiple dosing are some of the aspects expected to improve)[1,2], To meet that various modifications are made in conventional drug delivery system which is known as modified drug delivery system or modified release drug delivery system. A modified release drug delivery addresses, delayed release, extended release, and oral drug delivery system as well as system which are changed in order to achieve modified release effect.

Received on 30.01.2020 Modified on 12.04.2020
Accepted on 08.06.2020
Research J. Pharm. and Tech. 2021; 14(2):1163-1170.
DOI: 10.5958/0974-360X.2021.00208.0

Definition by USP - A modified-release dosage form is defined "as one for which the drug release characteristics of time course and/or location are chosen to accomplish therapeutic objectives which are not obtainable by conventional dosage forms. A modified release drug delivery address both[3].

Following must be considered for modified release dosage form:

- Small dose
- Short half-life (Long half-life drugs already have the desired kinetics)
- Wide Therapeutic Window
- Absorbed through the GI
- Modest to rapid absorption
- Highly stable in the GI

Advantages:[3,4]

1. Reduce dosing frequency
2. Improve patient compliance

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Research J. Pharm. and Tech. 14(3): March 2021

ISSN 0974-3618 (Print)
0974-360X (Online)

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REVIEW ARTICLE

A Systematic Review on Oral Drug Delivery as a Fast Dissolving Film to Improve Therapeutic Effectiveness

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ABSTRACT:
Oral routes are mainly preferred route to administer and to deliver drug. Most common oral dosage forms are capsule and tablet. In some cases, the solid oral dosage form may become difficult in swallowing e.g. sudden episode of allergic reaction, motion sickness, coughing, unavailability of water, fear of choking and in different age group of patient and patients who suffer from dysphagia. The administration of pediatric and geriatric population is the advantages of oral film technology where the difficulty in swallowing and larger oral dosage forms is eliminated. It is an interchange platform for molecules that undergo first pass metabolism. To overcome these problems, drug delivery systems of fast dissolving has been developed. Fast dissolving oral delivery systems are solid dosage forms, which dissolve or disintegrate within 1 min when placed in the mouth without chewing or water. The drug are formulated by Oral dissolving films incorporating with selected oral cavity absorption enhancers oral dissolving film carriers are specially designed. Oral films are formulated by using polymers, plasticizers, saliva stimulating agents, colours, flavors and sweeteners. Different methods are reported in literature as solvent casting method, hot melt extrusion method, rolling method and solid dispersion method for the preparation of film. The objective is to target local, for rapid onset of action, to avoid first pass metabolism and to mask bitter taste of drugs. Overall it leads to patient compliance with improved therapeutic success.

KEYWORDS: Fast dissolving film, solvent casting, first pass metabolism.

INTRODUCTION:

The administration of therapeutic agents is perfect route for oral route because the ease of administration and low cost of therapy lead to high levels of patient compliance. Oral dosage forms are more popular than other dosage forms because of ease of administration, accurate dosage, self- medication, pain avoidance, patient compliance, etc. sterile conditions is not require for solid oral delivery systems, therefore, manufacture is less expensive. for oral delivery system has Several novel technologies recently become available to address the pharmacokinetic and physicochemical characteristics of drugs, while improving patient compliance.[1]

Received on 21.01.2020 Modified on 26.03.2020
Accepted on 17.04.2020
Research J. Pharm. and Tech 2021; 14(3):1771-1778.
DOI: 10.5958/0974-360X.2021.00315.2

The most popular oral solid dosage forms are capsules and tablet. Tablets are widely accepted because of the convenience in terms of compactness, self-administration, and ease in manufacturing. Children, geriatric patients and many other persons including disabled patient often have trouble in swallowing tablet or capsules, furthermore, dosing is an issue, as most medications are available in doses that are significantly too large for the paediatric population and cannot easily and reproducibly be divided into smaller doses[1-5].

Oral route is most preferred route by manufacturer and medical practitioners due to highest acceptability by patients. All dosage forms are available about 60% of oral solid dosage form long onset time, lower bioavailability, and dysphagia patients turned the manufacturer to the parenteral and liquid orals. The liquid orals (emulsion, syrup, suspension, etc.) has the problem of correct dosing mainly and parenteral are painful drug delivery, which may affect the patient noncompliance. Fast dissolving drug delivery systems

Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 10 [3] February 2021 : 163-177

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD

REVIEW ARTICLE **OPEN ACCESS**

A Review on Microparticulate Drug Delivery System

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ABSTRACT

Microparticles are important part of drug delivery system because of their micron size and carrier properties. Microparticulate drug delivery system delivers the drug in the form of microparticles. The objective of this review is to study different features of microparticulate drug delivery system including its types, release mechanism, preparation methods. This review discusses the various aspects like types of microparticles, carriers used in microparticles preparation, release mechanism of drug advantages, disadvantages, and applications, techniques of preparation and evaluation of microparticles. Microparticulate drug delivery system have many advantages in comparison of conventional dosage form such as improved bioavailability and efficacy, controlled drug release, improved patient compliance and reduced toxicity. Microparticulate drug delivery system became an area of interest for many drugs to provide controlled and sustained drug release.

Key words: Microparticles, polymers, entrapment efficiency, controlled release, sustained release.

Received 01.11.2020 Revised 09.01.2021 Accepted 14.01.2021

INTRODUCTION

Microparticulate drug delivery system provides the controlled and sustained delivery of drug for extended period of time. Microparticles can be outlined as "the particles having diameter in the 1-1000µm size range." In 1974, Kramer had suggested the microspheres of albumin as a new drug delivery system. Later, the role of microsphere as sustained drug release vehicle was proposed by Java Krishna and Catha in 1997 [1]. Microparticulate drug delivery system is suitable for solids, liquids as well as for gases. Microparticles formed can be administered directly at the site of action or by various routes such as intramuscular, pulmonary, ocular, intraperitoneal, intra-organ, nasal, etc.

Microparticulate drug delivery system is useful for the delivery of vaccines, proteins andnucleic acid. Microparticles provide the protection tothe drug from the environment [2].

Over the last few years, biodegradable polymeric microparticles coated with hydrophilic polymer (E.g. PEG) are used potentially as it have long time circulating ability, target specific delivery and also able to deliver proteins, genes and peptides.[3]

Microparticles are majorly of two types:

1) **Matrix type** - Microspheres are matrix type of microparticles. In microspheres, the drug is dispersed homogeneously. They may be either dissolved or suspended. [4] Microspheres follow first order of drug release.(3)
2) **Reservoir type** – Microcapsules are reservoir type of microparticles. They are heterogeneous system in which core material is surrounded by membrane shell to form a reservoir.(5) Microcapsule follows zero order of drug release. Microcapsules are further classified as Mono coated and Poly coated microcapsules [3].

Publication202112

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Turkish Journal of Physiotherapy and Rehabilitation; 32(3)
ISSN 2651-4451 | e-ISSN 2651-446X

Development and Characterization of Itraconazole Loaded Emulgel

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ABSTRACT:

Background: Itraconazole is an anti-fungal agent, practically insoluble in water and dilute acids, slightly soluble in ethanol (95%) and freely soluble in dichloromethane. Itraconazole shows low solubility across the physiological pH range result in incomplete absorption from the gastrointestinal tract and thus shows low in vivo bioavailability (55%). Emulgel of Itraconazole improve the solubility thereby its bioavailability.

Methods: In the present study emulgel was prepared by using Carbopol 934 to prepare gel , liquid paraffin was used as oil phase.Itraconazole first dissolved in dichloromethane and later added in aqueous phase. Both the oily and aqueous phases were separately heated to 70-80^0 C, then the oily phase was added to the aqueous phase with continuous stirring until room temperature to form emulsion. The obtained emulsion and gel base was incorporated with each other in 1:1 ratio with gentle stirring to obtain the emulgel

Result: All developed formulations of Itraconazole(F1-F6) were evaluated for the physiochemical parameters such as percentage yield, drug content, pH, viscosity, Spreadability, Extrudability. Viscosity studies of various formulations revealed that formulation F4 was good to compare to others. Formulation F4 shows good Rheological properties. Formulation F4 shows maximum drug release i.e. 96.09% at the end of 270 min.

Conclusion: Itraconazole showed enhance the bioavailability. Carbopol-934 significantly affects drug release and rheological properties of the gels. Formulation F4 is sufficient enough to treat the skin infections and can be further developed for scale-up

Publication202113

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Journal of Pharmaceutical Research International

33(48B): 6-17, 2021; Article no.JPRI.75979
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Niosomes: A Promising Drug Delivery System in Transdermal Drug Delivery (TDDS)

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i48B33254
Editor(s):
(1) Paola Angelini, University of Perugia, Italy;
Reviewers:
(1) Van-An Duong, Gachon University, South Korea;
(2) Mingwan Zhang, University of Connecticut, USA;
(3) Jose Gabriel Amoril, Brazilian Ministry of Agriculture, Brazil;
Complete Peer review History: https://www.sdiarticle4.com/review-history/75979

Review Article

Received 26 August 2021
Accepted 01 November 2021
Published 08 November 2021

ABSTRACT

Infectious disease treatment and immunisation have undergone a transformative change in recent years. With the advancement of biotechnology and genetic engineering, a large number of disease-specific biological have been created, as well as a focus on delivering these biological effectively. Niosomes are vesicular Nano carriers that are gaining popularity as a potential transdermal drug delivery system due to properties like enhanced drug penetration, a local depot for sustained drug release, and a rate-limiting membrane for modulating systemic absorption of drugs through the skin. Niosomes are non-ionic surfactant-based vesicles that are biodegradable, relatively nontoxic, more stable, and less expensive than liposomes. This analysis gives a high-level overview of niosomes, including their chemical composition, structure, benefits, and applications, as well as some general observations on niosomes as percutaneous permeation enhancers.

Keywords: Niosomes; drug delivery system; transdermal drug delivery.

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Publication202114

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Journal of Pharmaceutical Research International

33(41B): 335-351, 2021; Article no.JPRI.71713
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Plant Phyto-constituents as Antibiotic Adjuvants: A Systematic Review and Bibliometric Analysis

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i41B32373
Editor(s):
(1) Dr. Farzaneh Mohamadpour, University of Sistan and Baluchestan, Iran.
Reviewers:
(1) Rangu Nirmala, JNTUH, India.
(2) J. Madhusudhanan, Aarupadai Veedu Institute of Technology (AVIT), Vinayaka Mission's Research Foundation University, India.
Complete Peer review History: https://www.sdiarticle4.com/review-history/71713

Review Article

Received 25 May 2021
Accepted 30 July 2021
Published 24 August 2021

ABSTRACT

The advent of antibiotics in the 19th century has significantly reduced the morbidity and mortality of infectious diseases. However, irrational use of antibiotics in humans as well as in animals has driven the 21st century to the rapid emergence of MultiDrug Resistance Bacteria (MRB). Moreover, the dissemination of COVID-19 pandemic has paved the way for MRB, typically due to increased use of antibiotics to avoid secondary infections.

The fast pace progression of bacterial resistance for the antibiotics and their combinations is making the management of MRB infections tough and increasing the cost of the treatment as well. However, use of Efflux Pump Inhibitors (EPI) as adjuvant for antibiotics has shown a ray of hope by retaining the susceptibility of the antibiotics and thereby reducing the burden of immediate requirement of new antibiotics for MRB. Accordingly, the present paper is aimed to scrutinize the predominant literature depicting the plant Phyto-constituents as an EPI and adjuvant for antibiotics in the management of MRB infections.

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International Journal of Pharmaceutical Sciences and Nanotechnology
Volume 14 • Issue 5 • September – October 2021
Review Article https://doi.org/10.37285/ijpsn.2021.14.5.1 MS ID: IJPSN-6-2-21-BAGADE

A Concise Insight on Pulsatile Drug Delivery System: An Outlook towards its Development

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Received June 2, 2021; accepted July 4, 2021

ABSTRACT

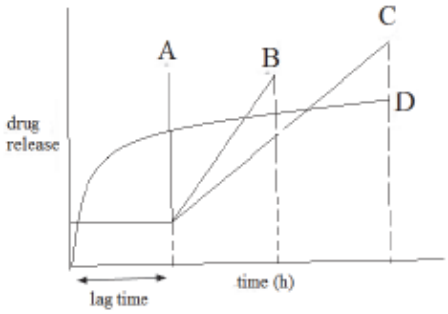
In pharmaceutical science, the pulsatile drug delivery system gains more attraction because of their number of benefits over the other dosage forms. In these systems, the drug is released at right time at the right site of action, and in the right amount, it is the most beneficial and important characteristic of the PDDS system due to that the patient compliance is increased, and the drug release is after a well-defined lag time. Moreover, this system is designed according to the circadian rhythm of the body. Because the disease has a predictable cyclic rhythm, such as Arthritis, diabetes mellitus, asthma, peptic ulcer, hypertension, cardiovascular disease the PDDS is more effective than other dosage forms.This system is a more time-specific and site-specific drug delivery system. In this system the drug is released as a pulse. The mechanism of PDDS is first diffusion then erosion and then osmosis. For the drug having a high first-pass effect and having a high risk of toxicity and side effects, these systems can be very useful. And to reduce dosing frequency and improve patient compliance this system is very helpful. There are various methods present like, single-unit systems and multiple-unit systems – which included capsular system, pulsatile delivery by osmosis, pulsatile delivery by erosion of membrane, delivery by rupture of membrane, etc.

KEYWORDS: Pulsatile drug delivery system; Chronopharmacology; Techniques; Circadian rhythm; Pulsatile release; Polymers.

Introduction

Traditionally the drug release pattern is generally immediate or extended type, but these drug release pattern have some disadvantages, so that now a day's vast amount of research will be focused on constant drug release pattern. The pulsatile drug delivery system will be on of that type in that system the release of drug will be constant for long time period. The pulsatile drug delivery system is a site and time specific drug delivery system thus it provide increasing patient compliance. Pulsatile system is defined as it is a rapid and transient release of certain amount of molecules within a short time period immediately after a predetermined time of period, that period called a lag time. The lag time will be essential for that drug which are degrade under gastric acid medium (e.g., peptide drugs) and produce irritation in gastric mucosa or induce nausea and vomiting. The drug having first pass metabolism result the reducing bioavailability (Reddy et al., 2009; Arora et al., 2006).

In the Fig.1 show that the drug release profile of pulsatile drug delivery system.



Where, A)sigmoidal release after lag time (B) delayed release after lag time (C) sustained release after lag time (D) extended release without lag time.

Fig. 1. Drug release profile of pulsatile drug delivery system.

Chronopharmacotherapy

It is branch of pharmaceutics for design and evaluate drug delivery system. As early as the fourth century BC, Alexander the Great's scribe Androsthenes noted that the leaves of certain trees opened during the day and

Gadakh and Chintamani, IJPSR, 2021; Vol. 12(6): 3006-3009. E-ISSN: 0975-8232; P-ISSN: 2320-5148

IJPSR (2021), Volume 12, Issue 6 **(Review Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 23 November 2020; received in revised form, 10 May 2021; accepted, 12 May 2021; published 01 June 2021

AYURVEDA A PROMISING TOOL FOR THE ERADICATION OF COVID-19

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Keywords:

Ayurveda, Herbal drugs, Covid-19, Treatment, Supportive

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ABSTRACT: The COVID-19 pandemic has created a global health crisis posing an unprecedented public health emergency. The number of deaths and people being infected is increasing daily throughout the globe. This situation is much more severe due to possible devastating situations because of several social and economic factors. Effective management to address this infection is still evolving, and attempts are being made to integrate traditional interventions along with standard of care. Ayurveda and yoga can be proved excellent results in cure of Covid-19. It has also been accepted by ICMR in its latest guidelines; they have showcase importance of Ayurveda and yoga in treatment of covid-19. In view of this, an attempt is made to conglomerate a few important herbs whose chemical constituents must be tested for their anti-viral potential against Covid-19 infection. Many of the ayurvedic herbal preparation proved its worth as an immune booster in treatment of Covid-19.

INTRODUCTION: The year 2020 had been impacted by the emergence of the dreadful disease known as COVID-19, which is started to spread in the world since 30th January 2020. It had found its origin in Wuhan city of China. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the causative agent for the COVID-19. [1] In India, its route starts with the first migrant come from Wuhan city of China was a medical student who was first identified patient of COVID-19. The government of India introduces to lockdown in the country from 17th March 2020. After that rapid increase in COVID-19 patients had been observed. Ministry of information and Broadcasting in July 2020 had declared that the mortality rate in India due to COVID-19 is lowest as compared to the rest of the world at 2.41%. ICMR apex body in India controlling medical research and related activities had suggested some ayurvedic practices and medicines which can be helpful in controlling the COVID-19 situation in India. India has near about 30 vaccines in the various stages of development and is expected in the first quarter of the year 2021. [2, 3]

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.12(6).3006-09

This article can be accessed online on www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.12(6).3006-09

The emergence of COVID-19 had created a greater impact on the economy of every country, which marked negative growth first in decades. The government of India had taken various measures to rebound economic growth with ease in lockdown. The motto of atmanirbhar Bharat Abhiyan had a tremendous boost to Indian industries especially those of in the pharmaceutical sectors and health-related industries. It has been observed as a marked increase in production of hospital beds, ventilators and PPE kits. India is the second major producer of PPE kits in world. The self-sufficiency objectives had created this impact on industrial growth opens the doors of new opportunities for everyone [4-9].

In India, the spread of the corona virus had been observed through peoples who had travel history to the affected countries in March. Then some peoples had also been attended the various functions that

Publication202117

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Research J. Pharm. and Tech. 14(8): August 2021

ISSN 0974-3618 (Print)
0974-360X (Online)

www.rjptonline.org

REVIEW ARTICLE

An Updated Overview on Mucoadhesive Buccal Drug Delivery System

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ABSTRACT:

Among the various routes of drug delivery, the oral route is an attractive site for the delivery of drugs. The main advantages of these formulations are: drug targeting, sustained release, increased permanence time in the buccal mucosa, increased bioavailability, and decreased potential adverse effects and maintains constant blood levels for extended period of time. The buccal cavity was found to be the most suitable and easily accessible site for the delivery of therapeutic agents for both local and systemic delivery. Buccal mucosa has a tremendous availability, which leads to direct access to systemic circulation through the internal jugular vein bypasses the drug from hepatic first pass metabolism. The main disadvantage of this route is Limited absorption area- the total surface area of the membranes of the oral cavity available for drug absorption is 170 cm^2 of which ~50 cm^2 represents non-keratinized tissues, including buccal membrane, the barrier function of the skin changes from one site to the other and from one person to other person with age and large dose of drug are difficult to be administered. Melt granulation is emerging technique and this technique used to increase the dissolution rate of poorly water-soluble drugs. Tablet molding technique: Tablets produced by the molding technique are easier to scale up for industrial manufacture than lyophilisation technique. Hot melt extrusion of film method: Hot melt extrusion has been used for the manufacture of controlled release matrix tablets, pellets and granules, as well as oral disintegrating films.

KEYWORDS: Mucoadhesive, Buccal Drug Delivery, Emerging technology, Direct milling.

INTRODUCTION:

Mucoadhesive tablets are unconventional formulations with a few numbers of products registered by regulatory agencies such as FDA and ANVISA, and available to the population. However, there are a high number of patents and articles using this pharmaceutical form as an alternative to the oral administration. These formulations can be applied in areas with low vascularization, aiming local administration, or with high vascularization, when systemic absorption is desired; in opposition to the oral tablets, whose pharmacological efficacy depends necessarily on the absorption and systemic distribution.

Received on 22.12.2019 Modified on 10.03.2020
Accepted on 20.04.2020
Research J. Pharm. and Tech. 2021; 14(8):4491-4496.
DOI: 10.52711/0974-360X.2021.00781

The main advantages of these formulations are: drug targeting, sustained release, increased permanence time in the buccal mucosa, increased bioavailability, and decreased potential adverse effects. Among the various routes of drug delivery, the oral route is an attractive site for the delivery of drugs. The buccal cavity was found to be the most suitable and easily accessible site for the delivery of therapeutic agents for both local and systemic delivery. Buccal Adhesive drug delivery system extend the residence time of the dosage form at the site of absorption and facilitate an intimate contact of the dosage form with the absorption surface and thus contribute to improved therapeutic performance of the drug. Bioadhesion can be defined as phenomenon of interfacial molecular attractive forces in the midst surfaces of the biological substrate and the natural and synthetic polymers, which allows the polymer to stick to the biological surface for a prolonged period of time. Among the many routes of drug delivery the oral route is perhaps the most preferred by clinicians and patients

ejpmr, 2021, 8(3), 367-374

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

SJIF Impact Factor 6.222

Research Article

ISSN 2394-3211

EJPMR

VALIDATED HPTLC METHOD FOR SIMULTANEOUS DETERMINATION OF LOPINAVIR AND RITONAVIR IN TABLET DOSAGE FORM

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Article Received on 01/01/2021 **Article Revised on 22/01/2021** **Article Accepted on 11/02/2021**

ABSTRACT

A high performance thin layer chromatographic method has been developed for the simultaneous determination of lopinavir and ritonavir from tablet dosage form. Separation was performed on aluminum HPTLC plate (20×10cm) precoated with silica gel F_{254} HPTLC plates as stationary phase and the mobile phase consisting of toluene, ethyl acetate, methanol, formic acid (6:4, 4.5:0.5:0.5v/v/v/v) and wavelength of detection 254nm was used. After development, plates were observed under UV light. The detector response was linear in the range of 2µg/spot - 12µg/spot and 2 µg/spot - 6 µg/spot for lopinavir and ritonavir respectively. The developed method was validated as per ICH guidelines. The validated lowest limit of detection was 0.004827 µg /spot and 0.003369 µg /spot whereas lowest limit of quantification was 0.014627 µg /spot and 0.010208µg /spot for lopinavir and ritonavir respectively. The described method has the advantage of being rapid and easy. Hence it can be applied for routine quality control analysis of lopinavir and ritonavir from pharmaceutical preparation and stability studies.

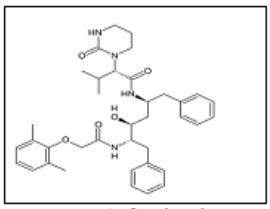
KEYWORDS: Lopinavir, Ritonavir, HPTLC, Validation.

INTRODUCTION

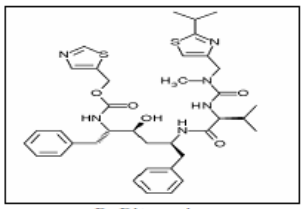
Lopinavir chemically (2S)-N-[(2S,4S,5S)-5-[2-(2,6dimethylphenox acetamido]-4-hydroxy-1,6-iphenylhexan-2-yl]-3-methyl-2-(2-oxo-1,3-diazinan-1-yl)butanamide and its empirical formula is $C_{37}H_{48}N_4O_5$ with a molecular weight of 628.80 (figure 1 A) [1-3]and Ritonavir (5s, 8s, 10s,11s)-10-hydroxy-2-methyl-5-(1-methylethyl)-1-[2-(1-methylethyl) -4-thiazolyl]-3,6-dioxo-8,11-is (phenylmethyl)-2,4,7,12-etraazatridecan-13-oic acid 5-thiazolyl methyl ester of molecular formula $C_{37}H_{48}N_6O_5S_2$ and its molecular weight is 720.95(figure 1 B).[1-3] These are antiretroviral drugs from protease inhibitor class. The drugs have been proved to be effective in anti-HIV treatment.

Ritonavir is the most potent protease inhibitor in its ability to inhibit CYP-450 and efflux pump-P-glycoprotein as a result the potential for severe drug interaction is quite great because of strong CYP-450 inhibiting effect of ritonavir. The drug has found value when used in fixed dosage form combination with other PIs to block their metabolism and acts as a booster for these drugs. In these cases ritonavir is used in a sub therapeutic dose but boosts the effectiveness of co administered drug.[4-7]

Literature survey of lopinavir and ritonavir either single or in combination with ritonavir revealed several methods based on HPLC and spectrophotometric methods in pharmaceutical formulation .however there are few HPTLC method for simultaneous determination. The proposed method was validated as per ICH guideline.



A: Lopinavir



B: Ritonavir

Figure 1: Structures of Lopinavir and Ritonavir.

Publication202119

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Journal of Pharmaceutical Research International

33(33A): 164-175, 2021; Article no.JPRI.69762
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Leaves of *Stereospermum suaveolens DC* Exhibit Anti-inflammatory and Anti-arthritic Potential Action in Experimental Animals

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Authors' contributions

This work was carried out in collaboration between both authors. Author RRC submitted work is part of Ph.D. research activity. Author DDB has guided and supervised the research work. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i33A31783
Editor(s):
(1) Dr. Sawadogo Wamtinga Richard, Ministry of Higher Education, Scientific Research and Innovation, Burkina Faso.
Reviewers:
(1) Nishat Fatima, Al Hawash Private University, Syria.
(2) Hee Dr Heethal Jaiprakash, International Medical University, Malaysia.
Complete Peer review History: http://www.sdiarticle4.com/review-history/69762

Original Research Article

Received 16 April 2021
Accepted 22 June 2021
Published 25 June 2021

ABSTRACT

Aim: The experimental investigation of current research work was to identify traditional rich claim of *Stereospermum suaveolens DC* leaves for anti-inflammatory and anti-arthritic potential action in animals.
Study design: Ethyl acetate fraction of *Stereospermum suaveolens* DC (Bignoniaceae) methanolic extract of leaves evaluated at 125mg/kg, 250mg/kg and 500mg/kg (p.o.) doses for anti-inflammatory and anti-arthritic activity.
Methodology: Ethyl acetate fraction of *Stereospermum suaveolens* DC (Bignoniaceae) methanolic extract of leaves was evaluated for phytochemical investigation for total flavonoid content using UV spectroscopy and TLC study. Carrageenan induced rat paw edema (Acute method) and Freund's complete adjuvant (FCA) induced chronic arthritis in wistar rats were used as an animal models to claim *Stereospermum suaveolens* DC leaves for anti-inflammatory and anti-arthritic potential. The rat paw volume and percentage inhibition of the paw edema were evaluated for anti-inflammatory activity. The assessments of arthritis in rats were measured by haematological values and radiological examinations.
Result: Ethyl acetate fraction of *Stereospermum suaveolens* DC (Bignoniaceae) methanolic extract

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Publication202120

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WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.632
Volume 10, Issue 8, 806-821 Review Article ISSN 2278 – 4357

A REVIEW: IN-VIVO AND IN-VITRO TESTING MODELS FOR ANTIALLERGIC FORMULATIONS

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Article Received on
02 June 2021,

Revised on 22 June 2021,
Accepted on 12 July 2021

DOI: 10.20959/wjpps20218-19549

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ABSTRACT

The allergic diseases are increasing on this globe over the years. There are four types of allergies like, type-1 (anaphylactic reactions), type-2 (cytotoxic reaction), type 3 (immunocomplex reactions), and type-4 (cell-mediated reactions). Hypersensitivity is among the common form of allergy. In this review, we have discussed *in-vivo* and *in-vitro* models for testing allergy like BALB/c, CH3/HeJ, C57BL/Mice, BN Rat, Zebrafish, Guinea Pig, Dog, Monkey, Cat, Pig, Sheep, Mast Cell, Human basophile, and RBL-2H3 etc. Dog are mostly used for human allergy testing as it is more related and shows common allergies same as humans. Mast cell play significant job in allergic study and RBL-2H3 cells play chief role in feed allergy. These models help in the development of new drug or novel therapy. The objective of this study is to develop allergy model and to analyse allergies throughout species and focus on how these allergies are equivalent in people.

KEYWORDS: *In-vivo* and *In-vitro* models, IgE, allergy screening, antiallergics.

INTRODUCTION

Animals are very contributed for understanding of allergy. Allergic conditions such as dermatitis, rhinitis, inflammation, sinusitis, inflammation to bronchi, and feed sensitivity represents common source of person ailment. Atopic dermatitis it is a congenital disease transmitted in all age group, and results from close connection between genetical organs. Rhinitis (AR) is a direct-type allergic response in allergic person afterward subjection to aerial irritants. The connection of antigen with particular IgE which is connected to nose mast

Publication202121

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WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.632
Volume 10, Issue 9, 804-827 Review Article ISSN 2278 – 4357

A REVIEW: ROLE OF DIETARY SUPPLEMENTATION IN COVID-19 PANDEMIC

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Article Received on
23 June 2021,
Revised on 13 July 2021,
Accepted on 03 August 2021
DOI: 10.20959/wjpps20219-19784

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ABSTRACT

COVID-19 is a novel coronavirus disease. It is an upper respiratory tract virus which can cause infection to the people with all age groups. Dietary supplements show gradually increasing mark in all over the globe as an immunity booster. Dietary supplements may include nutraceuticals as well as micronutrients. Nutraceuticals is the term of combining words "Nutrition" and "Pharmaceuticals". These are defined as the type of food or food extracts that shows a good and beneficial impact on the health of human body. The micronutrients are the chemical substances which are essential for the growth and health of living organisms in small amounts. Micronutrients shows a crucial role in the immune system and accordingly have a beneficial impact on the coronavirus disease outcome. The low levels of micronutrients such as vitamins, minerals, etc. are being correlated with the adverse clinical outcomes during any type of viral infections.

KEYWORDS: COVID-19, SARS-CoV-2, Dietary Supplements, Vitamins, Minerals, Proteins.

INTRODUCTION

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2/COVID 19), a novel coronavirus, is a worldwide pandemic, as declared by the World Health Organization. It is a viral infection that affects respiratory tract, in the peoples of all ages.[22,36] The Coronavirus Disease - 19 i.e. COVID-19 is a highly infectious disease and caused due to Corona virus. This COVID-19 is also known as one of the life-threatening pandemics. The rapid spread of this deadly virus at the unbelievable rate has shocked the world and create the challenge to

Publication202122

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International Journal of Pharmaceutical Chemistry and Analysis 2021;8(3):123–128

Content available at: https://www.ipinnovative.com/open-access-journals

International Journal of Pharmaceutical Chemistry and Analysis

Journal homepage: https://www.ijpca.org/

Original Research Article

Simultaneous analysis of eprosartan and hydrochlorothiazide in tablet formulation by High- Performance thin layer chromatography with ultraviolet absorption densitometry

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ARTICLE INFO

Article history:
Received 16-09-2021
Accepted 17-09-2021
Available online 22-10-2021

Keywords:
Eprosartan
HPTLC
Hydrochlorothiazide
Tablets
Validation

ABSTRACT

A new, simple, accurate, and precise high-performance thin-layer chromatographic method has been established for simultaneous analysis of Eprosartan and Hydrochlorothiazide from a tablet formulation. Standard and sample solutions of Eprosartan and Hydrochlorothiazide were applied to precoated 250 μm layer of silica gel G 60 F_{254} and the plates were developed with Chloroform: Acetonitrile: Glacial Acetic Acid (7:3:1,v/v/v) as mobile phase. Detection and evaluation of densitograms was performed densitometrically at 254 nm. The linear range was 200-700 ng/band with the retention factors of Eprosartan and Hydrochlorothiazide were 0.26± 0.02 and 0.44±0.02, respectively. The method was validated and successfully used for analysis of the drugs in tablets.

1. Introduction

Eprosartan (EPS), (E)-3-[2-butyl-1-[(4 carboxyphenyl)methyl]-1H-imidazol-5-yl]-2-[(2 thienyl)methyl]propenoic acid (Figure 1)[A], is a highly selective, non-peptide angiotensin-II antagonist. It has been shown to inhibit angiotensin-II induced vasoconstriction and to reduce systolic and diastolic blood pressure.[1] Hydrochlorothiazide (HYT), 6-chloro-3,4-dihydro-2H-1,2,4-benzothiadiazine-7-sulphonamide-1,1-dioxide (Figure 1)[B] is a diuretic drug.[2] The rationale behind use of this drug combination is that in treatment of hypertension in patients whose blood pressure is not adequately controlled by monotherapy. Oral administration of EPS with HYT has been found to be more effective than use of either drug alone.[3]

Other work dealing with analysis of EPS and other drugs in pharmaceuticals and biological samples includes use of LC–MS–MS,[4] capillary zone electrophoresis,[5] and micellar electrokinetic capillary chromatography.[6] Analysis of EPS in biological samples by HPLC–UV[7] and a chemometric method for optimization of solid-phase extraction HPLC–UV[8] of EPS in plasma have also been reported. There are several reports of the analysis of HYT

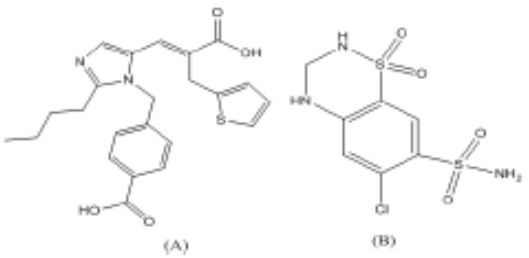

Fig. 1: The structures of (A) Eprosartan and (B) Hydrochlorthiazide

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https://doi.org/10.18231/j.ijpca.2021.024

Publication202123

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Journal of Pharmaceutical Research International

33(43A): 24-36, 2021; Article no.JPRI.73510
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Development and Evaluation of Floating Microspheres of Sumatriptan Succinate using Ethyl Cellulose and Mucilage Extracted from *Vigna Mungo*

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i43A32461
Editor(s):
(1) Dr. Rafik Karaman, Al-Quds University, Palestine.
Reviewers:
(1) J Jebahi Samira, Centre National des Sciences et Technologies Nucléaires. North Africa.
(2) S. Esath Natheer, Nehru Arts and Science College Coimbatore, India.
Complete Peer review History: https://www.sdiarticle4.com/review-history/73510

Original Research Article

Received 28 June 2021
Accepted 01 September 2021
Published 03 September 2021

ABSTRACT

Aim: The present investigation is to formulate and evaluate gastroretentive floating microspheres for sumatriptan succinate. Gastric retention is widely used approach to retain dosage form in stomach and to enhance absorption of drugs.
Methods: The gastroretentive floating microspheres was prepared by two different techniques as solvent evaporation and W/O/W multiple emulsion technique. Ethyl cellulose, HPMC K4M polymer and mucilage extracted from *Vigna Mungo* in various proportions were used for formulation of microspheres. Combination of ethyl acetate and acetone in different proportion was used as organic phase and the microspheres were characterized for particle size, shape, morphology, percentage yield, entrapment efficiency, drug loading, *In-Vitro* Floating/Buoyancy study, In-vitro Floating/Buoyancy study and release kinetics.
Results: The average particle size of all batches was found in the range 100 to 210 µm and the entrapment efficiency of all formulations was found in the range of 17.46 % to 59.28 %.Total

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Publication202124

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IJBPAS, October, Special Issue, 2021, 10(10): 67-81
ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)
'A Bridge Between Laboratory and Reader'
www.ijbpas.com

FORMULATION AND EVALUATION OF ORAL FAST DISSOLVING DELIVERY FOR ROSUVASTATIN

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Received 19th April 2021; Revised 20th June 2021; Accepted 29th July 2021; Available online 1st Oct. 2021

https://doi.org/10.31032/IJBPAS/2021/10.10.1006

ABSTRACT

In the present work, oral thin films of Rosuvastatin were designed with a view to enhance patient compliance by solvent casting method. In the solvent casting method, ludiflash (1,2,3,4 and 5% w/w), crospovidone (1,2,3,4 and 5% w/w) as super disintegrants were used in different concentrations with Gelatin, Poly vinyl alcohol as a film forming base for the formulation of oral disintegrating thin films of Rosuvastatin by solvent casting method. The prepared formulations of films were evaluated for film thickness measurement, folding endurance study, in-vitro disintegration time, in-vitro drug release pattern (in pH 6.8 phosphate buffer). Drug content, and drug-polymers interaction study (IR spectroscopy). Among all formulations, the formulation (F5) prepared by 5% ludiflash show good drug release (98.34%).

Keywords: Ludiflash, crospovidone; Rosuvastatin; oral disintegrating thin films

1. INTRODUCTION

Among the different routes of administration, the oral route of administration continues to be most preferred route due to various advantages including ease of administration, avoidance of pain, versatility and most importantly patient compliance. Taking the biological and physiological aspects of absorption and metabolism, not many drugs can be delivered successfully through the oral route because of the first pass effect of the drug which in turn affects the membrane permeability, absorption and bioavailability [1]. One such relatively new dosage form is

WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.632
Volume 10, Issue 11, 752-759 Review Article ISSN 2278 – 4357

A REVIEW ON BLACK FUNGUS/MUCORMYCOSIS

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Article Received on
14 Sept. 2021,
Revised on 04 October 2021,
Accepted on 24 October 2021
DOI: 10.20959/wjpps202111-20517

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ABSTRACT

Mucormycosis is a fungal infection that usually appears due to the presence of fungi or environmental factors that contribute to the prolonged use of antibiotics and intensive care. It is caused by the use of immunosuppressive steroids and the patient's history of diabetes. Mucor mycosis is a rare illness characterized by high mobility rate and body surface internal effects. It is usually treated with various medications.

INTRODUCTION

Mucormycosis is a fatal fungal infection that usually leads to a poor quality of life. It is treated with various surgical procedures and toxic chemicals even with the best treatment, mucormycosis still has a mortality rate of around 50% to 100%. This condition can be fatal even for individuals with a history of mild illness.

Angioinvasive infections are usually triggered by hematologic malignancies and/or stem cell transplantation in immunocompromised hosts. High-risk patients include those with diabetes and poorly controlled hyperglycemia. The fungi that cause mucormycosis are known as the Rhizopus, Mucor, and Cunninghamella. They can infect individuals with compromised immune systems and cause various types of injuries and illnesses. In the US, there has been a significant rise in the number of patients with mucormycosis, which is a fungal infection that can infect human hematopoietic stem cell transplant recipients. Cases of mucormycosis have increased significantly in France over the past decade. A study conducted in India, COVID19 disease could cause a yearly prevalence of around 200,000 cases. Output Rephrased/Re-written Text affecting various parts of body and it get spread rapidly the covid patients and also the covid worriers like doctors, nurses and ward boys are becoming plagued by this uncommon fungus at higher rate than ever present.

Publication202126

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Journal of Pharmaceutical Research International

33(60A): 1-7, 2021; Article no.JPRI.80162
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Development of Validated RP-HPLC Method for Estimation of Empagliflozin and Metformin in Combined Formulation

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i60A34446

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/80162

Original Research Article

Received 09 October 2021
Accepted 18 December 2021
Published 19 December 2021

ABSTRACT

Aim: The aim of the present study include development of validated RP-HPLC method for estimation of Empagliflozin and Metformin in combined dosage form by using LC-MS compatible volatile mobile phase.

Methodology: Appropriate separation of drugs was achieved using C18 column as a stationary phase and Acetonitrile: Water (50: 50, v/v) at a flow rate 1mL/min as mobile phase. Detection was done at 230 nm.

Results: The R_t of Metformin and Empagliflozin was found to be 2.20 ± 0.02 min and 3.64 ± 0.02 min respectively. When the marketed formulation was analyzed by the developed method, the % drug contents were found to be 98.57 ± 1.28 and 99.86 ± 1.02 %w /w for Empagliflozin and Metformin, respectively. The method was found to be linear in a range of 11.25 – 56.25 µg/mL for Empagliflozin and 85 – 425 µg/mL for Metformin. Detection limit and quantitation limit were found to be 0.30 and 0.92 µg/mL for Empagliflozin and 1.12 and 3.36 µg/mL for Metformin, respectively. The accuracy and precision results were found to be near 100 % w/w for both the drugs. The method was also found to be robust and specific.

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Journal of Pharmaceutical Research International

33(59A): 540-546, 2021; Article no.JPRI.79884
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Production and Analysis of Lip Balm using Herbal Resources

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i59A34303

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/79884

Original Research Article

Received 10 October 2021
Accepted 14 December 2021
Published 16 December 2021

ABSTRACT

Lip care products are an integral part of a day-to-day lifestyle. These impart the colour and protect the lips from the external environment. The major function of lip balm is to protect and moisturize the lips. A variety of lip care products are available in the market. The main concern with this product is that these contain synthetic colourant and flavouring agents that may have adverse effects such as darkening of lips. Besides, these may contain heavy metals that adversely affect various body organs. The current research work deals with preparation lip balm by using maximum possible natural ingredients and evaluation of the formulation. Various natural ingredients used were beetroot extract, Cocoa powder, Almond oil and Vitamin E. The physicochemical properties such as colour, odour, consistency, spreadability, melting point, pH and stability were studied. It was found that the formulation possesses red colour due to the addition of beetroot pigments, it had a typical flavour of cocoa powder, uniform in consistency and good spreadability. The melting point and pH of formulation were found to be 58-60°C ± 0.62 and 6.9 ± 0.25 respectively. The stability study indicated that formulation is stable at room temperature and refrigeration temperature. It can be concluded that lip balm formulation was successfully prepared by using these natural additives and better alternatives to synthetic excipients.

Keywords: Lip balm; natural ingredients; beetroot; cocoa powder; almond oil.

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Publication202128

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Mini-Reviews in Medicinal Chemistry, 2021, *21*, 000-000 1

REVIEW ARTICLE

Novel Niacin Receptor Agonists: A Promising Strategy for the Treatment of Dyslipidemia

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ARTICLE HISTORY

Received: April 00, 2020
Revised: August 22, 2020
Accepted: October 07, 2020

DOI:
10.2174/1389557521666210125144921

Abstract: ***Background***: Hyperlipidemia is characterized by high level of cholesterol and triglycerides in blood. Various classes of drugs like statins, fibrates, niacin *etc.* are used for treatment of hyperlipidaemia.

Objective: Niacin, which is one of the beneficial anti-hyperlipidemic agents, helps decreasing LDL cholesterol by 20 to 40% and causes increase of HDL cholesterol by 20 to 35%. However cutaneous flushing, loss of glucose tolerance, liver toxicity are the reported side effects of niacin therapy responsible for decreased patient compliance. Very recently, the G protein coupled receptor (GPCR); GPR109A located on the adipocytes has been identified as the receptor for activation of niacin.

Method: *In-vitro* studies have demonstrated that GPR109A receptor having high affinity for niacin. The present review attempts to provide a systematic presentation of the various chemical classes of compounds that have been reported as novel niacin receptor agonists including pyrazole-3-carboxylic acids, urea derivatives, anthranilic acids, biaryl anthranilides, tetrahydro anthranilic acid, xanthines, barbituric acid, bicyclic pyrazole carboxylic acids, pyrido pyrimidinones, pyrazolyl propionyl cyclohexenamides, pyrazole acids *etc.*

Results: As the design of GPR109A receptor agonists offers a promising solution for treatment of dyslipidemia, this review will be beneficial for medicinal and drug discovery chemists to expediate the process of discovery of new class of anti-hyperlipidemic agent with favorable lipid lowering profile with increase in HDL levels.

Conclusion: This review explains novel GPR109A receptor agonists for the treatment of dyslipidemia.

Keywords: Antihyperlipidemic drugs, cutaneous flushing, dyslipidaemia, Niacin receptor agonists, G-protein coupled receptor (GPCR), HDL.

1. INTRODUCTION

1.1. Background

Cardiovascular diseases (CVD) are the leading causes of mortality in the world, in both developed as well as in developing countries [1]. According to WHO global database, CAD (Coronary Artery Disease) is the leading cause of death in India, responsible for 28% of mortality [2]. Across the globe, the highest rate of CAD is observed among South Asians [3]. The rate of cardiovascular diseases in the urban Indian population is between 6.5-13.2% and between 1.6-7.4% in the rural population. However, due to changing life styles, presently, this rate is growing rapidly in rural areas [4]. The average age of onset of CVD in Indians is much lower than in other populations around the world [5]. A large variation of the occurrence of hypercholesterolemia is reported between countries, as well as within countries, and between different areas and population groups [6].

The atherosclerosis of large along with medium sized arteries is mainly responsible for cardiovascular diseases. One of the most important contributing factors is dyslipidaemia. [7-9] Dyslipidaemia or hyperlipidemia, which is characterized by the elevated level of lipids in the blood, including triglycerides, fatty acids, fats, cholesterol, phospholipids and cholesterol esters are mainly responsible for the development of atherosclerosis related conditions such as coronary heart disease (CHD), peripheral vascular disease and ischemic cerebrovascular disease [10].

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1389-5575/21 $65.00+.00

Publication202129

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The International journal of analytical and experimental modal analysis ISSN NO:0886-9367

Title

EVALUATION OF THE EFFECT OF CHRYSIN IN RENAL ISCHEMIA REPERFUSION INDUCED RENAL FAILURE IN WISTAR RATS

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Abstract

Renal ischemia is a principal source of acute renal failure (ARF) and results in high rates of morbidity and fatality. Renal ischemia reperfusion is a multifaceted disorder concerning diverse mechanisms characteristically renal vasoconstriction, insidious tubular injury, and glomerular damage. Moreover, ischemia reperfusion injury entails assorted proceedings, including hammering of energy, deformation of the ionic haemostasis, generation of impulsive oxygen species, and cell demise.

In the present study, the effect of Chrysin of its activity on renal ischemia reperfusion, has been evaluated. The animals were (180-230g) divided into 6 groups and 8 animal in each group after that administered with 10,20 and 40 mg/kg dose of chrysin administered to the rat by orally, for 28th days on 29th day the animals were anaesthetised by using Sodium thiopentone (35 mg/kg i.p) and were subjected to ischemia reperfusion injury. The animals were kept in metabolic cages for 24 hours on 30th day on that basis parameter were evaluated and the animal were sacrificed and their kidneys were isolated for histopathology and antioxidant parameters.

At the end of the study we found out that the decreased in water intake and Sodium level, decrease in urine output, Creatinine,Urea BUN,Pottasium level. when the test groups (10mg/kg, 20mg/kg, 40mg/kg) were compared with Ischemia reperfusion group and normal vehicle control group. GSH and SOD level in increased and MDA level decreased in rats when the test groups (10mg/kg, 20mg/kg, 40mg/kg) were compared with Ischemia reperfusion group.

Keywords- Ischemia Reperfusion,Haemostasis,Acute renal Failure,Hepatoprotective

The International journal of analytical and experimental modal analysis

ISSN NO:0886-9367

Exploration of Antidiabetic potential of aerial parts of *Abutilon indicum* Linn in streptozotocin- nicotinamide induced diabetes in rats

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Abstract

Present study was carried out to investigate Antidiabetic activity of ethyl acetate fraction of aerial parts of *Abutilon indicum* L. (EAAI) in streptozotocin induced early diabetic nephropathy in rats, to focus on its possible mode of action and identification of possible phytoconstituents responsible for the proposed activity. Experimental diabetes was induced in Wistar rats by single intraperitonial injection of streptozotocin (65 mg/kg). Animals were divided in six groups (n=6) and treated with variable doses of EAAI for 4 weeks. Fasting blood glucose was measured at 0, 7th, 14th, 21st, 28th day of the study. At the end of 4 weeks, oral glucose tolerance test (OGTT), lipid profile, glycosylated haemoglobin, was determined. Antioxidant enzymes of liver were evaluated. Pancreas of experimental animals was examined to determine structural changes. Further, EAAI was also analysed for its phytochemical composition using various qualitative and quantitative methods.

Daily oral administration of EAAI for 28 days to diabetic rats produced significant decrease in fasting blood glucose, lipid profile, and liver enzymes. Where as significant improvement in glycosylated haemoglobin, oxidative stress parameters of liver has been observed in EAAI treated diabetic rats. Histopathology of pancreas tissue showed structural improvement.

The results of our study demonstrate Antidiabetic potential of aerial parts of *Abutilon indicum* L. justifying its use in the indigenous system of medicine.

Keywords: Streptozotocin, *Abutilon indicum*, Hyperglycaemia, Oxidative stress, Antioxidants, Quercetin

1. INTRODUCTION

Diabetes mellitus (DM) is an endocrine disorder marked by abnormalities in lipid, carbohydrates, and protein metabolism and it is characterized by hyperglycaemia and glycosuria. Decreased insulin secretion or absence of insulin in blood is mainly responsible for diabetes mellitus. Increased blood sugar it does not only cause hyperglycaemia but result in numerous complications which are grouped as acute, sub acute, or chronic; these include but are not limited to retinopathy, neuropathy, nephropathy, cardiovascular disorders, hypoglycaemia, diabetic ketoacidosis, hyperosmolar nonketotic syndrome, polydipsia, frequent urination, lack of vigour, ocular impairment, weight loss, and excessive eating (Fatai , 2016). The prevalence of type 2 diabetes mellitus (T2DM) is approaching epidemic proportions, and diabetes mellitus (DM) affects people of all ages. There has been a dramatic increase in the prevalence of DM over the past 30 years; while previously, far fewer adults (and rarely children) were affected by this condition, mostly because obesity and physical inactivity were not as pervasive (Nissa, 2012). Current research is focused on the development of newer drug leads from phytoconstituents of medicinal plants which have been used in traditional practices, so as to get more potential and effective agents with lesser side effects than existing hypoglycaemic agents.

Abutilon indicum (Linn.) sweet (Malvaceae) commonly called 'Country Mallow' is a perennial plant up to 3 m in height. *Abutilon indicum* abundantly found as a weed thought out the tropical parts of India (Reyad, 2015). The plant is used in the traditional system of medicine for hypoglycemic, hepatoprotective, antimicrobial, male contraceptive, antidiarrheal activities, astringent, antibacterial, anthelmintic, carminative and diuretic. It is used locally for colds, high fever, mumps, tuberculosis, bronchitis, diabetes, carbuncle, haemorrhoids, hernia, diarrhoea and various types of

Original Article

Exploration of Elephant Foot Yam (*Amorphophallus paeoniifolius*) Starch: An Alternative Natural Disintegrant for Pharmaceutical Application

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ABSTRACT

Aim and Objectives: The aim of the current study is to isolate the starch from elephant foot yam (*Amorphophallus paeonifolius*) and investigate its potential as a disintegrant in tablet formulation as compare to standard corn starch. The objective of the study is to explore the applications of natural resources and develop an alternative to commercially available starches. **Materials and Methods:** Starch was isolated by a simple method, evaluated for phytochemical and physico-chemical properties. Tablets were prepared by wet granulation by varying concentrations of elephant foot yam or corn starch in the range of 2.5%, 5%, 7.5% and 10%. Further granules were evaluated for flow properties and tablets were evaluated for post-compression parameters. **Results:** It was found that the pH of the isolated starch sample was found to be neutral; it exhibited good swelling capacity and fair flow properties. P-XRD pattern showed a C-type diffraction pattern, SEM studies indicated that starch granules had a smooth surface. Granules possessed good flow properties and tablets complied with standard limits of weight variation. Hardness and friability were found in the range of 4.11-4.69 kg/cm² and 0.11-0.50% respectively. The wetting time was found in the range of 7 to 35 sec for elephant foot yam starch and 16-49 sec for corn starch. Disintegration time for elephant foot yam starch was found to be 28 to 84 sec and for corn starch, it was 40 to 90 sec. **Conclusion:** Formulations containing elephant foot yam starch showed a similar dissolution profile as that of corn starch. Stability studies were performed on F4 batch and it was found stable for three months.

Key words: Elephant foot yam, Corn starch, Disintegrant, Fast Disintegrating tablet, Disintegration time, Wetting time.

INTRODUCTION

Excipients are a critical and integral part of pharmaceutical dosage forms and are used for various purposes along with active ingredients.[1] Excipients play a vital role to ease the manufacturing process of various dosage forms, modify physical properties of dosage form, improve patient compliance by imparting color and flavor, acts as a carrier for insoluble drug, modify the release pattern in case of fast disintegrating and prolong release dosage forms, improve stability and bioavailability of drug etc.[2] Stable and efficacious product can be obtained by addition of appropriately stable and compatible excipients in precise quantities in the formulation. Excipients range from simple to complex substances that can be challenging to characterize. Inappropriate use of excipient might lead to mild to severe toxic effects. It is a critical task of a formulator to select appropriate excipients to develop an efficacious and stable dosage form as per the requirements. Hence the development of the excipients is one of the key research areas in pharmaceuticals.

Starch is an immortal excipient!!! It is the major storage polysaccharide of higher plants found in the form of discrete granules.

Submission Date: 22-05-2020;
Revision Date: 25-08-2020;
Accepted Date: 23-10-2020

DOI: 10.5530/ijper.55.1s.52

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CRITERIA III

Key Indicator 3.3 - Research Publication and Awards

3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during 2020

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RESEARCH PUBLICATION 2020

Year	Sr. No.	Name of Faculty	Title of the Paper	Name of Journal	Year, Vol, Page No, Issue	ISSN No.
2020	1	Ms. M.C. Upadhye, Dr. Ms. R.R. Pujari	Antidiabetic activity of Ficusglomerata roots	Current bioactive compounds	2020, 16(1), 33-41	1875-6646
2020	2	Ms. M.C. Upadhye, Dr. Ms. R.R. Pujari	Pharmacognostic, phytochemical and antioxidant activity of Ficusglomerata	Current bioactive compounds	2020,16(1), 42-47	1875-6646
2020	3	Dr. Ms. V.S. Tambe	Direct chiral HPLC-MS/MS method for determination of R-Lacosamide in human plasma	Pharmaceutical Chemistry Journal	2020, 54(1), 96-103	1573-9031
2020	4	Dr. Ms. V.S. Tambe	Qualitative analysis of Carica papaya leaves tablet formulation and study of fragmentation pattern of Rutin	Indian drugs	2020, 57 (11), 83-86	0019-462X
2020	5	Dr. Ms. V.S. Tambe	HPTLC Method Development for the Simultaneous Estimation of Ketorolac Tromethamine and Tramadol Hydrochloride from a Formulation	Acta Scientific Pharmaceutical Sciences	2020, 4(1), 84-88	2581-5423
2020	6	Ms. P. P. Taru	A Review on post covid - 19 Redevelopment Plans	Pharmaceutical Resonance COVID-19 Special Issue	2020, 6-9	2581-6136
2020	7	Mr. R.R. Chanshetti,	Anti-Inflammatory Potential Effect of Flavonoid Rich Ethyl Acetate Fraction of Methanolic Extracts of StereospermumSuaveolens DC (Bignoniaceae) Leaves in Experimental Animals	Pharmacology eJournal	2020, 4(26)	-
2020	8	Ms. S.R. Chintamani	Extraction, identification, and screening of Brassica oleraceavat.italicaplenck (Broccoli) floret to be an alternative for nanoparticle formulation	Indian Journal of Pharmaceutical Education and Research	2020, 54 (3), 724-731	2581-5423
2020	9	Ms. P.B. Kothawade	Novel nitrogen-containing heterocyclic compounds in GPR109A as an anti-hyperlipidemic: Homology modeling,	Journal of Research in Pharmacy	2020, 24 (4), 1-12	2581-6136

			Docking, dynamic simulation studies			
2020	10	Prof. Dr. S. N. Dhole	Formulation and Evaluation of Sustained Release Colon Targeted Mesalamine Tablet.	Research Journal of Pharmacy and Technology	2020, 13(5), 22-41	0974-360X
2020	11	Dr. N. S. Kulkarni	A comprehensive Review on Analytical method development and validation for SGLT-2 inhibitors by HPLC in its API and Dosage form.	Research Journal of Pharmacy and Technology..	2020, 13 (7); 3472-3479	0974-360X
2020	12	Dr. N. S. Kulkarni, Mr.M.K.Munde, Dr. S. N. Dhole	Improvement of Water Solubility and In Vitro Dissolution Rate of Deflazacort ByComplexation With βCyclodextrin Through Freeze Drying Process.	Indian Drugs.	2020, 57 (07), 70-73.	N 1083-7450
2020	13	Dr. N. S. Kulkarni, Mr.M.K.Munde	A systematic review on development and evaluation of controlled release and fast dissolving formulations for Anti-diabetic drugs over past decade.	International Journal of Pharmaceutical Sciences and Research.	2020, 11 (10), 4874-4883.	0975-8232
2020	14	Dr. N. S. Kulkarni, Dr. S.N. Dhole	Formulation and evaluation of gastro retentive floating microspheres: a systematic review.	International Journal of Pharmaceutical Sciences and Research.	2020, 11 (11), 5404-5416	0975-8232
2020	15	Dr. Ms. S. D. More, Dr.R.L.Mhetre	A Review On 3D Printing Technologies In Pharmaceutical Science	Bull.Env.Pharmacol.Lifesci	2020, 9(9), 126-134	2277-1808
2020	16	Dr. Ms. S. D. More, Dr. N. S. Kulkarni	A Review On Novel Approaches Of Mucoadhesive Oral Film Manufacturing Aspects	Bull.Env.Pharmacol.Lifesci	2020, 9(9), 116-125	2277-1808
2020	17	Ms. M. C. Upadhye, Ms. P.P.Taru, Dr.S.N.Dhole	A review on *bryphyllumpinnatum* (lam) Oken.	Res. J. Pharmacognosy and phytochem	2020,12, 111-113	0975-2331
2020	18	Ms. V. S. Vichare	Simultaneous Estimation Of Dapsone And Adapalene In Gel Formulation By Uv-Spectroscopy	International Journal Of Pharmaceutical Sciences And Research	2020, 11(12), 6179-6183.	0975-8232
2020	19	Ms. V. S. Vichare, Dr.S.N.Dhole	Simultaneous Estimation Of Dapsone And Adapalene In Gel Formulation By Derivative Spectroscopy	Current Trends In Pharmacy And Pharmaceutical Chemistry	2020, 29(4), 1-7	2582-5062
2020	20	Mr. M. K. Munde, Dr. N. S. Kulkarni	A Novel Validated Stability Indicating Analytical Method for Simultaneous	International Journal Of Pharmaceutical Education And Research	2020, 54(3),644-655	01-5464

			Quantification of Metformin Hydrochloride and Empagliflozin in Bulk and Marketed Formulation by HPTLC using Box-Wilson Experimental Design Approach			
2020	21	Mr. M. K. Munde, N. S. Kulkarni	Development and Validation of Novel Analytical Method for Empagliflozin and Metformin Hydrochloride in Bulk and Pharmaceutical Dosage Form by Four Different Simultaneous Estimation Approaches using UV Spectroscopy	Research J. Pharm. and Tech.	2020, 3(3)	0974-360X
2020	22	Mr. O. M. Bagade, Dr.S.N.Dhole	An Influence of Lyophilization on Praziquantel Loaded Nanosponge's by using food protein as a stabilizer with effect of Statistical Optimization.	Research J. Pharm. and Tech.	2020; 13(9):4491-4498.	0974-360X
2020	23	Mr. O. M. Bagade, Dr.S.N.Dhole	A Corollary of Nanoporous Carrier Drug Delivery System: An Updated Perspective	International Journal of Pharmaceutical Sciences and Nanotechnology	2020, 13 (5)	9074-3278
2020	24	Ms. S. R. Chintamani	Trends in Nanotechnology for the Treatment of Breast Cancer	Journal of Pharmaceutical Research International	2020, 32(36), 42-57	2456-9119
2020	25	Ms. S. R. Chintamani	Preparation Characterization And Evaluation Of Green Synthesis Nanoparticle Of Hydro Alcoholic Floret Extract Of Brassica Oleracea Var ItalicaPlenck (Broccoli) Using Qbd Approach For Breast Tumor Cells T-47D Treatment	International journal of scientific & technology research	2020, 9 (2), 1175-1187	2277-8616
2020	26	Ms. S. R. Chintamani	A Review On The Solubility Enhancement Techniques With Their Pros And Cons	Pensee	2020,50(12),1508-1526	0031-4773
2020	27	Ms. S. R. Chintamani	Role Of Exotic Plants In Cancer	Pensee	2020, 11(12) 6067-6077	0031-4773

2020	28	Ms. S. S. Jadhav	Curcumin Potentiates Therapeutic Efficacy of Metformin: A Preclinical Study in STZ-NA Induced Hyperglycemia in Wistar Rats	Research journal of pharmacy and technology	2020, 13(6)	0974-360X
2020	29	Ms. P. B. Kothwade	GPR109A receptor (PM0083972)	PMDB data bank	-	-
2020	30	Mrs. B. N. Atre	Disease Modifying Potential Of Wedelolactone Rich Fraction Of Eclipta Alba In Adjuvant Induced Arthritis In Rats By Inhibition Of Proinflammatory Cytokines.	International Journal Of Pharmaceutical Sciences And Research	2020, 11(12), 6067-6077.	0975-8232
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Current Bioactive Compounds 2020, 16, 33-41

RESEARCH ARTICLE

BENTHAM SCIENCE

Antidiabetic Effects of Ethanolic Extract of *Ficus glomerata* (L.) Roots

Mohini C. Upadhye[1,*], Uday Deokate[2], Rohini Pujari[3] and Vishnu Thakare[4]

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Abstract: ***Background***: *Ficus glomerata* (*F. glomerata*) Linn. Family Moraceace is a large tree found all over India including outer Himalayan ranges, Punjab, Chota Nagpur, Bihar, Orissa, West Bengal, Rajasthan, Deccan and also as a common plant in South India. It is planted around the home and temples. It is cultivated throughout the year, distributed in evergreen forests and moist localities.

Objective: The Ethanolic Extract of roots of *F. Glomerata* (EEFG) belonging to the family Moraceace, was investigated for its antidiabetic activity using alloxan induced diabetic rats.

Methods: Thirty rats were divided into 5 groups having 6 rats in each group. The alloxan was administered to the rats of all groups except normal control group through intraperitoneal route at a concentration of 140mg/kg body weight. A dose of 100mg/kg and 200 mg/kg body weight of EEFG was administered to alloxan induced diabetic rats. The administration of the extract was lasted for 11 days. Effectiveness of the extract on glucose, cholesterol, triglycerides, and high density lipoprotein and protein concentrations was analyzed.

Results: Significant ($p<0.05$) reduction in the levels of glucose, cholesterol, triglyceride of the diabetic rats was observed after treatment with ethanolic extract. After subjecting to oral glucose tolerance test EEFG also showed significant improvement in glucose tolerance.

Conclusion: *F. glomerata* root ethanolic extract showed that it possesses antidiabetic effect and can be found useful for the management of diabetes mellitus.

ARTICLE HISTORY

Received: October 13, 2017
Revised: December 18, 2018
Accepted: December 23, 2018

DOI:
10.2174/1573407215666190401151405

CrossMark

Keywords: Alloxan model, antidiabetic, diabetes, *Ficus glomerata*, herbal medicine, lipid profiles.

1. INTRODUCTION

Diabetes mellitus is characterized by chronic hyperglycemia, resulted due to absolute or relative deficiency or diminished effectiveness of circulating insulin. It is one of the most common serious metabolic diseases. Diabetes mellitus is the most important form of diabetes identified as a chronic progressive, systemic condition of impaired carbohydrate metabolism. The major manifestations include disorder metabolism and inappropriate hyperglycemia. In diabetes, oxidative stress is common and is mainly due to an increased production of oxygen free radicals and a reduction in the antioxidant defense mechanism. The prevalence of diabetes for all age-groups worldwide is estimated to be 2.8% calculated in 2000 and 4.4% in 2030. It is expected that there will be an increase from 171 million in 2000 to 366 million in 2030 in diabetic people [1, 2].

F. glomerata has been used in Indian medicinal practice as astringent, carminative, stomachic, vermicide, etc from a long ago. It is also considered as a good remedy for visceral obstructions. The extract of its fruit is used in leprosy, diarrhoea, circulatory and respiratory disorders and menorrhagia.

Fruits are also useful in the treatment of miscarriage, spermatorrhoea, epididymitis, cancer, myalgia, scabies, haemoptysis, intrinsic haemorrhage and excessive thirst. Bark is found to be acrid, cooling, galactagogue and effective for gynaecological disorders. The stem bark is useful in the treatment of menorrhagia, leucorrhoea, gonorrhoea, urinary diseases, hemorrhage and skin diseases. As per the Unani system of medicine, leaves are considered as astringent to bowels and good in case of bronchitis. The leaves are also used to treat dysentery and bilious infection, as mouthwash. The tender leaf buds in the paste form are applied on the skin to improve complexion [3-7]. Externally, latex can be applied to chronic infected wounds to alleviate edema, and pain and to promote its healing. The latex is also reported to be used for treating piles. The root sap is an effective remedy for treating diabetes, mumps and other inflammatory en-

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Current Bioactive Compounds 2020, 16, 42-47

RESEARCH ARTICLE

Pharmacognostical, Phytochemical and Antioxidant Studies of Indigenous Medicinal Plant

Uday Deokate[1,*], Mohini Upadhye[2], Rohini Pujari[2] and Digambar Ambikar[3]

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ARTICLE HISTORY

Received: October 15, 2017
Revised: December 08, 2018
Accepted: January 16, 2019

DOI:
10.2174/1573407215666190401152734

Abstract: ***Background:*** *Ficus glomerata* Roxb. is a moderate-sized avenue tree distributed throughout India both as wild or cultivated. It is traditionally used in various traditional systems of medicine including Ayurveda, Siddha and Homoeopathy. In these indigenous systems of medicine, different parts of the plant *Ficus glomerata* are commonly used for the treatment of dysentery, diarrhea, diabetes, bilious affections, stomachache, menorrhage, haemoptysis and also as a carminative and astringent.

Objectives: The current investigation deals with detail pharmacognostical studies on roots of *Ficus racemosa* mainly focusing the morphological, macroscopical analysis, preliminary examinations of root powder and florescence analysis.

Methods: Physicochemical constants of roots of *Ficus glomerata* were estimated as per official guidelines.

Results: Significant *in vitro* antioxidant activity was observed for alcoholic root extract of *Ficus glomerata*. The alcoholic extract and aqueous extract show the presence of tannins and saponins as major constituents. Remaining constituents were found to be carbohydrate, glycosides, phenolic compounds, gum and mucilage.

Conclusion: *Ficus glomerata* possess significant antioxidant activities.

Keywords: *Ficus glomerata*, macroscopical analysis, pharmacognosy, phytochemical investigation, traditional medicine, Scavenging.

1. INTRODUCTION

Ficus glomerata Roxb. syn. *Ficus racemosa* Linn. (Family Moraceae) is a common tree. It can be grown throughout the year, grows in evergreen forest, bank of streams, deciduous forest, at an altitude of 1800 m.

This tree is approximately 18 m high with leaves which are ovate to lanceolate, or elliptic, subacute, entire and petiolate. It is an indigenous plant in traditional system of medicine of AYUSH. Various parts of *Ficus glomerata (F. glomerata)* are used in the treatment of dysentery, diarrhea, diabetes, bilious affections, stomachache, menorrhaga, himoptysis, and piles, carminative and astringent. The important constituents of the plant are carbohydrates, tannins, steroids, gums, mucilage, lupeol, lupeol acetate, alfa-amyrin acetae, leucoanthocyanidin and leucoanthocyanin [1-3].

The present investigation deals with detail pharmacognostical studies on roots *F. glomerata*, including macroscopical analysis, florescence analysis and microscopical analysis including *in vitro* antioxidant activity. This will help in the authentication and confirmation of drug prior using in formulations containing herbal drugs, also in the determination of various physicochemical constants.

2. MATERIALS AND METHODS

2.1. Collection of the Plant Material

F. glomerata roots were obtained from Pune in October, and further was authenticated from Dr. Jayanthi, Botanical Survey of India, Pune.

2.2. Macroscopical Analysis of the Plant Material

The collected *F. glomerata* roots were shade dried and further evaluated for their morphological and sensory profile by studying organoleptic studies and special characteristics like texture and fracture (Fig. **1**) [4, 5].

2.3. Microscopical Characteristics

The powdered drug was cleared with chloral hydrate solution by boiling on the water bath for 5 to 10 min to remove the colouring matter. Clear sections were selected, stained with different reagents and mounted on a clean glass slide

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1875-6646/20 $65.00+.00

Publication20202

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DOI 10.1007/s11094-020-02162-6
Pharmaceutical Chemistry Journal, Vol. 54, No. 1, April, 2020 (Russian Original Vol. 54, No. 1, January, 2020)

DIRECT CHIRAL HPLC-MS/MS METHOD FOR DETERMINATION OF R-LACOSAMIDE IN HUMAN PLASMA

S. P. Jalakam,[1] V. S. Tambe,[2,*] M. N. Deodhar,[3] V. Prakya,[4] J. Waghmode,[1] and P. Pawar[1]

Original article submitted November 15, 2017.

R-Lacosamide (RLC) is a new approved antiepileptic drug for adjunctive use and monotherapy for partial-onset seizures in some countries. RLC use in other epilepsies and diseases is under study. Research is also going on the activities exhibited by the S-enantiomer (SLC). Taking into consideration further perspectives, the development of direct chiral method that can selectively estimate R-isomer in the presence of S-isomer from human plasma is needed. Plasma samples were spiked with RLC, deuterated internal standard, and SLC. Deuterated RLC as the internal standard enabled us to precisely measure the concentration of RLC by minimizing variations associated with the extraction, ionization, and separation. Target compounds were recovered by liquid-liquid extraction from human plasma using methyl *tert*-butyl ether. The percentage recovery was found to be 68%.The isomers were resolved completely using DIACEL-IC3 column in the reverse phase mode. The retention times of R- and S-isomers were found to be 6.20 ± 0.5 and 8.00 ± 0.5 min, respectively. The proposed method was found to be linear in a concentration range from 1.00×10^2 to 1.50×10^4 ng/mL. Direct chiral HPLC tandem mass spectrometric method that can quantify R-lacosamide in the presence of S-isomer from human plasma without any carry-over and matrix effects was successfully developed. This method is very simple, fast, economic, sensitive, and validated as per EMA guidelines.

Keywords: lacosamide; HPLC-MS/MS; direct chiral bioanalysis; blood plasma, liquid-liquid extraction.

1. INTRODUCTION

R-Lacosamide (RLC), formerly harkoseride, is the latest antiepileptic drug (AED) approved by the FDA for adjunctive use and monotherapy for partial-onset seizures. The R-enantiomer of this 2-acetamido-N-benzyl-3-methoxypropionamide possesses anticonvulsant and antinociceptive properties. The mechanism of RLC action is not yet fully understood [1]. It has been suggested to cause slow inactivation of sodium channels, which is an endogenous mechanism thereby reducing the ectopic hyperactivityof neurons. RLC binds to the collapsin response mediator protein-2 (CRMP-2) and modulates its function *in vitro*. It has favourable pharmacokinetics and safety profiles in comparison to all other approved AEDs.

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RLC displays a favorable interaction profile with currently prescribed AEDs and other commonly used medications. The effect of carbamazepine-induced liver enzyme induction on RLC metabolism has not yet been studied [2]. Although some preclinical studies suggested that RLC could be potentially effective against generalized onset seizures, there was no human study yet to establish RLC as a broad spectrum AED. RLC may expand treatment options for patients with partial epilepsy and may provide significant benefit to patients with refractory seizures [3]. It is also undergoing clinical evaluation for the monotherapy treatment of diabetic neuropathic pain, fibromyalgia, and migraine prophylaxis [4]. Also, the S-enantiomers (SLC) showed promising effect to reduce postoperative and neuropathic pain by inhibiting CRMP-2 phosphorylation by targeting specific sensory neuron populations [5]. In order to evaluate the activity, toxicity, absorption, distribution, metabolism, and excretion properties of the individual enantiomers, and any potential for chiral inversion caused by the biotransformation process, chiral bioanalytical assays are necessary for individual enantiomers and/or their metabolites *in vivo*.

Some achiral methods were reported for the analysis of lacosamide in formulations and plasma [6 – 9]. Only two

Publication20203

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QUALITATIVE ANALYSIS OF *CARICA PAPAYA* LEAVES TABLET FORMULATION AND STUDY OF FRAGMENTATION PATTERN OF RUTIN

ABSTRACT

The chemical constitution of *Carica papaya* leaves tablets and the fragmentation pattern of rutin is poorly investigated. Rutin was found to a constituent of tablet formulation. This work reports a study on the fragmentation pattern of rutin by electrospray ionization with multistage mass spectrometry in positive mode. Potential dissociation pathway for rutin is proposed. The fragmentation pattern provides important information for its determination by liquid chromatography coupled to mass spectrometry.

Keywords: Carica papaya; Rutin; HR-MS

INTRODUCTION

Carica papaya Linn belonging to family Caricaceae has been used to treat ailments like malaria, dengue and jaundice. It has immunomodulatory and antiviral activity[1,2]. Its young leaves are rich in flavonoids (quercetin, rutin, kaempferol and myricetin), alkaloids (carpaine, pseudocarpaine, dehydrocarpaine I and II), phenolic compounds (ferulic acid, caffeic acid, chlorogenic acid), cynogenetic compounds (benzylglucosinolate) and carotenoids (β- carotene, lycopene)[3]. Leaf extracts from *C. papaya* are generally used for patients with dengue fever and in thrombocytopenia[4-9]. The extract is marketed in the form of capsules, tablets and syrup which does not claim any phytoconstituents. Although herbal medicines acceptance is increasing in the global market, concern is raised about inconsistent composition of herbal medicines. As per EMA guidelines, the herbal products should be standardised using markers. The quality of herbal medicine can be indicated in terms of the quantity of chemical marker[10]. Chemical fingerprinting is important to indicate the presence of chemical markers in the samples[11].

MATERIALS AND METHODS

Experimental

Materials

Rutin (RUT, 99.5% w/w) was purchased from Yucca Enterprises, Wadala, Mumbai. *C. papaya* leaves extract tablets (Caripill, Micro Labs limited, Bangalore, India) were purchased from the local market. This formulation contains 1100 mg of papaya leaves extract.

High resolution mass spectrometry

HR-MS study was essential to check the presence of various phytoconstituents in the tablet formulation. This data is useful to select the chemical marker for analysis of tablet formulation. Bruker Daltonik GmbH, Germany, Impact II UHR-TOF (ultra high resolution- time of flight) mass spectrometer was used. It was also used to study fragmentation of RUT standard and RUT present in

Table I: Fragments of RUT

Ions	Elemental composition	Measured exact mass	Theoretical exact mass	Error in mmu	Error in ppm	RDB*
RUT	$C_{27}H_{31}O_{16}^+$	610.1637	610.1534	10.3	16.8	13
RUT+ Na	$C_{27}H_{30}O_{16}Na^+$	633.1399	633.1432	3.3	5.05	13
Fragment I	$C_{21}H_{20}O_{12}Na^+$	487.0846	487.0847	0.1	0.20	12
Fragment II	$C_{24}H_{24}O_{12}Na^+$	543.0869	543.1115	24.6	45.3	13
Fragment II	$C_{24}H_{24}O_{12}Na^+$	543.0869	543.1115	24.6	45.3	13
Fragment III	$C_{22}H_{20}O_{10}Na^+$	467.1004	467.0954	5.5	11.7	13
Fragment IV	$C_{14}H_{12}O_6Na^+$	331.0990	331.0430	55.9	168.8	09
Fragment V	$C_{15}H_{10}O_7Na^+$	325.0312	325.0324	1.2	3.69	11

• *RDB: Ring and double bonds*

Publication20204

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ACTA SCIENTIFIC PHARMACEUTICAL SCIENCES (ISSN: 2581-5423)
Volume 4 Issue 1 January 2020
Research Article

HPTLC Method Development for the Simultaneous Estimation of Ketorolac Tromethamine and Tramadol Hydrochloride from a Formulation

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DOI: 10.31080/ASPS.2020.04.hptlc-method-development-for-the-simultaneous-estimation-of-ketorolac-tromethamine-and-tramadol-hydrochloride-from-a-formulation

Received: December 16, 2019
Published: December 27, 2019

Abstract

Objective: The study was aimed to develop simple, specific, accurate HPTLC method for simultaneous determination of the Ketorolac Tromethamine and Tramadol HCl in pharmaceutical dosage form.

Material and Method: A rapid, selective and simple high performance thin layer chromatographic method was developed and validated for their simultaneous estimation in a mixture. Well resolved peaks were observed for both the drugs on aluminium sheet with silica gel 60 F_{254} as the stationary phase. The solvent system consisted of ethyl acetate: methanol: 25% ammonia solution [8.5: 1.5: 0.5 v/v/v]. The λmax were observed at 282nm and 271nm for Ketorolac Tromethamine and Tramadol HCl respectively. Spectrodensitometric scanning-integration was performed at a wavelength of 282 nm.

Results: This system was found to give compact spots for both Ketorolac [Rf value of 0.08 ± 0.01] and Tramadol [Rf value of 0.52 ± 0.02]. The polynomial regression data for the calibration plots showed good linear relationship in the concentration range of 200-700 ng/band for ketorolac [r^2 =0.999] and 500-1750 ng/band for Tramadol [r^2 = 0.995]. The LOD and LOQ were found to be 0.3912 ng/band and 1.7930 ng/band for Ketorolac and 4.6370 ng/band and 7.7551 ng/band for Tramadol, respectively. The peak purity of both drugs was found to be always more than 0.995 proving the specificity of the method.

Conclusion: The method was validated for linearity, LOD, LOQ, specificity, accuracy and precision as per ICH guidelines. The proposed method has demonstrated to have a potential use in simultaneous analysis of Ketorolac tromethamine and Tramadol hydrochloride from a tablet formulation.

Keywords: Ketorolac Tromethamine; Tramadol Hydrochloride; HPTLC Method; Simultaneous Estimation

Abbreviations

KETO: Ketorolac Tromethamine; TRAM: Tramadol Hydrochloride

Introduction

Two drugs are used in this study are Ketorolac Tromethamine [KETO, Figure 1a, NSAID] and Tramadol Hydrochloride [TRAM, Figure 1b, Opioid analgesic]. The combination of KETO/TRAM is a rational therapy for pain by different mechanisms of action. Ketorolac is a carboxylic acid derivative mainly used for its analgesic activity. Tramadol is a centrally acting analgesic used to produce pain relief. The combination of ketorolac and tramadol analgesic efficacy is higher than each of its component individually and has a faster onset of action. Literature revealed analytical methods viz. HPLC [1-8], UPLC [9], HPTLC [10-13] and Spectrophotometric techniques [14-19] for analysis of individual drugs as well as in combinations with other drugs. But no single HPTLC method has been reported for the simultaneous estimation of KETO and TRAM in a formulation.

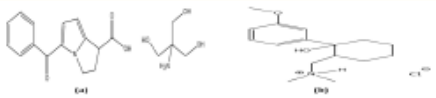

Figure 1: (a) Structure of Ketorolac Tromethamine. (b) Structure of Tramadol hydrochloride.

HPTLC is a reliable, fast and accurate for quantitative drug analysis. Moreover, many samples can be run simultaneously using a small quantity of mobile phase, thus minimizing analysis time and cost per analysis. So here an attempt has been made to develop simple, accurate, sensitive, rapid, economic and specific HPTLC method for simultaneous estimation of KETO and TRAM from a formulation.

Citation: Vrushali S Tambe., *et al.* "HPTLC Method Development for the Simultaneous Estimation of Ketorolac Tromethamine and Tramadol Hydrochloride from a Formulation". *Acta Scientific Pharmaceutical Sciences* 4.1 (2020): 84-88.

Publication20205

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Pharmaceutical Resonance COVID - 19 Special Issue 2020

REVIEW ARTICLE

A REVIEW ON POST COVID - 19 REDEVELOPMENT PLANS

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Abstract : Humans are in grieved situation of fighting with pandemic COVID-19 which has spread all across the world. It is a major burden on our Government to cope with this situation as; it is not clear what will be the scenario coming ahead. We were struggling in some of the areas like sanitization, hygiene, education, economy, employment, health and healthcare personnel, public awareness, food security, climate even before this chaotic situation and now the plight is worsening more. Considering the COVID-19 as an opportunity to arise with a new resonance these areas should be intensively concerted.Here, in this review we have illustrated emerged challenges after the massive outbreak of corona virus. The possible rebound needed to restore the enormous transitions & the foreknowledge strategies needed for longer & healthier lives. It shows us track to be followed to reseal & re-emerge our nation with more effective tools to put footprint on the globe. We are hopeful that this outline will inform readers about the plans of redevelopment strategies for sustainable living. By making such provisions run through, we would be able to tackle such disastrous situations if any, in future.

Keyworkd : *COVID-19, Redevelopment, Sustainable, Strategies.*

1. INTRODUCTION:

A terrifying outbreak of mysterious corona virus masked an appearance in Wuhan (China) and inflated globally[1]. This disease was authenticated as COVID-19 (Corona Virus Disease 2019) by WHO on 12th Jan 2020 and SARS–COV-2 (Severe Acute Respiratory Syndrome Corona Virus-2) by International Committee on Taxonomy of Viruses on 11th Feb 2020. This uncontrollable spread of disease has no definite treatment. So it is better to prevent by following the guidelines led by the government.

Covid-19 has made us realize that everyone needs to be ready for the unimaginable scenario.[2] In India many sectors like sanitization, hygiene, education, economy, employment, health and health-care personnel, public awareness, food security, climate etc. were undervalued and this crisis has further retarded them. But, considering this testing time as an opportunity India should reset these sectors. With holistic planning and establishing new development models we can become more efficient and assembled for future eventualities and lead a sustainable journey ahead.

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2. SECTORS FOR REDEVELOPMENT POST COVID - 19 :

Fig. No. 1: Sectors to be concentrated for redevelopment post Covid -19

Publication20206

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Anti-inflammatory potential effect of flavonoid rich ethyl acetate fraction of methanolic extracts of *Stereospermum suaveolens DC* (Bignoniaceae) leaves in experimental animals.

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ABSTRACT

Objective: To assess anti-inflammatory potential effect of flavonoid rich ethyl acetate fraction of methanolic extract of Stereospermum suaveolens DC (Bignoniaceae) leaves.

Method: The phytochemical investigation and TLC analysis was studied as per standard phytochemical method. The inflammation was induced in wistar rats by sub-plantar injection of 0.1 ml of 1 % solution of carrageenan. The flavonoid rich ethyl acetate fraction of methanolic extract of *Stereospermum suaveolens DC* (Bignoniaceae) leaves was treated at different doses of 125mg/kg, 250mg/kg and 500mg/kg (p.o.). The rat paw volume was measured at 1h, 2h, 3h, 4h, 5h using Digital plethysmometer (VJ instruments - VJDP-01). The percentage inhibition of paw edema was calculated.

Result: The phytochemical investigation revealed presence of flavonoid, saponins, alkaloids, carbohydrates and phenolic components.The TLC study shown confirmation of presence of flavonoid. The significant paw edema inhibition and percentage of inhibition obtained in a dose of 250mg/kg is high as compared to 125mg/kg and 500mg/kg dose fraction in experimental model of inflammation. **Conclusion:** From the present obtained study it was concluded that flavonoid rich ethyl acetate fraction of methanolic extract of *Sterospermum suaveolens DC* leaves has potential anti-inflammatory activity.

Key words: Anti-inflammatory activity, Ethyl acetate fraction, Carageenan induced paw edema, *Sterospermum suaveolens* DC

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Original Article

Extraction, Identification and Screening of *Brassica oleracea* var. *italica* Plenck (Broccoli) Floret to be an Alternative for Nanoparticle Formulations

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ABSTRACT

Background: Plant or plant extract act as a source of several abundant natural compounds such as flavonoids, phenolics, alkaloids, steroids, tannins, saponins and other nutritional compounds. The extract not only acts as reducing and stabilizing agents due to presences of various secondary metabolites for the bio reduction reaction but, also shows added pharmacological potential. Among others, a cruciferous vegetable like Broccoli is assumed to affect the growth of numerous forms of cancers since it contains multiple chemical constituents such as, Selenium, Sulphoraphene, Glucosinolate and Diindolylmethane which shows anticancer activity. **Objectives:** The study involves extraction of florets of *Brassica oleraceae* var. *italica* which is done by cold maceration process by using different solvents like water, ethanol, methanol and methanol: water (6:4) followed by phytochemical screening. **Methods:** Broccoli plant was collected from local farmer and Extraction of aerial part (Florets) was done by cold maceration by using various solvents such as water, Et: OH, Water: EtOH (6:4 ratio). The optimization of the extract with solvent selection was done by the observation of color, nature and also by the calculation of percentage yield, solubility concentration and phytochemical screening tests. Further, the optimized extract was subjected to calculate the total phenolic and flavonoids concentration. **Results:** The study involves collection of Broccoli from Local farmer. The plant was identified and authenticated as *Brassica oleraceae* var. *italica*. (Family: Brassicaceae) from Botanical Survey of India, Western Regional Centre, Pune by Ms. Priyanka A. Ingale, Scientist B (Voucher specimen No. RBC-3, BSI/WRC/IDEN. CER./2016/667). Extraction of florets of *Brassica oleraceae* var. *italica* which was done by cold maceration process by using different solvents likes water, ethanol, methanol and methanol: water (6:4) followed by phytochemical screening. **Conclusion:** The present study reflects that the extract of *Brassica oleraceae var. italica* Plenck shows major presence of phenolic and flavonoids as per phytochemical screening to be an alternative for the nanoparticle formulation.

Key words: Broccoli, Extraction, Identification, Screening, Qualitative and Quantitative Analysis.

Submission Date: 04-10-2019;
Revision Date: 06-02-2020;
Accepted Date: 17-06-2020

DOI: 10.5530/ijper.54.3.123

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INTRODUCTION

Herbal medicine that forms an integral part of CAM has been testified to play a vital role in the management of breast cancer. Different medicinal plants including *Taxus baccata* (Pacific Yew), *Podophyllum peltatum* (Mayapple), *Camptotheca acuminate* (happy tree) and *Vinca rosea* (Periwinkle) have been evaluated in clinical trials for breast cancer.[1,2] Medicinal plants are a source of a large number of bioactive that are excellent anticancer agents as they have the efficacy to control the molecular mechanisms and various signaling pathways implicated in carcinogenesis such as inflammation,

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Publication20208

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Journal of Research in Pharmacy
Research Article
www.jrespharm.com

Novel nitrogen-containing heterocyclic compounds in GPR109A as an anti-hyperlipidemic: Homology modeling, docking, dynamic simulation studies

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Received: 10 January 2020 / Revised: 07 April 2020/ Accepted: 13 April 2020

ABSTRACT: Niacin or nicotinic acid therapy leads to reduce the level of Low-density Lipoprotein cholesterol (20-40%) with significant elevation of High-Density Lipopreoin cholesterol level (20-35%). From research, it was said that Nicotinic acid might exert its positive action by activating the G-protein-coupled receptor (GPCR) which is found on adipocytes. GPR109A (family of GPCR) receptor was important for nicotinic acid (niacin) for its anti-lipolytic effects. As GPR109A is a targeted drug for the treatment of dyslipidemia, its structural analysis needs to be elucidated. But the Protein 3D structure of target was not available at Protein Data Bank (PDB), so we have generated its structure through homology modeling and validation was carried out. Screening of top lead molecules with the help of Various computational approaches like molecular-docking and Molecular-Dynamic (MD) simulations studies along with different online tools. The docking results showed that the lead compound 2B [(R)-methyl 2-(2-(1H-indol-3-yl) acetamido)-3-(1H-indol-3-yl) propionate] revealed significant binding energy value (-30.54 kcal/mol) as that with the nicotinic acid which is a standard drug (-17.68 kcal/mol). In addition to that, Molecular-Dynamic (MD) simulations analysis proved that compound 2B has lesser variations throughout the simulation period as represented by the root-mean-square deviation (RMSD) and root-mean-square fluctuation (RMSF) graphs. Current *in silico* study describes the modeling of novel heterocyclic compounds as antihyperlipidemic drugs for the treatment of dyslipidemia. This study also describes a deeper idea about the structural information of the lead compound 2B and its entire molecular interactions against GPCR109A and provides a hypothetical guideline to utilize this compound as an antihyperlipidemic for the treatment of dyslipidemia.

KEYWORDS: G-protein coupled receptor (GPCR); homology modeling; antihyperlipidemic drugs; nicotinic acid; molecular docking and molecular dynamic simulations.

1. INTRODUCTION

Nicotinic acid (Niacin), the water-soluble vitamin used to reduce plasma lipid levels of total cholesterol (TC), free fatty acids (FFA), triglycerides (TG) when administered to humans beings [1, 2]. Nicotinic acid robustly increases high-density lipoprotein levels compared to other anti-hyperlipidemic drugs [3]. How Nicotinic acid acts by lowering lipid levels in the body this metabolism is still not clear. Harmful side effects shown by Nicotinic acid such as flushing (facial reddening), reduced glucose tolerance or gastral intestinal effects decrease patient compliance [4]. Nicotinic acid plays an important role by inhibiting fat cell lipolysis by the activation of a G protein-coupled receptor (GPCR) and successive inhibition of cAMP configuration [5, 6] and [7]. In 2003, identified three G Protein-coupled receptors (GPR109A, GPR81, and GPR109B) that binds to nicotinic acid with projected similarity [8-10]. The GPR109A receptor, couples to G protein of Gi family, which is expressed mainly in adipocytes and immune cells. The receptors GPR109A and GPR81 both exist in humans as well as in rodent species [11]. The anti-hyperlipidemic effects of nicotinic acid cause a reduction in FFA and TG, but in mice lacking PUMA-G anti-

How to cite this article: Kothawade P, Lokhande K, Thomas A, Swamy K, Chitlange S, Novel nitrogen-containing heterocyclic compounds in GPR109A as an anti-hyperlipidemic: Homology modeling, docking, dynamic simulation studies,. J Res Pharm. 2020; 24(4): 1-12.

ISSN: 2630-6344
https://doi.org/10.35333/jrp.2020.00

Publication202010

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Research J. Pharm. and Tech. 13(7): July 2020

ISSN 0974-3618 (Print)
0974-360X (Online)

www.rjptonline.org

REVIEW ARTICLE

A Comprehensive Review on Analytical Method Development and Validation for SGLT-2 Inhibitors by HPLC in Its API and Dosage Form

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ABSTRACT:

SGLT-2 is the newly developed class of antidiabetic medicine also called as gliflozins. Empagliflozin, dapagliflozin and canagliflozin are the SGLT-2 class inhibitors for the treatment of type II diabetes mellitus. SGLT-2 inhibitors shows the 82% of plasma protein binding, 36.8% of partitioning of red blood cells, 78% of bioavailability, 5.6 to 13.1 hrs half life in oral route of administration. In this review we complied analytical methods for the development and determination of the SGLT-2 inhibitors. Table no. 1, 2, 3 shows the analytical method development and validation of empagliflozin dapagliflozin and canagliflozin alone and with its combination by the HPLC method respectively also table no. 4 shows the various formulations available in SGLT-2 Inhibitors.

KEYWORDS: Empagliflozin, dapagliflozin, canagliflozin, pharmacokinetic parameters, pharmacodynamic parameters, HPLC method.

INTRODUCTION:

SGLT-2 inhibitors are also called as gliflozins. SGLT-2 is a class of medicine which inhibits reabsorption of glucose in kidney and lower blood sugar level. They are also used in the treatment of type II diabetes mellitus (DM-2). SGLT-2 inhibits the sodium-glucose transport protein-2. The gliflozins are used to treat type 2 diabetes mellitus but are most often used as second or third line agents instead of first-line because there are other medications on the market that have much longer safety record and are less expensive than gliflozins. Gliflozins may be a good option for patients who are failing with metformin monotherapy, especially if reducing weight is part of the underlying treatment.

Received on 07.08.2019 Modified on 12.09.2019
Accepted on 09.10.2019
Research J. Pharm. and Tech 2020; 13(7): 3472-3479.
DOI: 10.5958/0974-360X.2020.00616.2

They are used in combination, for example metformin plus gliflozin and the triple therapy metformin, sulfonylurea and gliflozin.[1]

MECHANISM OF ACTION:

Sodium glucose co transporters (SGLTs) are newly available drug which are used in treatment of early and late type 2 diabetes. It blocks the glucose reabsorption in kidney and increase urinary glucose excretion. Glucose excreted and plasma levels drop down lead to development of all glycemic parameters. This mechanism of action is depend on blood glucose level as well as different actions of thiazolidinediones (mediated through GLUTs), is independent of the actions of insulin. Therefore, there is minimum potential for hypoglycemia, not risk of overstimulation or tiredness of beta cells. Because their mode of action relies upon normal renal glomerular-tubular function, SGLT-2 efficacy is reduced in persons with renal impairment. [2][3]

SHORT NOTES

IMPROVEMENT OF WATER SOLUBILITY AND *IN VITRO* DISSOLUTION RATE OF DEFLAZACORT BY COMPLEXATION WITH β-CYCLODEXTRIN THROUGH FREEZE DRYING PROCESS

ABSTRACT

Deflazacort is a poorly water-soluble drug and is practically insoluble in water. The objective of this study was to improve the solubility of deflazacort by using as solubility enhancer β-cyclodextrin and also to study the effect of the water-soluble polymer PEG 4000 on solubility of the deflazacort:β–cyclodextrin binary system. The inclusion complexes of deflazacort with β-cyclodextrin in 1:1 w/w, 1:2 w/w and 1:3 w/w proportions were prepared by kneading, microwave irradiation and freeze-drying techniques. The *in vitro* dissolution study showed improved dissolution rate for deflazacort for freeze-dried binary deflazacort: β-cyclodextrin 1:2 w/w complex, as compared to ternary deflazacort:β-cyclodextrin: PEG 6000 1:2 w/w complexes, plain deflazacort, physical mixtures and complexes prepared by kneading and microwave technique. This was confirmed by Fourier transform infrared spectroscopy, differential scanning calorimetry, powder x-ray diffraction study, scanning electron microscopy and ^{1}H nuclear magnetic resonance spectroscopy study. Thus, deflazacort:β-cyclodextrin complex with improved solubility was successfully developed using freeze drying technique.

Keywords: β-cyclodextrin, microwave, freeze drying.

INTRODUCTION

Therapeutic effectiveness of a drug depends on the solubility of the active pharmaceutical ingredient/ drug. To achieve desired concentration of the drug in systemic circulation, solubility is very important to show pharmacological response. Most of new chemical entities/ active pharmaceutical ingredients (APIs) discovered nowadays possess poor solubility by virtue of itheir lipophilicity. A large number of researchers have reported complex formation between cyclodextrin or its derivatives and poorly water-soluble drugs to improve the latter's water solubility, stability and bioavailability. Deflazacort (DFZ) is a poorly water-soluble drug used in the treatment of Duchenne muscular disease and is also categorized under anti-inflammatory and immunosuppressive agents. Hence, there is definite need for solubility enhancement of deflazacort[1,2].

MATERIAL AND METHODS

Deflazacort and β-cyclodextrin were obtained as gift samples from Swapnroop Drugs and Pharmaceuticals, Aurangabad, Maharashtra, India and Signet Chemical Corporation, Mumbai, India, respectively. All chemical and reagents usedwere of analytical grade.

Experimental

Phase solubility study of deflazacort drug was performed in distilled water as per the method described by Higuchi and Connors[3] to confirm solubility enhancement capability of β-cyclodextrin (β-CD). The dissolved amount of deflazacort was quantitated by UV visible spectroscopy at 243 nm.

Preparation of inclusion complexes of deflazacort with β–CD :

Freeze drying technique was employed to prepare inclusion complexes of deflazacort with β-CD in 1: 1 w/w (500 mg: 500 mg), 1: 2 w/w (500 mg: 1000 mg) and 1:3 w/w (500 mg: 1500 mg) in 30 mL, 60 mL and 90 mL distilled water were prepared respectively and lyophilized using Martin Christ LD plus 1-2 models operated at Vaccum mbar 0.10 and Ice condenser temperature is -50°C. Freeze dried inclusion complex of DFZ (500 mg): β-CD (1000 mg): PEG 6000 (225 mg) was also prepared. Inclusion complexes were also prepared by kneading and microwave irradiation techniques for comparison purpose[4,5].

CHARACTERIZATION OF INCLUSION COMPLEXES

Fourier Transform Infra-Red spectroscopy

Pure deflazacort, physical mixtures of deflazacort with β-CD as well as the inclusion complexes were characterized by FTIR spectrophotometer. IR spectral analysis was carried out by using Shimadzu FTIR Spectrometer.

Differential scanning calorimetry

Pure drug, physical mixtures of drug with β-CD as well as inclusion complexes prepared by kneading,

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(Received 11 December 2019) (Accepted 15 April 2020)

https://doi.org/10.53879/id.57.07.12243

Publication202012

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Munde et al., IJPSR, 2020; Vol. 11(10): 4874-4883. E-ISSN: 0975-8232; P-ISSN: 2320-5148

IJPSR (2020), Volume 11, Issue 10 (Review Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 18 October 2019; received in revised form, 19 June 2020; accepted, 25 August 2020; published 01 October 2020

A SYSTEMATIC REVIEW ON DEVELOPMENT AND EVALUATION OF CONTROLLED RELEASE AND FAST DISSOLVING FORMULATIONS FOR ANTI-DIABETIC DRUGS OVER PAST DECADE

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Keywords:

Diabetes mellitus, Formulations, Excipients, Evaluation

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ABSTRACT: Diabetes mellitus is the heterogeneous metabolic disorder caused by the high blood sugar level. Untreated high blood sugar can damage kidneys, eyes, nerves and other organs. Type 1 diabetes mellitus disorder is caused by the lack of insulin hormone while type 2 diabetes mellitus is a disorder of insulin resistance by β cells of the pancreas. For the management of type 2 diabetes mellitus different drugs are available as single or combination forms like Pioglitazone, Repaglinide, Metformin, Voglibose, Glipizide. Several research activities were carried out for its development, formulation and evaluation by the development of controlled-release and fast-dissolving formulations. The extensive literature review revealed information related to the formulation of sustain/fast release dosage form for the antidiabetic drugs. Newer techniques were used by the researcher for the formulation of dosage forms as solvent diffusion-evaporation technique, Reverse phase evaporation technique, emulsion solvent evaporation technique and Hot melt extrusion granulation technique. The review represents the types of formulation, methods used, excipients used and evaluation parameters of developed dosage forms and their correlation with therapeutic success.

INTRODUCTION: Diabetes mellitus is the heterogeneous metabolic disorder caused by the high blood sugar level. Insulin moves sugar from the blood into cells and used as energy. Untreated high blood sugar can damage kidneys, eyes, nerves, and other organs [1]. There are two important types of diabetes mellitus.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.11(10).4874-83

This article can be accessed online on www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.11(10).4874-83

a) Type 1 Diabetes Mellitus: Type 1 diabetes mellitus is caused by the lack of insulin hormone. In type 1 diabetes mellitus use of insulin is required and which is given to the patient in injection form.

b) Type 2 Diabetes Mellitus: Type 2 diabetes mellitus is the common type of diabetes, and it is a disorder of insulin resistance by β-cells of the pancreas. In this condition, treatment includes the use of oral drugs, which increases the amount of insulin secreted by β-cells of pancreas [2].

There are different ways for the classification of antidiabetic drugs, which depend on nature, age, and lifestyle of the person as well as other factors [3].

Publication202013

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Kulkarni et al., IJPSR, 2020; Vol. 11(1): 1000-13. E-ISSN: 0975-8232; P-ISSN: 2320-5148

IJPSR (2020), Volume 11, Issue 11 **(Review Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 08 February 2020; received in revised form, 28 April 2020; accepted, 07 May 2020; published 01 November 2020

FORMULATION AND EVALUATION OF GASTRO-RETENTIVE FLOATING MICRO-SPHERES: A SYSTEMATIC REVIEW

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Keywords:

GRDDS, Floating microspheres, Increased GRT, Bioavailability

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ABSTRACT: Gastro-retentive drug delivery system is the novel controlled release system that overcomes the problem like the first-pass metabolism, narrow index of absorption, unstable in intestinal pH, low bioavailability. Different approaches to GRDDS are floating, muco-adhesive, swelling, high density, magnetic drug delivery system. The floating drug delivery system is the most promising approach. The dosage forms remain buoyant for a longer duration of time in the gastric fluid due to the low density of dosage form. Gastric residence time is increased. In this system, there is site-specific drug delivery in the upper part of GIT. Drug release is a slow and controlled manner; drug absorption is increased. The bioavailability of drug is enhanced. Floating microspheres are gaining attention because it remains buoyant for longer time and uniform distribution of drug over the gastric fluid. Fluctuation in plasma drug concentration is reduced. Gastro-retentive dosage form prolong dosing interval reduce the frequency of drug administration so increase in patient compliance. GRDDS is useful for sustained/controlled drug delivery. This article gives an overview of different gastro-retentive systems, suitable drug candidates for GRDDS, advantages, and disadvantages, factors affecting GRDDS, floating microspheres, methods of preparation, evaluation, and application. Also, this review includes different studies on floating microspheres by various researchers.

INTRODUCTION: The oral drug delivery system is the most preferable and easy route of administration. This is a highly acceptable route [1, 2, 3]. The oral route is the most convenient, and patient compliance is more. This route plays a major role in the controlled and sustained drug delivery system. Gastro retentive drug delivery system is one of the novels and controlled drug delivery systems.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.11(1).5404-16

This article can be accessed online on www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.11(1).5404-16

Gastro-retentive drug delivery system increases the bio-availability of drug substance as the drug remains in the stomach for longer duration, and drug release is for extended time. It also prolongs the dosing interval, so increase patient compliance.

Various innovative approaches of gastric retention include bio-adhesion, expansion system, high-density system, magnetic systems, super porous hydrogels, low-density system, raft forming system, floating ion exchange resins. The controlled drug delivery system is going to be retained in the stomach and is called a gastro-retentive drug delivery system (GRDDS). Many drugs have an absorption window from the stomach and proximal part of the small intestine. GRDDs

Publication202014

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Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 9[9] August 2020 : 126-134

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD
Global Impact Factor 0.876
Universal Impact Factor 0.9804
NAAS Rating 4.95

REVIEW ARTICLE **OPEN ACCESS**

A Review on 3D Printing Technologies in Pharmaceutical Science

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ABSTRACT

3D printing known formally as Additive Manufacturing began in the late 1980s. It is a digital manufacturing process that creates 3D objects by fusing or depositing material such as variety of polymers, metals, and ceramics in successive layers laid down under computer control. This objects can be of almost any shape or geometry & are produced from a 3D model as defined in a Computer- aided design(CAD). A variety of 3D printing technologies have been developed to fabricate novel solid dosage forms which are among the most renowned & distinct products today. The present review focused on briefing various techniques, applications in Pharmaceutical technology.

Keywords: *3D Printing Technology, Polypill concept, Thermal-Inkjet Printing, Binder Deposition, Stereo lithography, Democratization.*

Received 29.03.2020 Revised 15.05.2020 Accepted 30.07.2020

INTRODUCTION

The 3D Printing technology has caught the attention of medical devices industry and pharmaceutical industry due to its application on various platform in health care industry. 3D printing technology promises a future of drugs & medicine printed on demand, personalized with customized doses. The potential of 3D printing is about being able to deliver what you want, how much & when you want. This technology will definitely help Doctors & pharmacists to provide "Tailor made" medicine for each patient [1, 7].

3D printing in pharmaceutical drug delivery would excel greatly in the domain of personalized medicine, where the medication could be customized as per the need of treatment, & not "one fits all" approach. 3D printing can play a significant role in multiple active ingredients dosage forms, where the formulations can be as a single blend or multilayer printed tablets with sustained release properties. This reduces the frequency and no. of dosage forms units consumed by the patient on a daily routine. 3D printing technology has high potential in individualized dosage forms concept called the polypill concept. This brings about the possibility of all the drugs required for the therapy into a single dosage form unit [8].

Three dimensional printing technology is a novel rapid prototyping technique in which solid objects are constructed by depositing several layers in sequence. The rapid prototyping involves the construction of physical models using computer – aided design in three dimension. It is also known as additive manufacturing and solid free form fabrication [2].

3D printing relies on computer aided designs to achieve almost flexibility, time saving, & exceptional manufacturing capability of pharmaceutical medicines which can be utilized in personalized and programmable medicine.

ADVANTAGES OF 3D PRINTED DRUG DELIVERY [2-4, 15]

- High drug loading ability when compared to conventional dosage forms.
- Accurate and precise dosing of potent drugs which are administered at small doses.
- Reduce cost of production due to lesser material wastage.
- Suitable drug delivery for difficult to formulate active ingredients like poor water soluble drug.
- Narrow therapeutic window as well as increase complexibility.

Publication202015

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Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 9[9] August 2020 : 116-125

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD
Global Impact Factor 0.876
Universal Impact Factor 0.9804
NAAS Rating 4.95

REVIEW ARTICLE **OPEN ACCESS**

A Review on Novel Approaches of Mucoadhesive Oral Film Manufacturing Aspects

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ABSTRACT

Oral route are most commonly preferred route for delivering drug. The aim of the present study was to gives an overview about the principles of creation of mucoadhesive bonds & about novel dosage form. Mucoadhesive film in terms of their composition, preparation & practical usage. It may be preferred over adhesive tablet in terms of flexibility and comfort. This study focused on development of a mucoadhesive buccal delivery system with a twofold objective of offering a rapid as well as a prolonged delivery with enhanced therapeutic efficacy.
Keywords: *Oral mucosa,Mucoadhesive polymer, Buccal film, Dosage form.*

Received 21.03.2020 Revised 15.05.2020 Accepted 20.07.2020

INTRODUCTION

In recent years, significant interest has been shown in the development of controlled drug delivery to, or via mucous membrane by the use of bio adhesive or mucoadhesive polymers [1-3]· These dosage form can be administer by different routes, including ocular, nasal, rectal and vaginal, for local and systemic delivery.

Among the various drug delivery system is found to be the most promising because, buccal mucosa, itself provides a protective covering for the underlying tissues, acting as a physical barriers against Toxin & microorganism [7].

The use of the oral cavity membranes as sites of drug interest for the past decade. It is well known that the absorption of therapeutic compounds from the oral mucosa provides a direct entry of the drug into the systemic circulation, thereby avoiding first-pass hepatic metabolism and GI drug degradation, both of which are associated with perioral administration [6].

Mucoadhesion is a state in which two materials, one of which is mucous or a mucous membrane is held together for an extended period of time. Various mucoadhesive polymer have been investigated &identified generally hydrophilic macromolecules that contain numerous hydrogen bond forming groups and will hydrate & swell when placed in contact with an aqueous solution [4].

Buccalfilms are the most recently developed dosage form for buccal administration. They have gained importance as efficacious and novel drug delivery systems and are cost effective with a good patient compliance. As buccal films are implied for attachment to the buccal mucosa, they can be formulated to exhibit local as well as systemic action. Buccal films may be preferred over buccal tablet, in terms of flexibility and comfort.

Buccal films have direct access to the systemic circulation through the internal jugular vein, which bypass the drug form the hepatic first pass metabolism leading to high bioavailability. Further, these dosage forms are self-administrable, pharmocoeconomic and have superior patient compliance.

The film can be defines as a dosage form that employs a water dissolving polymer, which allows the dosage form to quickly hydrate, adhere and dissolve when placed on the tongue, or in the oral cavity, which results in systemic drug delivery.

The main property of the buccal film is that due to the large surface area of the film, it allows quick wetting of the film which accelerates absorption of the drug quickly when compared to tablets.

Publication202016

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Research Journal of Pharmacognosy and Phytochemistry. 12(2): April-June, 2020

ISSN 0975-2331 (Print)
0975-4385 (Online)
DOI: 10.5958/0975-4385.2020.00019.9

Vol. 12 |Issue-02|
April-June| 2020

Available online at
www.anvpublication.org

Research Journal of Pharmacognosy and Phytochemistry
Home page *www.rjpponline.org*

REVIEW ARTICLE

A Review on *Bryophyllum pinnatum* (Lam.) Oken

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ABSTRACT:
Bryophyllum pinnatum is widely used in Ayurvedic system of the medicine as astringent.the plant is widely use in traditional medicine for treatment of various ailments and well known for its haemostatic and wound healing properties.it is an indigenous and exotic plant. plant is found naturally throught the country. It is succulent,herb,leaves are variable size and leaflets are elliptic.the leaf extract of *Bryophyllum pinnatum* has been reported to possess antihypertensive,antiulcer properties.readialy available and easy to cultivate.secondary metabolites are obtained from different parts of plant alkaloids,flavenoids,tannin,phenolic compound etc.although there are few toxicological reports on extract these have not been sufficiently extensive.Bryophyllum pinnatum also known as air plant cathedral bells,life plant.it is native to Madagascar and popular houseplant has become naturalized in tropical and subtropical areas. The present review is an attempt to highlight the various toxic and pharmacological aspect of the *Bryophyllum pinnatum*.

KEYWORDS: Medicinal plant, Pharmacology, toxicitycardiac glycosides, *Bryophyllum pinnatum*.

1. INTRODUCTION:

Bryophyllum pinnatum also called as life plant widely distributed perennial medicinal herbs.native to Madagascar but has been natutalized in several other region of asia,Australia and newzealand.also called as panfuti[(12)] secondary metabolites obtained from the various part of the plants.many pharmacological activities of plant known antihelminthetic, anticancer, antihypertensive, antioxidant, anti-inflammatory. The species of these is thought to be poisonus to livestock as it contain cardiac glycosides[(12)]

Received on 12.02.2020 Modified on 14.03.2020
Accepted on 09.04.2020 ©AandV Publications All right reserved
Res. J. Pharmacognosy and Phytochem. 2020; 12(2): 111-113.
DOI: 10.5958/0975-4385.2020.00019.9

2. Origin:

Native to Madagascar and South Africa.

Morphology:

Bryophyllum pinnatum is a succulent herb 0.3-1.2m high. Stems obtusely four angled, older one pale coloured and younger ones are reddish with white. Leaves are usually simple/compound, upper ones are 3-5/7 foliolate with long petioled[(12)] The bell-shaped (i.e. tubular), drooping (i.e. pendulous), flowers (up to 7cm long) are arranged in branched clusters at the terminal of the stems (i.e. in terminal inflorescences). Each flower is present on a stalk (i.e. pedicel) 10-25mm long. that are partially connected to the tube (i.e. calyx) and streaked with pink or reddish colored blotches[(13)] The yellowish-green to dark red coloured petals (3-6cm long) are also partially fused into a tube (i.e. a corolla tube) that differentiate into four petal lobes (i.e. corolla lobes) near

Vichare and Handargule, IJPSR, 2020; Vol. 11(12): 6179-6183. E-ISSN: 0975-8232; P-ISSN: 2320-5148

IJPSR (2020), Volume 11, Issue 12 **(Research Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 13 November 2019; received in revised form, 20 July 2020; accepted, 15 October 2020; published 01 December 2020

SIMULTANEOUS ESTIMATION OF DAPSONE AND ADAPALENE IN GEL FORMULATION BY UV- SPECTROSCOPY

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Keywords:

Dapsone, Adapalene, UV- Visible Spectrophotometric method, validation

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ABSTRACT: Objective: A new, simple, sensitive, and economical UV spectrophotometric method was developed for the simultaneous analysis of Adapalene and Dapsone in pharmaceutical formulation. **Method:** This UV method was developed with Tetrahydrofuran and Distilled water as solvents. The wavelengths selected for analysis in the present method were 237 nm and 293 nm. The method was validated as per ICH guidelines. **Results:** The method was validated for linearity, accuracy, precision, specificity and robustness. Linearity was found to be within the concentration range of 0.05-0.25 µg/ml for Adapalene and 2.5-12.5 µg/ml for Dapsone. Accuracy for the method was determined by recovery studies. The % drug recovered was found to be 99-102% w/w. The % RSD values of repeatability and intermediate precision were found to be less than 2, providing method was precise in nature. From all these studies it was observed that there was no interference of excipients from the formulation during the analysis. **Conclusion:** The advantages of this method for analytical purposes lie in the rapid determination, its cost-effectiveness, easy preparation of the sample and good reproducibility. In addition to this, the present method can be recommended for the simultaneous determination of Adapalene and Dapsone in routine quality control analysis in combined drug formulations.

INTRODUCTION: Dapsone is also known as 4, 4'- Diaminodiphenyl sulfone **Fig. 1**. Its molecular formula is $C_{12}H_{12}N_2O_2S$ and molecular weight is 248.30 g/mol [1]. Its logP value is 0.97 and pKais 2.41. Dapsone is a white to creamy-white crystalline, odourless powder with a slightly bitter taste. It is active against a wide range of bacteria but mainly used for its actions against Mycobacterium leprae [2] and prescribed in the treatment of leprosy in combination with rifampicin and clofazimine. Additionally, it is used in the treatment of skin related problems.

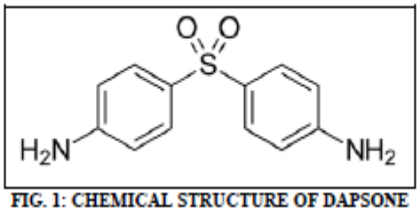

FIG. 1: CHEMICAL STRUCTURE OF DAPSONE

Its mechanism of action is similar to sulfonamides. Dapsone competes with the para-amino benzoate for the active site of dihydropteroate synthase and inhibits dihydrofolic acid synthesis [3]. It is official in IP, BP, and USP [1, 4, 5]. Adapalene is a 6-[3-(1-Adamantyl)-4-methoxyphenyl]-2-naphthoic acid. The molecular structure of Adapalene is as follows (fig 2). Its molecular formula is $C_{28}H_{28}O_3$, and the molecular weight is 412.5 g/mol [6]. It is a third-generation retinoid with a log P of 8.6 and pKa of 3.99.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.11(12).6179-83

The article can be accessed online on www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.11(12).6179-83

2(4), 2020, 1-7

Current Trends in Pharmacy and Pharmaceutical Chemistry
e-ISSN 2582-5062
www.ctppc.in

Research Article

Simultaneous Estimation of Dapsone and Adapalene in Gel Formulation by Derivative Spectroscopy.

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ABSTRACT

A simple, accurate, precise, and rapid UV-Visible spectroscopic method has been developed and validated for the simultaneous estimation of Dapsone and Adapalene is a marketed gel formulation. Analysis of marketed gel formulation was done by a first-order derivative spectroscopic method using tetrahydrofuran, methanol, and distilled water as solvents. From the first-order derivative overlay spectrum wavelengths, 307 nm (zero absorbance of Adapalene) and 365 (zero absorbance of Dapsone) were selected for analysis. The % drug content was found to be 99.753±1.520 and 99.38±1.853 for Dapsone and Adapalene respectively. The developed method was validated as per ICH guidelines Q2(R1) for linearity, range, accuracy and precision. The linearity of the method was found to be in the range of 25-125 µg/ml of Dapsone and 0.5-2.5 µg/ml of Adapalene respectively. The precision of the method was estimated by repeatability study. The % RSD values were found to be less than 2, proving the method is precise. The present method can be recommended for the simultaneous determination of Adapalene and Dapsone in routine quality control analysis in combined drug formulations.

KEYWORDS

Dapsone, Adapalene, derivative spectroscopy, method development, validation.

1. INTRODUCTION

Dapsone is an antibacterial agent used in the management of leprosy and various skin disorders. Chemically it is 4-[(4-aminobenzene)sulfonyl]aniline with molecular formula $C_{12}H_{12}N_2O_2S$ and molecular weight 248.30 g/mol (fig. 1).Its logP and $_pKa$ values are 0.97 and 2.41 respectively[1]. It shows a mechanism of action similar to sulfonamides which involve the inhibition of folic acid synthesis for the active site of dihydropteroate synthase [2,3]. It is official in IP, BP, and USP [1,4,5].

Adapalene is chemically 6-[3-(1-Adamantyl)-4-methoxyphenyl]-2-naphthoic acid (fig 2) with molecular formula $C_{28}H_{28}O_3$ and molecular weight 412.5 g/mol [6]. Its logP value is 8.6 and $_pKa$ is 3.99. It is topically used in the treatment of acne[7]. It shows a

Original Article

A Novel Validated Stability Indicating Analytical Method for Simultaneous Quantification of Metformin Hydrochloride and Empagliflozin in Bulk and Marketed Formulation by HPTLC using Box-Wilson Experimental Design Approach

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ABSTRACT

Background: A novel stability indicating analytical method was developed and validated by High Performance Thin Layer Chromatography (HPTLC) using Design of experiment approach. The proposed method is useful for quantification of Metformin hydrochloride and Empagliflozin in bulk and its dosage forms simultaneously. Design of experiment approach was applied for optimization of chromatographic conditions. **Materials and Methods:** For optimization process independent variables were used as Isopropyl alcohol proportion in mobile phase, saturation time of chamber and distance travelled by mobile phase. Experiments were carried out on silica gel pre-coated plate using mobile phase as 2 % Ammonium acetate: Isopropyl alcohol: Triethylamine (4:6:0.1 v/v/v). Direct evaluation of chromatograms were done by TLC scanner with reflectance/absorbance mode set at 242 nm. Method was validated as per ICH Q2 (R1) requirements. **Results:** Correlation coefficients for calibration curves were found to be 0.985 and 0.988, the calibration curve is in concentration range of 5000-30000 ng band^{-1} and 125–750 ng band^{-1} for Metformin hydrochloride and Empagliflozin respectively. The method showed % recovery between 99.05 to 102.54 % for Metformin hydrochloride and 99.20 to 101.50 % for Empagliflozin. The method has a prospective to determine Metformin hydrochloride and Empagliflozin simultaneously. The Metformin hydrochloride and Empagliflozin were subjected to forced degradation studies like hydrolysis, oxidation, thermolysis and photo-degradation. **Conclusion:** Proposed method has capacity to separate the Metformin hydrochloride and Empagliflozin in its degradation products. Hence one can apply this method effectively for routine analysis and during stability study as per regulatory requirements.

Key words: Method development, Validation, HPTLC, Stability studies, DoE.

Submission Date: 23-01-2020;
Revision Date: 14-05-2020;
Accepted Date: 13-08-2020

DOI: 10.5530/ijper.54.3s.164

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INTRODUCTION

Chemically Empagliflozin, 1-chloro-4-(glucopyranos-1-yl)-2-(4-(tetrahydrofuran-3-yloxybenzyl) benzene, [Figure 1 (a)] is an orally available competitive inhibitor of Sodium-glucose Co-transporter-2 (SGLT2) with anti-hyperglycemic activity. Empagliflozin function by inhibiting SGLT-2 present in proximal tubules in the kidneys. Empagliflozin reduces renal reabsorption of glucose leads to increase in urinary excretion of glucose and act as a antidiabetic agent for treatment of type-2 diabetes.[1] Metformin [Figure 1 (b)] is anti-hyperglycemic agent acts by inhibition of hepatic glucose output and therefore, the liver is most likely the principle site of Metformin function.[2] Chemically Metformin is 1-carbamimidamido-N,N-

www.ijper.org

Publication202020

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Research J. Pharm. and Tech. 13(3): March 2020

ISSN 0974-3618 (Print)
0974-360X (Online)

www.rjptonline.org

RESEARCH ARTICLE

Development and Validation of Novel Analytical Method for Empagliflozin and Metformin Hydrochloride in Bulk and Pharmaceutical Dosage Form by Four Different Simultaneous Estimation Approaches using UV Spectroscopy

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ABSTRACT:

Four new UV spectrophotometric methods namely simultaneous equation, absorbance ratio, area under curve and first derivative (zero crossing) spectroscopic methods were developed and validated for simultaneous estimation Empagliflozin and Metformin hydrochloride in bulk and tablet formulation. In simultaneous equation method, absorbance was measured at 224 and 232 nm for both the drugs. Empagliflozin and Metformin hydrochloride was estimated using 224 and 232 nm in absorbance ratio method. In Area under curve method both drugs were estimated at 224 and 232 nm respectively. First derivative (zero crossing) method was based on the transformation of UV spectra in to first derivative spectra followed by measurement of first derivative signal at 224 and 232 nm for Empagliflozin and Metformin hydrochloride, respectively using 2 nm as wavelength interval (Δλ) and 1 as scaling factor. Methods were found to be simple, fast, highly sensitive, cost effective and hence can be useful for simultaneous estimation of Empagliflozin and Metformin hydrochloride in commercial tablet formulation for routine quality control analysis.

KEYWORDS: Simultaneous equation, absorbance ratio, area under curve method, first derivative (zero crossing) spectroscopic methods, tablet formulation.

INTRODUCTION:

Empagliflozin (EN) chemically,(1-chloro-4-[b-D-glucopyranos-1-yl]-2-[4-([S]-tetrahydrofuran-3-yl-oxy) benzyl]-benzene is an orally administered selective sodium glucose cotransporter-2 (SGLT-2) inhibitor, which lowers blood glucose in people with type 2 diabetes by blocking the reabsorption of glucose in the kidneys and promoting excretion of excess glucose in the urine. Empagliflozine have the potential to reduce cardiovascular risk in patients with type 2 diabetes[1,2].

Received on 23.07.2019 Modified on 26.11.2019
Accepted on 08.12.2019
Research J. Pharm. and Tech 2020; 13(3):1236-1242.
DOI: 10.5958/0974-360X.2020.00228.0

In patients with type 2 diabetes and hyperglycaemia a higher amount of glucose is filtered and reabsorbed. Empagliflozin improves glycaemic control in patients with type 2 diabetes by reducing renal glucose reabsorption. The content of glucose moiety removed by renal excretion, through this glucuretic mechanism is dependent on blood glucose concentration and GFR. Inhibition of SGLT2 in patients with type 2 diabetes and hyperglycaemia leads to excess glucose excretion in the urine[3-5]. Metformin hydrochloride (MET) is given orally in the treatment of type 2 diabetes mellitus and is the drug of choice in overweight patients. They do not stimulate insulin release but require that some insulin be present in order to exert their antidiabetic effect. Possible mechanism of action includes the delay in the

Research J. Pharm. and Tech. 13(9): September 2020

ISSN 0974-3618 (Print)
0974-360X (Online)

www.rjptonline.org

RESEARCH ARTICLE

An Influence of Lyophilization on Praziquantel Loaded Nanosponge's by using food protein as a stabilizer with effect of Statistical Optimization

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ABSTRACT:

Nanosponges are tiny sponges with a size of a small virus, which can be filled with a wide variety of drugs and can circulate around the body until they stumble upon the specific target site and attach on the surface and begin to release the drug in a controlled and expected manner. Praziquantel is anthelmintic drug which is belong to biopharmaceutical class II drug. There was no interaction found between drug and excipients as revealed by an IR spectra and standard curve of the pure drug and placebo formulation. Nanosponge of different ratios were prepared by emulsion solvent diffusion method by using ethyl cellulose (X1) and PVA / whey protein was used as polymers, dichloromethane (DCM) (X2) as a solvent and Stirring speed (X3) maintained for different batches. These factors were selected as independent variables, while Drug loading, Particle size and cumulative drug release were selected as dependent variables. The whey protein is used as stabilizers. Furthermore, an optimal batch was selected from eight formulations by using 2^3factorial design and evaluated for bulk density, tapped density, angle of repose, compressibility Index, Carr's index, dissolution studies, Entrapment efficiency, production yield, compatibility studies, powder x-ray diffraction (P-XRD), Differential scanning colorimetric (DSC), particle size analysis etc. Hence, nanosponge formulation using a variety of polymers was found to be a good alternative approach for increasing the dissolution rate of Praziquantel.

KEYWORDS: Particle size, Micromeritics, Nuclear Magnetic Resonance, cumulative drug release, factorial design, anthalmintic.

INTRODUCTION:

Targeted drug delivery to definite sites is the major problem which is being faced by the researchers. The development of new colloidal carrier nanosponges has the prospective to solve these problems. Nanosponge is innovative and emerging technology which offers controlled drug delivery for topical use. Nanosponges play an important role in targeting drug delivery in a controlled manner. A wide variety of drugs can be loaded into nanosponge for targeting drug delivery. Both water soluble and insoluble that is lipophilic as well as hydrophilic drugs can be loaded into nanosponges [1-3].

Nanosponge drug delivery system has emerged as one of the most promising fields in life science. The development of nanosponges has become an important step toward overcoming these problems. These tiny sponges can circulate around the body till they meet the target site, stick on the surface and begins to release the drug in a controlled and anticipated way which is more efficient for given dosage. Nanosponges are smaller in size due to their small size and spongy nature they can bind poorly-soluble drugs inside their matrix and develop their bioavailability. They can be formulated for targeting drugs to specific site and prevent drug and protein degradation and prolong the drug release in a controlled manner[3].These nano-sized colloidal carriers have been recently proposed for drug delivery, since their application can solubilize poorly water-soluble drugs and endow with prolonged release, as well as

Received on 01.01.2020 Modified on 11.03.2020
Accepted on 23.04.2020
Research J. Pharm. and Tech. 2020; 13(9):4491-4498.
DOI: 10.5958/0974-360X.2020.00792.1

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International Journal of Pharmaceutical Sciences and Nanotechnology
Volume 13 • Issue 5 • September – October 2020
Review Article https://doi.org/10.37285/ijpsn.2020.13.5.1 MS ID: IJPSN-6-1-20-BAGADE

A Corollary of Nanoporous Carrier Drug Delivery System: An Updated Perspective

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Received June 1, 2020; accepted July 4, 2020

ABSTRACT

Nanosponges have come into sight as one of the most promising fields of science because of their perceived applications in controlled drug delivery. It has been increasingly investigated to achieve targeted and sustained release of drugs. Nanosponges are one of the novel drug delivery system, which is gaining popularity now-a-days because of their perceived application in controlled and site-specific drug delivery. The fundamental appeal of the nanosponge technology arises from the difficulty experienced with conventional formulations in releasing active ingredients over an extended period of time, unpleasant odor, greasiness and skin irritation. They are tiny sponge-like spherical particles with a large porous surface and are believed to contribute towards reduced side effects, improved stability, increased elegance and enhanced formulation flexibility. The present investigation in the appraisal describes nanosponge technology embracing its method of preparation, characterization, *in-vitro* and *in-vivo* evaluation methods along with recent research and future potential.

KEYWORDS: Nanosponge; Controlled drug delivery; Polymers; Porosity; Cross linkers.

Introduction

Targeted drug delivery to explicit sites is the noteworthy setback that is being faced by the researchers. The development of new colloidal carrier nanosponges has the potential to solve these problems. Nanosponge is a novel and emerging technology, which offers controlled drug delivery for topical use. Nanosponges take part in a vital role in targeting drug delivery in a controlled mode. A wide variety of drugs can be loaded into nanosponge for targeting drug delivery. Both hydrophilic as well as lipophilic drugs can be encumbered into nanosponges (Patel et al., 2014; Mathew et al., 2014 and Subramanian et al., 2012). Nanosponges are integrated in specific dosage form, circulate around the body until they stumble upon the specific target site, unite to the surface, and start to discharge the drug in controllable and predictable manner (Tamkhane et al., 2014). Nanosponges are capable to encapsulate both hydrophilic and lipophilic drug substance (Ali et al., 2014). It is feasible to manage the size of nanosponges by varying the concentration of polymer to cross linkers. The particle size was examined 285nm using polymethylmethacrylate polymer, 370 nm by means of ethyl cellulose as polymer and 310nm using pluronic F-68 as polymer (Srinivas et al., 2013). Nanosponges are solid in character and can be prepared as oral, topical, parenteral dosage form (Patel et al., 2014). Complexing nanoparticles are nanoparticle that attracts the molecule by electrostatic charges and conjugating nanoparticles are the nanoparticles that link the drug through covalent bond (Bolmal et al., 2013; Subramanian et al., 2012). The innovation of nanosponges has turn out to be a significant pace toward overcoming these problems. Another important nature of these sponges is their aqueous solubility; this allows the use of these systems in point of fact for drugs with poor solubility. These petite sponges can circulate around the body until they stumble upon the target location and fuse on the surface and began to release the drug in a controlled and predictable manner, which is more

ABBREVIATIONS: β-CD: β Cyclodextrin; 3D: 3 Dimensional; DMF: Dimethyl Formamide; DMSO: Dimethyl Sulfoxide; PY: Production Yield; CDs: Cyclodextrins; CGT: Cyclodextrin-Glycosyltrans-Ferase; AGU: Anhydrous A-D-Glucopyranoside Units; α-CD: α-Cyclodextrin; γ-CD: γ-Cyclodextrin; HDI: Hexamethylene Diisocyanate; TDI: Toluene-2,4-Diisocyanate; DOC: Dissolved Organic Carbon; AAA: Aromatic Amino Acids; SDS: Sodium Dodecyl Sulphate; XRD: x-Ray Diffraction Pattern; UV: Ultra Violet; HPLC: High Performance Liquid Chromatography; SEM: Scanning Electron Microscopy; TEM: Transmission Electron Microscopy; AFM: Atomic Force Microscopy; DSC: Differential Scanning Calorimetry; TOC: Total Organic Carbon; CP: Cefpodoxime Proxetil; EVA: Ethylene Vinyl Acetate; si RNA: Small Interfering Ribo Nucleic Acid; FNS: Functionalized Nanosponges; PVA: Poly Vinyl Alcohol; IV: Intra Venous

Publication202023

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Journal of Pharmaceutical Research International

32(36): 42-57, 2020; Article no.JPRI.63239
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Trends in Nanotechnology for the Treatment of Breast Cancer

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Authors' contributions

This work was carried out in collaboration among all authors. Author SBD designed the study, managed the literature searches, performed the summarization of data and wrote the first draft of the manuscript. Authors ZA and KSB reviewed and corrected the manuscript. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2020/v32i3630991
Editor(s):
(1) Dr. Paula Mendonça Leite, Universidade Federal de Minas Gerais, Brazil.
(2) Dr. Vasudevan Mani, Qassim University, Saudi Arabia.
(3) Dr. Aurora Martínez Romero, Juarez University, Mexico.
Reviewers:
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(3) Giovanna Rosa Degasperi, Pontifical Catholic University of Campinas, Brazil.
Complete Peer review History: http://www.sdiarticle4.com/review-history/63239

Review Article

Received 29 September 2020
Accepted 05 December 2020
Published 22 December 2020

ABSTRACT

Breast cancer is the most common and progressively increased form of cancer mostly among women. Various therapies have been tried to cure this cancer but none of them is without side effect. These might be attributed to the indiscriminate destruction of normal cells along with cancer cells or other systemic effects of the chemotherapeutic agent. These difficulties initiate the urge to develop targeted drug delivery systems. Nanotechnology deals with formulation of nanostructures for innovative drug delivery. Nanodrug delivery systems are being used for targeting in the treatment of various diseases, hence this concept is also applicable to the treatment of breast cancer. Nanoparticles have an additional effect of improvement in the solubility of drugs such as paclitaxel, reduction in dose and toxicity, increased cellular uptake etc. Owing to smaller size these are easily taken by tumor cells and effectively encapsulate the hydrophobic drugs. This review is aimed to summarize the various management therapies majorly focusing on the recent nanodrug delivery systems to target chemotherapeutic agents in the breast cancer cells. Various nanodrug systems are in clinical trials and few of them are already in the market. These are promising tools for future cancer treatment and research.

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INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH VOLUME 9, ISSUE 02, FEBRUARY 2020 ISSN 2277-8616

Preparation, Characterization And Evaluation Of Green Synthesis Nanoparticle Of Hydro Alcoholic Floret Extract Of Brassica Oleracea Var. Italica Plenck (Broccoli) Using Qbd Approach For Breast Tumor Cells T-47D Treatment

Ravindra B. Chintamani, Kishor S. Salunkhe, Amol R. Kharat, Sonali R. Chintamani, Rudra Pratap Singh, Machindra J. Chavan

Abstract : Background: Breast cancer is the second prime cause of death in women globally, and is expected to surpass heart diseases in the next few years. The resources available for diagnosis, prevention, and treatment of cancer are limited or non-existent. Unfortunately, presently available cancer chemotherapeutic agents surreptitiously affect the host cells of patients mainly bone marrow, epithelial tissues, reticule-endothelial systems and gonads. Metal nanoparticles have tremendous applications in the area of biomedical, agricultural, cancer, biotechnology and in other areas. Metallic NPs are commonly prepared by using various metals. In group of all metals, Silver has become the metal of researchers choice in treatment of cancer as a result of its solitary physiochemical properties. Objectives: The proposed study aimed to formulate the biologically synthesized green silver nanoparticles using floret extract of aerial part of Broccoli, wherein both silver as well as extract shows potential activity. Methods: Brassica oleracea var. Italica Plenck (Broccoli) hydro alcoholic floret extract mediated Silver Nanoparticles (Ag-Nps) were prepared by biological reduction method by implementing QbD approach. Resulted Ag-NPs were characterized for Morphology i.e. Particle Size and shape by FESEM, TEM and AFM. Other studies like Zeta Potential, % Yield, % Silver Loading and % Extract Loading were also undertaken, The studies also includes DSC, FTIR, UV-Spectroscopy, PXRD and EDS. Results: The studies showed promising results. In vitro and In vivo studies demonstrated that nanoparticles revealed higher anticancer efficacy than extract and proved stated hypothesis of significantly change in anticancer potential than individual. Conclusion: This study makes an attempt to overcome the limitations of conventional treatments of cancer and tumor with cost effective, eco-friendly, stable and safe targeted drug delivery as an alternative and / or complementary method of treatment.

Keywords: Breast Tumor Cell (T-47D), Green Synthesis Nanoparticle, Floret Extract of Broccoli, QbD Approach.

List of Abbreviations:
FE - Floret Extract; NPs – Nanoparticles; Ag-NP - Silver Nanoparticles; GSNPs Green Silver Nanoparticles; GSNP-F - Green Silver Nanoparticles of Florets; BNP -Blank Nanoparticles; CAM -Complementary and Alternative Medicine; CT - Chemotherapy; FTIR - Fourier Transform Infrared spectroscopy; NCCS - National Centre for Cell Science; MTT - (3-(4,5- Dimethylthiazol - 2- yl) - 2,5- Diphenyltetrazolium Bromide; MTT Assay - (3-(4,5-Dimethylthiazol - 2- yl) - 2,5- Diphenyltetrazolium Bromide Assay; PBS - Phosphate Buffered Saline; FE-SEM - Field Emission Scanning Electron Microscopy; HR-TEM - High Resolution Transmission Electron Microscopy; TGA - Thermo-Gravimetric Analysis; AFM - Atomic Forced Microscopy; XRD X-ray Diffraction; PXRD - Powder X-ray Diffraction; PSA - Particle Size Analysis; MP - Melting Point; BP - Boiling Point; UV-Vis - Ultra Violet Visible; DSC - Differential Scanning Colorimetry; SD - Standard Deviation; ICH - International Conference on Harmonization; IC_{50}- Inhibitory Concentration; QbD - Quality by Design; CQA - Critical Quality Attributes; TQPP / QTPP - Quality Target Product Profile; DoE - Design of Experimentation; ANOVA - Analysis of Variance, NDDS - Novel Drug Delivery System.

1. INTRODUCTION

Breast cancer is the second prime reason of cancer death in women globally, and is expected to surpass heart diseases in the next few years [1-2]. It reports for around seven % of worldwide burden of cancer and one-fifth of all the cancers in India [3]. As per American Cancer Society, a count of 29% incidences and 15% deaths due to breast cancer around the world has been anticipated [4]. In India, breast cancer was the leading cancer among females (24.85%) with the highest incidence and death rates being 10.53 and 16.18 %, respectively [5]. It has overtaken cervical cancer to become the leading cancer in Indian metro cities and is expected to double in 2016 [6]. It has been expected that by 2030, the universal occurrence of breast cancer would be grow to more than two million new cases per year; however, in India cases would reach up to two lakhs per year. Breast Cancer is a clinically diverse disease with multi-factorial etiology, triggered due to numerous risk factors comprising hormonal, genetic factors, environmental, dietary and lifestyle ; exposure to the ionizing radiation; as well as race, age, gender, ethnicity and history of family. Control of breast cancer is a foremost clinical challenge due to its complexity, heterogeneity and aggressiveness. The typical treatment available for breast cancer consists of chemotherapy, surgery, radiation therapy, targeted therapies and hormonal therapy. Even though these managements of cancer are highly efficacious, yet they are accompanying with grave side effects that have moved the global attention towards Complementary and Alternative Medicines (CAM). Use of CAM has become progressively common among the patients of breast cancer throughout the globe. It was investigated that the use of CAM in cancer patients differing from 7- 64% with increased use (47-83%) in breast cancer patients. Herbal medicine that forms an integral part of CAM has been testified to play a vital role in the management of breast cancer. Different medicinal plants including Taxus baccata (Pacific Yew), Podophyllum peltatum (Mayapple), Camptotheca acuminate (happy tree) and Vinca rosea (Periwinkle) have been evaluated in clinical trials for breast cancer [7]. Medicinal plants are a source of a large number of bioactive that are excellent anticancer agents as they have the efficacy to control the molecular mechanisms and various signaling pathways

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PENSEE ISSN NO: 0031-4773

A review on the solubility enhancement techniques with their pros and cons

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Publication202026

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PENSEE ISSN NO: 0031-4773

Role of exotic plants in cancer

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Short Running title: EXOTIC PLANTS IN CANCER THERAPY

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Research J. Pharm. and Tech. 13(6): June 2020

ISSN 0974-3618 (Print)
0974-360X (Online)

www.rjptonline.org

RESEARCH ARTICLE

Curcumin Potentiates Therapeutic Efficacy of Metformin: A Preclinical Study in STZ-NA Induced Hyperglycemia in Wistar Rats

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ABSTRACT:
Type 2 diabetes mellitus is a metabolic disease characterized by persistent hyperglycemia. High blood sugar can produce long-term complications such as cardiovascular and renal disorders, retinopathy, and poor blood flow. The pharmacotherapy of diabetes includes use of oral hypoglycaemic agents like insulin and oral hypoglycaemic agents such as biguanides, sulphonylureas, insulin analogues, alpha glucosidase and amylse inhibitors, gliptins etc. Though these agents are therapeutically beneficial, they are associated with adverse effects such as hypoglycaemia, vitamin B_{12} deficiency, weight gain, etc. The alternatives as herbs and/or phytoconstituents, exercise, yoga, etc have been explored widely for treatment and management of diabetes mellitus. Number of plants and their isolated phytoconstituents are proven for antidiabetic activity in preclinical and clinical studies and one of widely explored of them is Curcumin. The Curcumin in its nanoparicles form had been already proven for potential antidiabetic activity. Though the phytoconstituents are said to be safe their interactions with modern medicines might be either beneficial or harmful and should be considered while co-administration of them. This research work focuses on evaluation of drug interaction between CuNPs and Metformin in STZ-Nicotinamide induced hyperglycemia in Wistar rats. The physical incompatibility between curcumin and metformin was not observed in the study. The coadministration of both produced significant reduction in glycemic and oxidative parameters than only metformin treated animals. The study suggest coadministration of curcumin and metformin can be used for better and safe management and treatment of diabetes mellitus.

KEYWORDS: Curcumin nanoparticles, Diabetes Mellitus, Metformin.

INTRODUCTION:

Diabetes is a chronic metabolic disorder mainly characterized by the loss of carbohydrate homeostasis with disturbances of fat and protein metabolism which results from defects in either insulin secretion or insulin action or both. Insulin is a protein (hormone) synthesized in beta cells of pancreas in response to various stimuli such as glucose, sulphonylureas, and arginine however glucose is the major determinant.

Received on 27.07.2019 Modified on 03.09.2019
Accepted on 05.10.2019
Research J. Pharm. and Tech 2020; 13(6):2591-2596.
DOI: 10.5958/0974-360X.2020.00461.8

Impaired insulin secretion, resistance to tissue actions of insulin, or a combination of both are thought to be the commonest reasons contributing to the pathophysiology of T2DM, a spectrum of disease originally arising from tissue insulin resistance and gradually progressing to a state characterized by complete loss of secretory activity of the beta cells of the pancreas[1].

Medications currently available for treating hyperglycemia in type 2 diabetes include: biguanides (metformin), sulfonylureas (glibenclamide, known as glyburide in the U.S. and Canada, gliclazide, glimepride, and glipizide), thiazolidinediones or glitazones (pioglitazone), glucagon-like peptide-1 (GLP-1) agonists (exenatide and liraglutide), amylin agonists (pramlintide), dipeptidyl peptidase four (DPP-4) inhibitors (sitagliptin, vildagliptin, alogliptin, and

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Atre et al., IJPSR, 2020; Vol. 11(12): 6067-6077. E-ISSN: 0975-8232; P-ISSN: 2320-5148

IJPSR (2020), Volume 11, Issue 12 (Research Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 29 November 2019; received in revised form, 08 February 2020; accepted, 14 March 2020; published 01 December 2020

DISEASE MODIFYING POTENTIAL OF WEDELOLACTONE RICH FRACTION OF *ECLIPTA ALBA* IN ADJUVANT INDUCED ARTHRITIS IN RATS BY INHIBITION OF PRO-INFLAMMATORY CYTOKINES

B. N. Atre [1], S. Arulmozhi [*1], L. Sathiyanarayanan [2], V. V. Dhapte [3] and K. R. Mahadik [2]

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Keywords:

Rheumatoid arthritis, Antiinflammatory, *Eclipta alba*, Wedelolactone, Cytokines

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ABSTRACT: *Eclipta alba* (Family-Asteraceae) is a herb commonly used in traditional Ayurvedic medicine for the treatment of inflammation, pain, and wounds. The present study is aimed to validate the ethnobotanical use of *Eclipta alba* in an animal model. The animals were induced with arthritis by injection of FCA on day 0 and treated with wedelolactone rich fractions of *Eclipta alba* (100, 200 and 400 mg/kg) from day 12 to day 28. WEA caused a significant effect in arthritis by inhibiting the joint inflammation and decreasing hyperalgesia and allodynia. WEA significantly decreased the biochemical markers and serum Tumor Necrosis factor-α, Interleukin 1β and Interleukin-6 levels and significantly increased the antioxidant profile. WEA (400 mg/kg) exhibited anti-rheumatic activity as evidenced by altered hematological milieu (ESR, CRP, WBC, RBC and Hb), histopathology of ankle joints, reduced cytokine levels, paw volume and related parameters associated with arthritis. Taken together, these results demonstrated the antiarthritic activity of WEA against experimental arthritis, and the underlying mechanism behind this efficacy might be mediated by inhibition of proinflammatory cytokines by wedelolactone in combination with other phytoconstituents.

INTRODUCTION: Rheumatoid arthritis (RA) is one of the prime health predicaments worldwide, which is the foremost cause of disability and the most common autoimmune disease in the world, leading to premature death if not treated properly [1]. In RA, inflammation of synovial tissue lining the joint capsule results in an invasion of the cartilage and bone, leading to progressive joint dysfunction manifested as synovitis, synovial hyperplasia, stiffness, and pain [2].

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.11(12).6067-77

This article can be accessed online on www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.11(12).6067-77

The extent of inflammation is determined by the balance between proinflammatory and anti-inflammatory cytokines [3]. Reactive oxygen species, addition to cytokines, play a crucial role in the development and progression of RA [4]. Both sexes are affected while females are more susceptible to the ratio of 3:1. Conventional treatment with NSAIDs, DMARDs gives symptomatic relief, and newer biologicals like tumor necrosis factor-α (TNF-α) antagonist brought a therapeutic revolution by improving clinical, functional, and radiographic outcomes. However, the adverse effects, toxicity, and cost of the existing drugs appeal for a new alternative cost-effective therapy, which addresses the multiple targets in the treatment of RA [5].

Herbs have been in use from the time immemorable as a preventive and therapeutic medicine. Extensive

Publication202030

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Pharmaceutical Resonance COVID - 19 Special Issue 2020

REVIEW ARTICLE

CONVALESCENT PLASMA AS A POENTIAL THERAPY FOR TREATING COVID-19 PATIENTS

Bhagyashree S. Bhanage

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Abstract : Currently the Covid-19 or corona virus pandemic has threatened the whole world as there is no any confirmed medicine or vaccine available to treat this. In this situation, on the basis of historical data, covalescent Plasma therapy is the ray of hope towards treatment of covid-19 patients to reduce the mortality rate. The usefulness of this therapy is based on the presence of neutralizing antibodies in the blood of recently survived patient of severe covid-19. And the transfusion of this neutralizing antibodies into the infected person. Patient's hummoral immunity is the key factor for the treatment of convalescent plasma therapy. The presented article is based on the study of potential use of convalescent plasma therapy in the treatment of covid-19 patients

Keyworkd **:** *Convalescent Plasma, Hummoral Immunity, Neutralizing Antibodies, Apheresis, HLA Antibodies.*

1. Introduction :

Basically our immune system has been divided into innate and acquired immunity. In this , acquired immunity has its two types Active and Passive acquired immunity. In the passive aquired immunity, when the antibodies are transferred by the natural way, i.e. e.g. from mother to foetus is the type of Natural Passive immunity. And when the antibodies are transferred from other sources or resistance passively transferred to the recipient by the administration of antibodies is the Artificial Passive immunity. And the agents used for this purpose are the convalescent sera of human or animal origin, pooled human gammaglobulin1 etc. This article is based on use of such convalescent sera or plasma in the treatment of COVID-19. Nowadays we all are going through the difficult situation of covid-19 pandemic , which has become a big threat for the world. And currently no specific vaccines or antiviral agents are available for the treatment of covid-19 patients. This article is based on the use of passive acquired immunity or we can say convalescent plasma in the treatment of covid-19 patientsto reduce the mortality rate in emergency situations[1] [2]

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2. History :

The convalescent plasma therapy was firstly used in the treatment of diphtheria in late 1800's. After that many of the bacterial infections such as pertussis, scarlet fever, influenza etc. have been treated using convalescent plasma therapy. Its therapeutic effectiveness was also studied during the period of Spanish influenza pandemic in 1918-1920. And later on it is widely used as a effective remedy in Measles, Influenza, Chickenpox, Cytomegalovirus, Ebola virus, Middle East Respiratory Syndrome coronavirus (MERS-coV) etc. During H1N1 Influenza pandemic in 2009, studies showed that there was reduction in the mortality rate and decrease in the viral load within short period of time i.e. of five days without showing any adverse effects[2][3]

3. Procedure of Convalescent Plasma Therapy:

Convalescent plasma obtained from a patient who has been currently survived with previous infection and has created memory cells or has been developedhumoral immunity against the pathogen containing huge amount of neutralizing antibodies which can be helpful to remove the virus from the another patient's body.

3.1 Collection of the convalescent plasma :

Apheresis is the process used to collect the convalescent plasma from the donor. Apheresis is the process in which blood is removed from the donor's body, and passed through a machine in which blood is separated by centrifugation in various components such as plasma, red blood cells, leukocytes, platelets,

Publication202031

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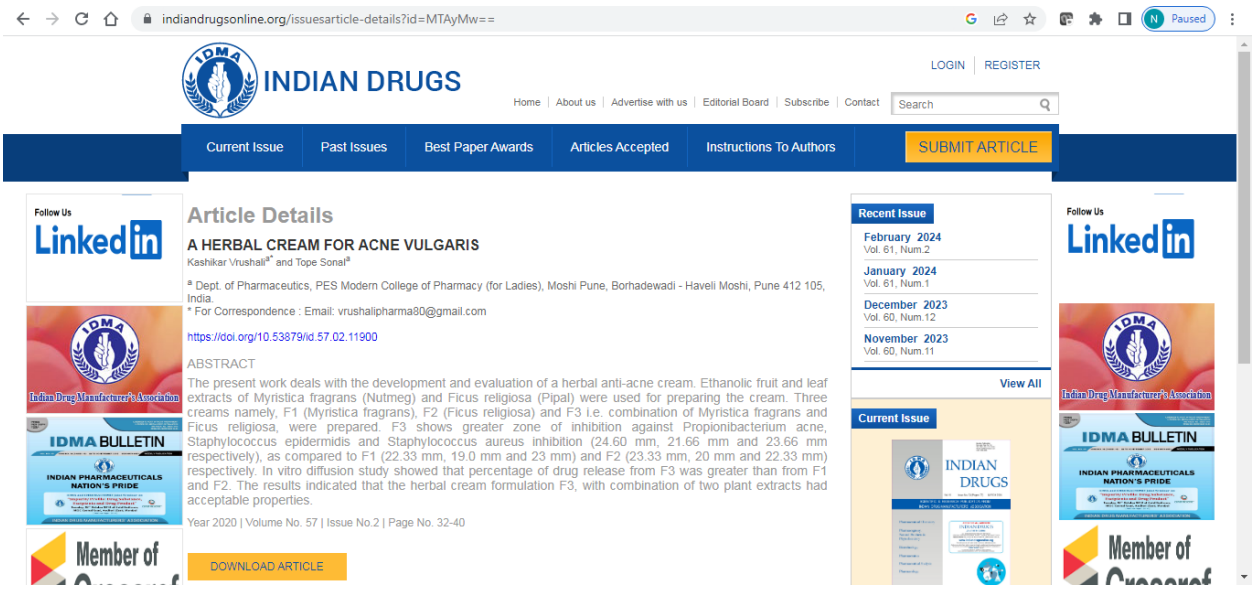

Publication202032

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Government of Maharashtra No. TEM/2004(235/04) TE-1, Pharmacy Council of India (32-347/2012-PCI),
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(M.S., M.N.A.M.S.) Chairman,
Business Council P.E. Society, Pune

CRITERIA III

Key Indicator 3.3 - Research Publication and Awards

3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during 2019

Research Publication 2019

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RESEARCH PUBLICATION 2019

Year	Sr. No.	Name of Faculty	Title of the Paper	Name of Journal	Year, Vol, Page No, Issue	ISSN No.
2019	1	Dr. V.S. Kashikar	Study of buckwheat (*Fagopyrumesculentum*) seed powder as a tablet binder	Indian Drugs	Vol. 2019, Issue 56 (02), 73-77	**0019-462X**
2019	2	Ms. V. S. Vichare	Development and validation of UV-visible spectroscopic methods for simultaneous extimation of canagliflozin and metformin in pharmaceutical formulation	Asian Journal of Research in Chemistry	Vol. 2019, Issue 12 (1), 16-20.	ISSN 0974-4150(Online)
2019	3	Dr. V. S. Kashikar	Development and validation of spectroscopic estimation by area under curve method of eperisone hydrochloride with aceclofenac	World Journal of Pharmacy and Pharmaceutical Sciences	Vol 8, Issue 7, 949-956, 2019.	ISSN: 2278-4357
2019	4	Dr. V. S. Kashikar	Development and validation of chromatographic estimation and forced degradation study of eperisone hydrochloride & ibuprofen	World Journal of Pharmacy and Pharmaceutical Sciences	Vol 8, Issue 7, 957-973, 2019.	ISSN: 2278-4357
2019	5	Dr. Prof. S. N. Dhole,	Multiparticulate floating drug delivery system of anagliptin: design and optimization for its efficacy in management of metabolic syndrome	International Journal of Applied Pharmaceutics	2019, 11(4), 171-181	0975-7058
2019	6	Dr. Prof. S. N. Dhole,	Lipid-based floating multiparticulate delivery system for bioavailability enhancement of berberine hydrochloride	Journal of Applied Pharmaceutical Science	2019, 9(11)	2231-3354
2019	7	Dr. Ms. S. D. More	Review on Nano Flare: A Novel Diagnostic Probe	Current Trends in Pharmacy and Pharmaceutical Chemistry	2019, 24 (3), 24-30	2582-5062
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2019	10	Dr. Mr. N.S. Kulkarni, Dr. Prof. S.N. Dhole	A Review on Hydrotropic Solubilization for Poorly Water-Soluble Drugs: Analytical application and Formulation development.	Research Journal of Pharmacy and Technology.	2019, 12 (7), 3157-3163.	0974-3618
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2019	13	Ujjwala Y. Kandekar, RohiniPujari	Exploration of MucoadhesiveMicroparticlesby using Linumusitatissimum Mucilage	Latin American Journal of Pharmacy	38 (12): 2463-72 (2019)	2362-3853
2019	14	Ms. M.H. Tapkir	Lique Solid Compact Drug Delivery System: A Review	World Journal of Pharmacy and Pharmaceutical Sciences	2019,8(10), 329-345	2278-4357
2019	15	Ms. M.H. Tapkir	Nasal Drug Delivery: A Promising Approach for Brain Targeting	World Journal of Pharmacy and Pharmaceutical Sciences	2019,8(10), 477-491	2278-4357

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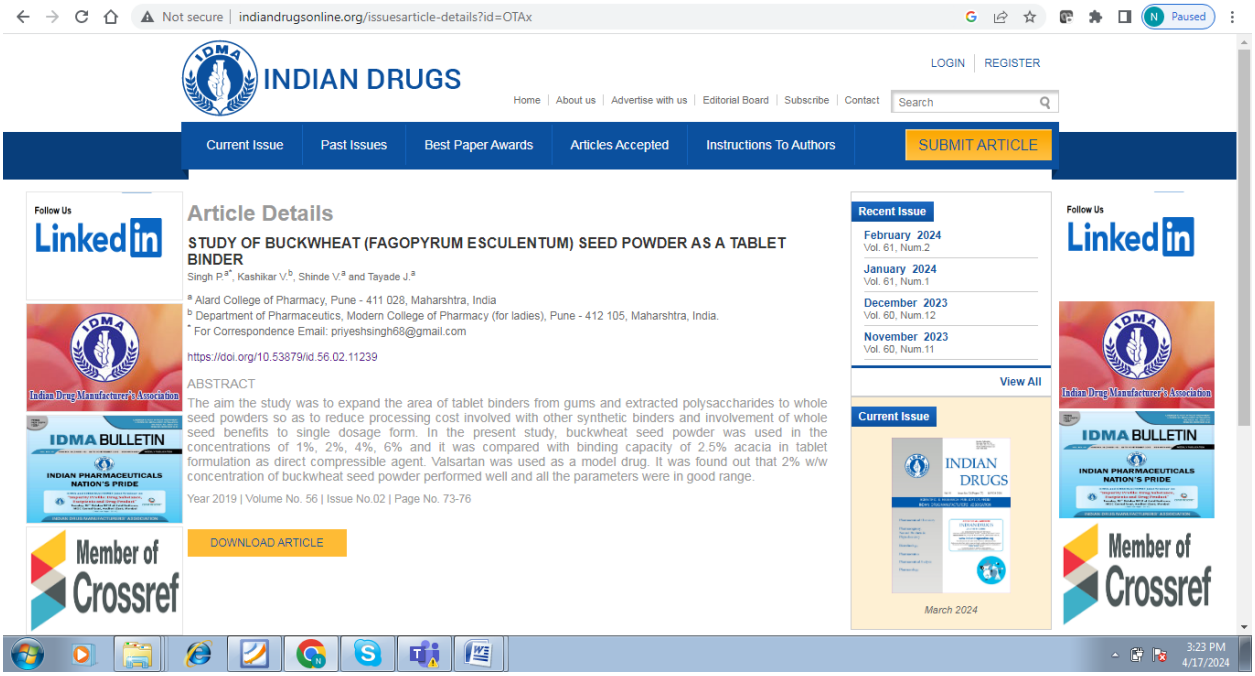

Publication20191

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ISSN 0974-4169(Print)
0974-4150(Online)
www.ajrconline.org

RESEARCHARTICLE

Development and Validation of UV-Visible Spectroscopic Methods for Simultaneous Estimation of Canagliflozin and Metformin in Pharmaceutical Formulation

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ABSTRACT:
Two simple, accurate, precise and rapid UV-Visible spectroscopic methods have been developed and validated for simultaneous estimation of Canagliflozin (Cana) and Metformin HCl (Met) in pharmaceutical formulation. Method A was Absorbance correction UV spectroscopy while method B was First order derivative spectroscopy. Method A was based on measurement of absorbances at wavelengths 233 nm (λ max of Met) and 291 nm (λ max of Cana). In case of Method B, from the first order derivative overlain spectra wavelengths 243 nm (Zero absorbance of Cana) and 318 nm (Zero absorbance of Met) were selected for analysis. Analysis of marketed formulation was done by both the methods. The percentage drug contents were found to be 98.48 ± 0.83 and 100.76 ± 1.29 for Cana and Met respectively by method A. Similarly, by method B the percentage drug contents were found to be 97.94 ± 0.96 and 97.22 ± 1.15 for Cana and Met respectively. Both the developed methods were validated as per ICH guidelines Q2 (R1) for linearity, range, accuracy and precision. Linearity of both the methods was found to be in a range of 0.75 – 4.5 µg/ml and 2.5 – 15 µg/ml for Cana and Met respectively. The accuracy of the methods was determined by recovery studies. The % of drugs recovered was found to be close 100, indicating accuracy of the method. Precision of the methods was estimated by repeatability and intermediate precision studies. The % RSD values were found to be less than 2, proving methods were precise. Therefore, the developed methods could be effectively used for routine quality control analysis in industry for simultaneous analysis of Cana and Met in pharmaceutical formulation.

KEYWORDS: UV-Visible spectroscopy, Derivative spectroscopy, Canagliflozin, Metformin, method development, validation.

1. INTRODUCTION:

Canagliflozin (Cana) is a selective Sodium-Glucose Co-transporter 2 (SGLT2) inhibitor used for the management of type 2 Diabetes Mellitus. Chemically it is (2S,3R,4R,5S,6R)- 2-{3-[5-(4-fluoro-phenyl)-thiophen-2-ylmethyl]-4-methyl-phenyl}-6 hydroxymethyltetrahydro-pyran-3,4,5-triol (Figure 1)[1]. It is not official in IP-2014, BP-2008 and USP-2011.

Metformin HCl (Met) is chemically *N*, *N*-dimethyldiguanide used in the treatment of type 2 diabetes. It suppresses hepatic gluconeogenesis and

Received on 31.10.2018 Modified on 12.12.2018
Accepted on 09.01.2019

Asian J. Research Chem. 2019; 12(1): 16-20.
DOI: 10.5958/0974-4150.2019.00004.X

WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.421
Volume 8, Issue 7, 949-956 Research Article ISSN 2278 – 4357

DEVELOPMENT AND VALIDATION OF SPECTROSCOPIC ESTIMATION BY AREA UNDER CURVE METHOD OF EPERISONE HYDROCHLORIDE WITH ACECLOFENAC

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Article Received on
30 April 2019,
Revised on 21 May 2019,
Accepted on 11 June 2019,
DOI: 10.20959/wjpps20197-14139

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ABSTRACT

A simple, sensitive, rapid and reproducible UV method has been developed and validated for simultaneous determination of Eperisone Hydrochloride (EPE) and Aceclofenac Sodium (ACE) in bulk and in Laboratory mixture. RP - HPLC methods has been developed and validated for simultaneous determination of Eperisone Hydrochloride (EPE) and Ibuprofen (IBU) in bulk and in Laboratory mixture. For development of UV method for EPE and ACE methanol was used as a solvent and detection wavelengths were found to be at 255 nm and 277 nm respectively. The method was found to be linear in concentration range 2-10 µg/mL for both drugs. The method was validated as per ICH guidelines. The Recovery study, precision and repeatability results showed % RSD less than 2%. The method is found to be robust & rugged.

KEYWORDS: Eperisone hydrochloride, Aceclofenac, Simultaneous equation method, Q – ration analysis, Area under curve method, UV.

Publication20193

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WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.421
Volume 8, Issue 7, 957-973 Research Article ISSN 2278 – 4357

DEVELOPMENT AND VALIDATION OF CHROMATOGRAPHIC ESTIMATION AND FORCED DEGRADATION STUDY OF EPERISONE HYDROCHLORIDE & IBUPROFEN

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Article Received on
30 April 2019,
Revised on 21 May 2019,
Accepted on 11 June 2019
DOI: 10.20959/wjpps20197-14140

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ABSTRACT

A simple, sensitive, rapid and reproducible RP - HPLC methods has been developed and validated for simultaneous determination of Eperisone Hydrochloride (EPE) and Ibuprofen (IBU) in bulk and in Laboratory mixture. The RP - HPLC analysis was performed on the Phenomenex Luna 5µ C8 (5µm, 250mm × 4.6mm) column, at ambient temperature using Methanol: 0.1% ortho-phosphoric acid (70:30) as mobile phase. The flow rate was adjusted to 1.0 mL/min. The detection was carried out at 265 nm. Linearity was found to be in concentration range 2-10 µg/mL for both drugs (i.e. EPE & IBU) with coefficient of correlation 0.998 and 0.997. Accuracy, intermediate precision, Repeatability result showed % RSD less than 2%. The method is found to be rugged and robust.

KEYWORDS: Eperisone hydrochloride, Ibuprofen, HPLC, Forced degradation.

Publication20194

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International Journal of Applied Pharmaceutics

ISSN- 0975-7058 Vol 11, Issue 4, 2019

Original Article

MULTIPARTICULATE FLOATING DRUG DELIVERY SYSTEM OF ANAGLIPTIN: DESIGN AND OPTIMIZATION FOR ITS EFFICACY IN MANAGEMENT OF METABOLIC SYNDROME

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Received: 27 Mar 2019, Revised and Accepted: 10 May 2019

ABSTRACT

Objective: The present research aims to design and optimize gastroretentive floating pellets of anagliptin (a dipeptidyl peptidase-4 inhibitor), so as to reduce P-Glycoprotein (PGP)-mediated efflux in the intestine hence to improve oral bioavailability.

Methods: The drug-containing core pellets were prepared by extrusion and spheronization process followed by subsequent coating with three successive layers i.e. Eudragit RS 100, sodium bicarbonate ($NaHCO_3$): hydroxypropyl methylcellulose E5LV (HPMC E5LV) and Eudragit RL 100 using fluidized bed processor. A 3 level 3 factor box-behnken design was adopted to investigate the effect of Eudragit RS 100, $NaHCO_3$: HPMC E5LVand Eudragit RL 100 on floating lag time and drug release at 10 h. Desirability function under numerical optimization technique was used to identify the optimum formulation.

Results: The study reveals the significant effect of the amount of $NaHCO_3$ and coating level of polymers on floating lag time and drug release. The optimum system could float within 4 min and exhibited more than 85% drug release in 10 h. The pharmacokinetic study conducted in male Wistar rats indicated 2.51 fold increase in relative bioavailability of optimized formulation compare to anagliptin drug. Formulated anagliptin pellets were evaluated in cafeteria diet-induced metabolic syndrome model in male Wistar rats. Anagliptin floating pellets treatment compared to cafeteria diet group significantly inhibited increase in body weight (238.79±2.52 g vs. 277.98±3.69 g, P<0.001), calorie intake (2283.99 kcal vs. 3086.05 kcal, P<0.05) and serum levels of total cholesterol (95.19±0.61 mg/dl vs. 110.04±1.31 mg/dl, P<0.01), triglycerides (96.12±1.25 mg/dl vs. 105.99±1.29 mg/dl, P<0.01) while high-density lipoproteins levels were improved (42.15±0.92 mg/dl vs. 30.92±0.77 mg/dl, P<0.01) indicated its hypophagic and anti-hyperlipidemic effects.

Conclusion: The gastroretentive floating pellets of anagliptin was obtained and could be a promising technique to deliver anagliptin with improved bioavailability in the management of the metabolic syndrome.

Keywords: Anagliptin, Metabolic syndrome, Floating drug delivery system, Pellets and Spheronization

DOI: http://dx.doi.org/10.22159/ijap.2019v11i4.33249

INTRODUCTION

The urbanization and sedentary lifestyles of 21st century leads to increase the prevalence of metabolic syndrome and is becoming a major public health concern. Metabolic syndrome includes the number of chronic disease such as insulin resistance, obesity, dyslipidemia, cardio-metabolic risk and hypertension [1]. Patient compliance becomes an issue in the management of metabolic syndrome, due to the use of multiple drugs and risk of enhanced drug-drug interactions [2]. Identifying drug candidates exhibiting polypharmacology could be one of the strategies favourable to deal with multifactorial diseases [3]. Anagliptin a dipeptidyl peptidase 4 (DPP4) inhibitor, besides their glucose-lowering activity, is a promising drug candidate for management of multifactorial diseases constituting metabolic disorders [4]. However, systemic bioavailability of anagliptin is limited by PGP mediated efflux in the intestine [5]. PGP, a plasma membrane-bound ATP-dependent efflux transporter, is a well-recognized factor that can influence drug pharmacokinetics [6]. In addition, anagliptin has a shorter biological half-life of 3-4 h. It is needed to improve the oral bioavailability of anagliptin to be effectively used in many clinical applications. The conventional controlled-release technologies are not suitable for the delivery of PGP substrates because they carry a significant part of the drug to distal regions of the gastrointestinal tract (GIT). On the other hand, continuous delivery to the proximal part of the GIT, as provided by gastroretentive dosage forms, might be useful for these drugs [7-9]. Various approaches have been reported to retain the formulation in the upper part of GIT such as swelling systems, high-density systems, magnetic systems, mucoadhesive systems and floating systems [10]. Among all the gastroretentive systems, due to minimum effect on GIT motility, floating drug delivery systems (FDDS) are considered suitable and preferable [11-13]. These systems are particularly useful for drugs having absorption in upper GIT, drugs which are unstable in the intestine and exhibits poor solubility in intestinal pH [14]. FDDS are low density system which allows them to remain buoyant over gastric content for prolonged period of time [15]. Based upon the mechanism of buoyancy effervescent systems are the widely employed technique used in the development of FDDS. In the effervescent systems, carbon dioxide gas liberation occurs upon contact with gastric fluid due to neutralization reaction which lowers the density and allows the system to remain buoyant [16]. A wide range of single unit and multiparticulate FDDS were designed and developed, the multiparticulate FDDS were preferred over single unit system due to reduce inter and intra subject variabilities in drug absorption and lower possibility of dose dumping [17-19]. Designing sustained release multiparticulate drug delivery system of anagliptin with prolonged residence time in the stomach using FDDS approach can significantly improve the overall bioavailability.

In the present investigation, a floating multiparticulate drug delivery system of anagliptin based on effervescent technique was developed. The drug-containing core pellets were prepared using extrusion and spheronization process. The drug-loaded pellets were coated with three successive layers, internal coat of Eudragit RS 100 as release retardant followed by effervescent layer coat ($NaHCO_3$: HPMC E5LV); and top coat of Eudragit RL 100 as a gas entrapped polymeric membrane. The effect of the amount of effervescent agent and coating level of polymeric membrane on floating ability and drug release properties were studied and optimized using response surface methodology.

MATERIALS AND METHODS

Materials

Anagliptin was obtained as gift sample from Wockhardt Limited, Aurangabad, India. Eudragit RL 100 and Eudragit RS 100 were provided by Evonik Pharma, Mumbai, India. Sodium bicarbonate, Hydroxypropyl

Publication20195

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Journal of Applied Pharmaceutical Science Vol. 9(11), pp 036-047, November, 2019
Available online at http://www.japsonline.com
DOI: 10.7324/JAPS.2019.91105
ISSN 2231-3354

Lipid-based floating multiparticulate delivery system for bioavailability enhancement of berberine hydrochloride

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ARTICLE INFO

Received on: 27/05/2019
Accepted on: 18/09/2019
Available online: 04/11/2019

Key words:
Berberine hydrochloride, gelucire, solid dispersion, lipid floating multiparticulate, gastroretentive.

ABSTRACT

The objective of the present investigation was to design and optimize lipid-based floating multiparticulate of Berberine hydrochloride (BERH), so as to increase its solubility and to reduce P-Glycoprotein mediated efflux in the intestine, hence to improve oral bioavailability. Solid dispersions were prepared using hydrophilic carriers gelucire 44/14 and gelucire 50/13 in different ratio. The prepared solid dispersion of BERH was further formulated into sustain release gastroretentive floating pellets using hydrophobic lipid carrier gelucire 43/01 as release retardant, sodium bicarbonate ($NaHCO_3$) and hydroxylpropyl methyl cellulose K4M (HPMC K4M) as gas former and matrix polymer, respectively. The effect of amount of gelucire 43/01 and $NaHCO_3$: HPMC K4M were studied and optimized using a 3-level, 2-factor, factorial design. Solid dispersion of BERH compared to pure drug showed 4-fold enhancement in aqueous solubility. The optimum system could float for more than 8 hours and showed 88.46% drug release in 8 hours. The pharmacokinetic study conducted in male Wistar rats indicated 2.32-fold increase in relative bioavailability of optimized formulation compare to the marketed tablet. The lipid-based floating pellets of BERH were obtained and could be an applicable choice to deliver BERH with improved bioavailability in effective use for various clinical applications.

INTRODUCTION

Berberine hydrochloride (BERH), a quaternary isoquinoline alkaloid, presents in various plants of Berberis species which are commonly found in the Eastern hemisphere (Kosalec *et al*., 2009). It has been historically used as an anti-diarrheal agent in Ayurvedic and Chinese medicine (Chang, 1959). In the past few years, numerous studies have demonstrated the potential therapeutic applications of BERH including anti-diabetic, anti-hyperlipidemic, anti-obesity, anti-arrhythmic, and anti-cancer (Gao *et al*., 2013; Jantova *et al*., 2003; Kettmann *et al*., 2004; Kong *et al*., 2004; Lee *et al*., 2006; Sanchez, 1996; Shen *et al*., 2014; Tsai and Tsai, 2004). However, the systemic bioavailability of BERH is very low due to its poor water solubility and dissolution rate which limits its clinical use (Tan *et al*., 2011). BERH is also a P-glycoprotein substrate (P-gp) results into active efflux from the intestine (Maeng *et al*., 2002; Pan *et al*., 2002; Zhang *et al*., 2013). In addition, BERH has a shorter biological halflife of 2–2.5 h (Alolga *et al*., 2016). Hence, it is necessary to improve the solubility and bioavailability of BERH so that it can be effectively used in many clinical applications.

In recent years, some studies have explored the use of P-gp inhibitors, permeation enhancers and lipid-based delivery systems to enhance the oral bioavailability of BERH (Fan *et al*., 2013; Ke *et al*., 2015; Khayam *et al*., 2018; Sailor *et al*., 2015; Wei *et al*., 2011; Zhu *et al*., 2013). However, P-gp inhibitors possess their own pharmacological effects and might leads to toxic effects while use of permeation enhancers suffers with the drawback of compromised integrity of intestinal mucosa (Davis, 2005). Among the lipid-based systems, self-microemulsifying systems, solid lipid nanoparticle and liposomes of BERH were developed showed significant enhancement in bioavailability but faces the problems of either low drug loading capacity or poor long term stability (Sailor *et al*., 2015). Solid dispersion technique is one of the areas that have been

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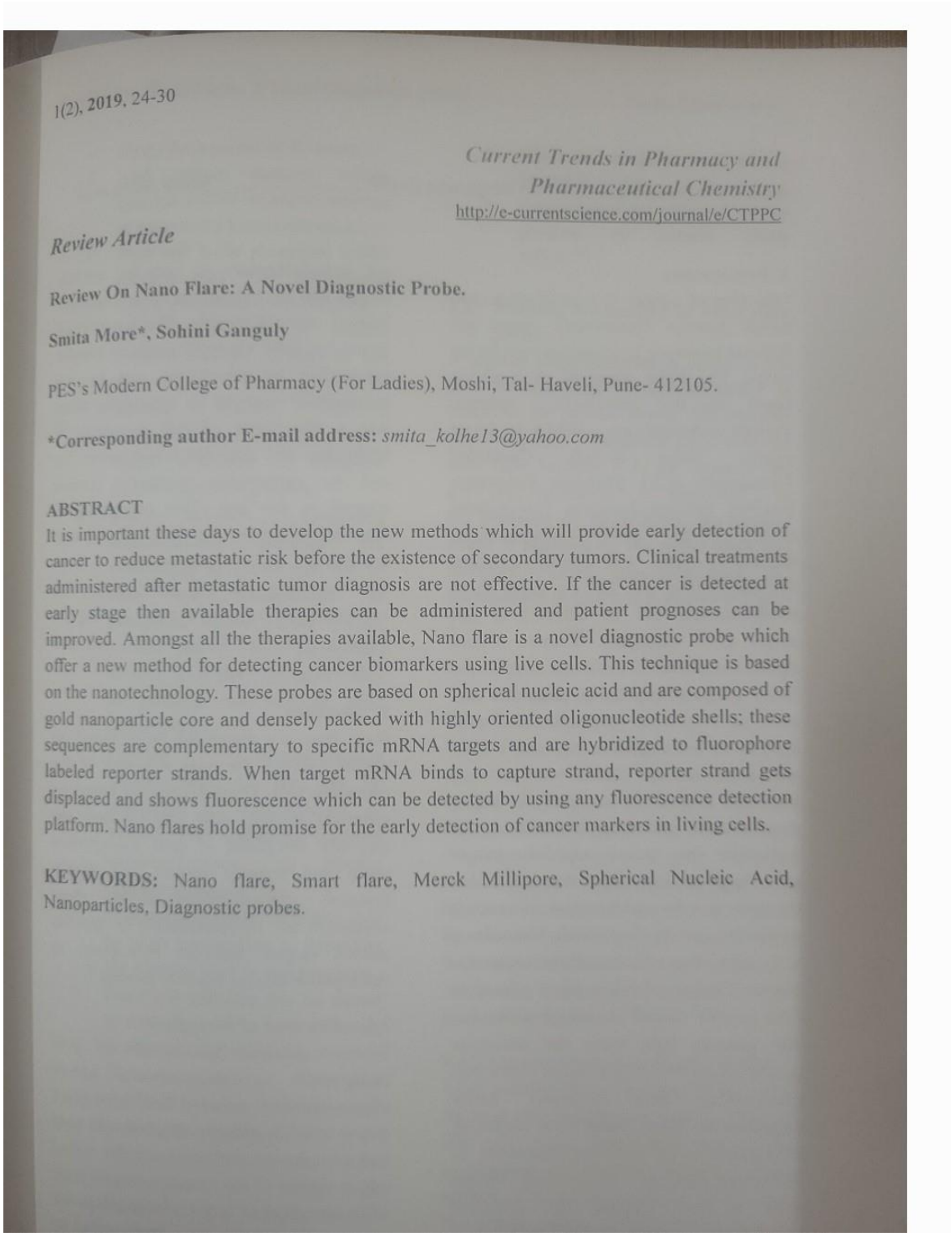

1(2), 2019, 24-30

Current Trends in Pharmacy and Pharmaceutical Chemistry
http://e-currentscience.com/journal/e/CTPPC

Review Article

Review On Nano Flare: A Novel Diagnostic Probe.

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ABSTRACT

It is important these days to develop the new methods which will provide early detection of cancer to reduce metastatic risk before the existence of secondary tumors. Clinical treatments administered after metastatic tumor diagnosis are not effective. If the cancer is detected at early stage then available therapies can be administered and patient prognoses can be improved. Amongst all the therapies available, Nano flare is a novel diagnostic probe which offer a new method for detecting cancer biomarkers using live cells. This technique is based on the nanotechnology. These probes are based on spherical nucleic acid and are composed of gold nanoparticle core and densely packed with highly oriented oligonucleotide shells; these sequences are complementary to specific mRNA targets and are hybridized to fluorophore labeled reporter strands. When target mRNA binds to capture strand, reporter strand gets displaced and shows fluorescence which can be detected by using any fluorescence detection platform. Nano flares hold promise for the early detection of cancer markers in living cells.

KEYWORDS: Nano flare, Smart flare, Merck Millipore, Spherical Nucleic Acid, Nanoparticles, Diagnostic probes.

Publication20197

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Research Article
AMERICAN JOURNAL OF PHARMACY AND HEALTH RESEARCH
www.ajphr.com
2019, Volume 7, Issue 7
ISSN: 2321–3647(online)

Formulation and Comparative Evaluation of Diclofenac Aqua Gel by Using Various Polymers

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ABSTRACT

Aqua gel is a polymeric gel formulated by using crosslinking agent to form a network of crosslinked polymer chains. It is a hydrophilic structure with capability of holding water in their three-dimensional networks. Formulation and comparative evaluation of Diclofenac aqua gel by using various polymers have been carried out to check efficient concentration of various polymers as well as to choose an appropriate polymer. Diclofenac has chosen as an active pharmaceutical ingredient which have tendency to cause acidity or GI irritation when comes in contact with GI fluid. Avoidance of such side effect is one of the motives of this research. Administration of Diclofenac trans dermally will avoid to get contact with GI fluid as well as avoid GI irritation. In this research various concentration of polymer has been taken to compare between polymer concentration as well as various polymer efficiency.

Keywords: Aqua gel, Hydrogel, topical gel, Diclofenac gel, hydrophilic gel.

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Received 22 June 2019, Accepted 02 July 2019

Please cite this article as: More S *et al.*, Formulation and Comparative Evaluation of Diclofenac Aqua Gel by Using Various Polymers . American Journal of Pharmacy & Health Research 2019.

Publication20198

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Current Pharmaceutical Analysis, 2019, 15, 592-603

RESEARCH ARTICLE

Study of Intrinsic Stability of Mometasone Furoate in Presence of Salicylic Acid by HPTLC and Characterization, Cytotoxicity Testing of Major Degradation Product of Mometasone Furoate

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Abstract: ***Background:*** A successful attempt has been done to develop and validate a simple stability indicating HPTLC method for the estimation of Mometasone furoate (MF) and its degradation product in the presence of Salicylic acid (SA). The degradation product was isolated, characterized and tested for cytotoxicity.

Introduction: Mometasone furoate (MF) is chemically 9,21-Dichloro-17α-[(2-furanylcarbonyl) oxy]-11β-hydroxy-16-α-methylpregna-1,4-diene-3,20-dione, a high potency glucocorticoid. Salicylic acid (SA) has antiseptic, antifungal and keratolytic properties. Combination of MF and SA is available in the market as an ointment and is used for the treatment of skin inflammation, skin diseases, acne, skin redness and other conditions. Till now, there is no scientific documentation on HPTLC method for simultaneous estimation of MF and SA in the topical formulation; stress testing of drugs and determination of degradation products.

Methods: Combination of Toluene: Ethyl Acetate: Methanol: Ammonia (6.4:1.5:2.0:0.1) was selected as the mobile phase. Detection was done by UV absorbance mode at wavelength 250 nm. Topical formulation containing MF and SA was analyzed by the developed method. The developed method was validated as per ICH guidelines. The standard drugs were subjected to stress testing like hydrolysis, oxidative, thermal and photolytic degradation.

Results: Good separation with R_f values 0.61 ± 0.02 (MF) and 0.21 ± 0.02 (SA) was achieved by optimized chromatographic conditions. The % drug content was found to be 97.41±1.15 and 99.43 ± 0.73 for MF and SA, respectively in a topical formulation. From the results of validation parameters, the developed method was found to be specific, accurate, precise, sensitive and robust. After stress testing, SA was found to be stable under different stress conditions. Whereas, MF was found to be base sensitive and single degradation product was observed and isolated by preparative TLC. It was characterized by LC-MS and LC-MS/MS studies. Isolated degradation product was subjected to cytotoxicity testing on A549 and SiHa cell lines.

Conclusion: A simple stability indicating HPTLC method was developed and validated for the estimation of MF and its degradation product in presence of SA. Probable structure of degradation product of MF and probable pathway of degradation was interpreted. Results of cytotoxicity testing showed that the degradation product was more cytotoxic as compared to MF against both the cell lines.

ARTICLE HISTORY

Received: December 14, 2017
Revised: March 30, 2018
Accepted: April 09, 2018

DOI:
10.2174/1573412914666180418162143

Keywords: Mometasone furoate, salicylic acid, HPTLC, cytotoxicity testing, LC-MS, stress testing.

1. INTRODUCTION

Mometasone furoate (MF) (Fig. **1**) is chemically 9,21-Dichloro-17α-[(2-furanylcarbonyl) oxy]-11β-hydroxy-16-α-methylpregna-1,4-diene-3,20-dione, a high potency glucocorticoid. It has anti-inflammatory, immuno-suppressive, vasoconstrictive and antiproliferative actions. It is used in the treatment of rhinitis and skin diseases like eczema, dermatitis, psoriasis etc. It is also used to prevent asthmatic attacks [1, 2]. It is official in IP-2014, BP-2008 and USP-2011 [3-5].

Salicylic acid (SA) (Fig. **2**) has antiseptic, antifungal and keratolytic properties. It is used in the treatment of skin conditions like acne, dandruff, warts, corns and psoriasis [1, 2]. It is official in IP-2014, BP-2008 and USP-2011 [3-5].

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1875-676X/19 $58.00+.00

Publication20199

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Research J. Pharm. and Tech. 12(7): July 2019

ISSN 0974-3618 (Print)
0974-360X (Online)

www.rjptonline.org

REVIEW ARTICLE

A Review on Hydrotropic Solubilization for Poorly Water Soluble Drugs: Analytical Application and Formulation Development

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ABSTRACT:

Solubilisation of poorly soluble drugs is encountered as a challenge in screening studies of new chemical entities as well as its formulation development is obstacle. A number of methodologies can be adapted to improve solubility of poor water soluble drug and its bioavailability. Hydrotropes possess the ability to increase the solubility of sparingly soluble and poorly soluble drugs in water. It is a molecular phenomenon, adding a second solute (i.e. hydrotrope) helps to increase the aqueous solubility of poorly soluble drug. The presence of a excess quantity of one solute enhances the solubility of another solute. Various organic solvents are used for the development of analytical methods for poorly water soluble drugs. The major drawback of such solvents is cost, toxicity and environmental hazards. To overcome these issues less costly hydrotropic agents have gain wide application for the development of analytical methods for routine analysis of marketed dosage form and developed dosage forms. The mixed hydrotropy approach suggests the minimum amount of the hydrotropic agents as a blend of two or more agents. Such blends results in lesser quantity as that of single hydrotropic agents. Similarly the hydrotropic agents are now days widely used to develop dosage forms as solid dispersion, mouth dissolving tablets, injections to improve therapeutic effectiveness and bioavailability for poorly water soluble drugs.

KEYWORDS: Solubility, Hydrotropy, Mixed Hydrotrophy, dosage form.

INTRODUCTION:

Solubilisation of poorly soluble drugs is encountered as a challenge in screening studies of new chemical entities as well as its formulation development is obstacle. A number of methodologies can be adapted to improve solubility of poor water soluble drug and its bioavailability. Orally administered drugs undergo complete absorption only drug shows excellent solubility in gastric environment and ultimately shows better bioavailability if drug belong to BCS class II. Bioavailability is dependent on several factors, aqueous drug solubility and drug permeability across the biological membranes.

Received on 28.01.2019 Modified on 21.02.2019
Accepted on 29.03.2019
Research J. Pharm. and Tech. 2019; 12(7):3157-3162.
DOI: 10.5958/0974-360X.2019.00532.8

For BCS class III drugs permeability is the rate limiting step for the absorption and has limited bioavailability. Solubilized drug molecules only can be absorbed by the cellular membranes to subsequently reach the site of drug action (vascular system for instance). The drug must be present in the form of an aqueous solution at the site of absorption. Therefore drug solubility and its oral bioavailability remains one of most challenging aspects of drug development process. The solubility issue may lead to poor in vivo and in vitro characteristics and difficult to achieve predictable and reproducible in vivo/in vitro correlations because of solubility issues. There are numerous approaches available in literature to enhance the solubility of poorly water soluble drugs. The techniques are selected on the basis of certain aspects such as physicochemical properties of drug, excipients to be used and type of dosage form need to be developed. The generally used techniques for solubilisation of drug include chemical modification, pH adjustment, solid dispersion, complexation, co-solvency, micellar

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ISSN 2581 – 4303

Available Online at www.ijpba.info
International Journal of Pharmaceutical & Biological Archives 2019; 10(3):172-179

RESEARCH ARTICLE

Characterization of Self-Microemulsifying Dosage Form: Special Emphasis on Zeta Potential Measurement

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Received: 12 March 2019; Revised: 25 April 2019; Accepted: 06 June 2019

ABSTRACT

The emulsion is a disperse system which is thermodynamically unstable. To improve the stability of the disperse system microemulsion or nanoemulsion was prepared to improve thermodynamic stability. Zeta potential is a physical property which is exhibited by any particle in suspension/emulsion, i.e., in colloidal dispersion. It can be used to optimize the formulations of suspensions and emulsions. Zeta potential is the measure of overall charges acquired by particles in a particular medium and is considered as one of the benchmarks of stability of the colloidal system. As a rule of thumb, suspensions/dispersed system with zeta potential above 30 mV (absolute value) are physically stable. Suspensions with a potential above 60 mV show excellent stability. Suspensions below 20 mV are of limited stability; below 5 mV they undergo pronounced aggregation if the system is stabilized by the electrostatic mechanism. If the values are low for visually stable emulsions, it could be attributed to steric repulsion between approaching molecules, i.e., system is sterically stabilized. Such sterically stabilized colloidal systems though they have low zeta potential values are found to be stable during storage. Tween is well accepted steric stabilizer for colloidal systems. Stability of such a visually stable emulsion or microemulsions should be carried out under accelerated or long-term stability conditions to confirm the globule size and zeta potential on aging.

Keywords: SMEDDS, surfactants, zeta potential

INTRODUCTION

The emulsion is a disperse system which is thermodynamically unstable. To improve the stability of the disperse system microemulsion or nanoemulsion was prepared to improve thermodynamic stability.

FORMULATION OF SELF-MICROEMULSIFYING DRUG DELIVERY SYSTEM (SMEDDS)

SMEDDS is defined as mixtures of oils (natural/synthetic), surfactants (solid/liquid) or alternatively, and cosolvents/cosurfactants that have a capacity to form fine oil-in-water (o/w) microemulsions on dilution followed by agitation in gastrointestinal fluid (*in vivo*) or when added to the dissolution medium (*in vitro*). The appearance of SMEDDS formulations is transparent or bluish tinge, with particle size in the range of 1–200 nm on dilution. As emulsions are metastable and thermodynamically unstable dispersed forms, SMEDDS is physically and thermodynamically stable formulations that are easy to manufacture.[1-3]

ORAL ABSORPTION AND BIOAVAILABILITY OF POORLY WATER SOLUBLE DRUG BY SMEDDS

Bioavailability enhancing property has been associated with a number of *in vivo* properties of lipid formulation including:

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Publication201911

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ISSN 2581 – 4303

Available Online at www.ijpba.info
International Journal of Pharmaceutical & Biological Archives 2019; 10(3):202-206

RESEARCH ARTICLE

Simultaneous Equation and Area Under the Curve Spectrophotometric Methods for Estimation of Ranolazine Hydrochloride Presence of its Base-induced Degradation Product: A Comparative Study

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Received on: 20 April 2019; Revised on: 25 May 2019; Accepted on: 12 June 2019

ABSTRACT

Two simple spectrophotometric methods were developed and validated for the determination of ranolazine hydrochloride in the presence of its base-induced degradation product, namely simultaneous equation method using two wavelengths of 272 and 249 nm method (A) and area under the curve method using two wavelength ranges of 267–277 nm and 244–254 nm method (B). The accuracy, precision, and linearity ranges of the planned methods were firm. The methods were validated and the specificity was assessed by analyzing synthetic mixtures containing the drug and it's degradant. The two methods were useful for the determination of the cited drug in its pharmaceutical preparation and the obtained results were statistically compared with those of a reported method. The comparison shows that there is no important difference between the proposed methods and the reported method about both accuracy and precision.

Keywords: Base degradation, ranolazine hydrochloride, spectrophotometric methods

INTRODUCTION

Ranolazine hydrochloride (RS)–N-(2,6-dimethylphenyl)-2-[4-[2-hydroxy-3-(2-methoxyphenoxy)-propyl]piperazin-1-yl] acetamide [Figure 1] is an antianginal class. Ranolazine HCl is available as tablet dosage form 1 to 2. Ranolazine is not official in pharmacopoeia. A few methods in literature were reported for the determination of ranolazine HCl by ultraviolet (UV)-visible spectroscopy, high-performance liquid chromatography (HPLC), and high-performance thin-layer chromatography method.[1-3] Although these techniques are sufficiently sensitive, they use expensive instrument and time consuming. The present UV method is a simple method and does not include complicated solvent system development as required for liquid chromatography.[4,5] Therefore, this study aimed to develop and validate simple, rapid, accurate and specific, fast, low cost, and selective methods for routine quality control analysis of pharmaceutical product containing ranolazine HCl. UV spectrophotometry is an easy to use and robust method for the quantification of drugs in formulation when there is no interference from excipients.[6]

Experimental

Instruments

SHIMADZU UV-1800 PC dual-beam UV-visible spectrophotometer was used.

Software

UV-Probe personal spectroscopy software version 2.1 (SHIMADZU) was used.

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Publication201912

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Latin American Journal of Pharmacy
(formerly *Acta Farmacéutica Bonaerense*)
Lat. Am. J. Pharm. **38** (12): 2463-72 (2019)

Received: September 6, 2019
Revised version: September 20, 2019
Accepted: September 22, 201

Exploration of Mucoadhesive Microparticles by using *Linum usitatissimum* Mucilage

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SUMMARY. **Era has arisen to circumvent the application of conventional oral dosage forms and explore these novel drug delivery approaches to gain better benefits. Present investigation was carried out in the view to develop and characterize the mucoadhesive polymeric microparticles of mucilage obtained from natural resource *i.e. Linum usitatissimum* in order to prolong the release and overcome the drawbacks such as shorter half life and gastrointestinal irritation of dexibuprofen. *L. usitatissimum* mucilage was isolated and combined with sodium alginate for its fabrication into microparticles. Various batches were formulated and characterized, the results of FITR and DSC studies revealed the compatibility between drug and polymers. Apart from this, percent mucoadhesion was found to be in the range of 50-85%, whereas particle size was found in the range of 830-865 μm. Optimized formulation was successful in releasing the drug for the prolonged time period of 12 h. Overall study indicated that natural mucilage can be efficiently utilized to retard the drug release and minimize the side effects of the drug, so as to get maximum utilization of the therapeutic dose.**

RESUMEN. Ha surgido una era para eludir la aplicación de formas de dosificación oral convencionales y explorar estos nuevos enfoques de administración de medicamentos para obtener mejores beneficios. La presente investigación se llevó a cabo para desarrollar y caracterizar las micropartículas poliméricas mucoadhesivas de mucílago obtenidas del recurso natural *Linum usitatissimum* para prolongar la liberación y superar los inconvenientes, como la vida media más corta y la irritación gastrointestinal del dexibuprofeno. El mucílago de *L. usitatissimum* se aisló y se combinó con alginato de sodio para su fabricación en micropartículas. Se formularon y caracterizaron varios lotes y los resultados de los estudios FITR y DSC revelaron la compatibilidad entre el fármaco y los polímeros. Aparte de esto, se encontró que el porcentaje de mucoadhesión estaba en el rango de 50-85%, mientras que el tamaño de partícula se encontró en el rango de 830-865 μm. La formulación optimizada tuvo éxito en la liberación del fármaco durante el período de tiempo prolongado de 12 h. El estudio general indicó que el mucílago natural se puede utilizar de manera eficiente para retrasar la liberación del fármaco y minimizar los efectos secundarios del mismo, a fin de obtener la máxima utilización de la dosis terapéutica.

KEY WORDS: dexibuprofen, *Linum usitatissimum*, mucoadhesive, sodium alginate

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ISSN 0326 2383 (printed ed.)
ISSN 2362-3853 (on line ed.)

Publication201913

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WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.632
Volume 8, Issue 10, 329-345 Review Article ISSN 2278 – 4357

LIQUE SOLID COMPACT DRUG DELIVERY SYSTEM: A REVIEW

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Article Received on
03 August 2019,
Revised on 23 August 2019,
Accepted on 13 Sept. 2019,
DOI: 10.20959/wjpps201910-14728

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ABSTRACT

Drugs which are orally administered possess the solubility is one of the major problem, because of the drugs with the low aq. solubility, such drugs get slowly dissolve and leads to low bioavailability. So, it is the biggest provocation in front of the scientists to improve the solubility of such drugs. Nearly about 40-50% of the drugs shows this problem. SEDDS is novel approach for improving the solubility of the lipophilic drug. The special feature of this delivery system is its ability to self-emulsify, that is their propensity to form oil-in-water emulsion on gentle agitation when diluted with aq. phase present outside the gastrointestinal tract. SEDDS possess low cost including easily available excipients such as natural oils or synthetic oil, surfactant, co-surfactant/ co-solvent. The major advantage of SEDDS is that it avoid the first pass effect and get absorbed by the lymphatic pathways. In this review we present a report on the formulation characterization, different dosage forms and application of SEDDS with examples of currently available marketed preparations.

KEYWORDS: Self emulsifying drug delivery, Bioavailability and Solubility enhancement.

INTRODUCTION[1]

Due to low aq. Solubility of drug, low oral bioavailability is seen and it is a major concern for formulation scientists. So, It is major part of study for the pharmaceutical scientists to convert those molecules into such a formulation that will show the desired bioavailability after oral administration. There are various strategies used in formulation development that can be use to improve the bioavailability of poorly soluble drug, it can be done by increasing the dissolution rate or by keeping the drug in solution and maintaining the drug in solution in intestinal lumen. SEDDS is an isotropic mixture of oil, surfactant, solvents, co-solvents/

Publication201914

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WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.632
Volume 8, Issue 10, 477-491 Review Article ISSN 2278 – 4357

NASAL DRUG DELIVERY: A PROMISING APPROACH FOR BRAIN TARGETING

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Article Received on
10 August 2019,
Revised on 30 August 2019,
Accepted on 20 Sept. 2019,
DOI: 10.20959/wjpps201910-14842

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ABSTRACT

The delivery of potential therapeutic moieties to brain is restricted by the Blood Brain Barrier. Approximately 1.5 billion people undergoing from disorder of CNS, these disorders needed to be cured by proper drug delivery to brain. Recently CNS disorders, such as Alzheimer's disease, Parkinson's disease, Huntington's disease, depression, anxiety, seizures, epilepsy, migraine, etc can be effectively treated by intranasal drug delivery to brain and CNS. Intranasal route of delivery facilitates direct delivery of drug to the brain without systemic absorption, thus enhancing the efficacy and decreasing the side effects of neurotherapeutics. The olfactory and the trigeminal neural pathways enable direct targeting drug to the brain by passing the BBB, this has gained an important consideration for delivery of wide range of therapeutic moieties to brain. This short review aims to known basically the barriers for nasal drug delivery, crucial factors for nasal formulations and some advantages and disadvantages of intranasal drug delivery system.

KEYWORDS: Intranasal drug delivery, Blood Brain Barrier, bioavailability, olfactory and trigeminal pathways.

INTRODUCTION[1,2,3]

The delivery of drug to the brain still remains problematic because of poor bioavailability due to the impervious nature of the endothelial membrane separating the central intestinal fluid and the systemic circulation from blood (termed as Blood Brain Barrier-BBB). The absorption and permeation of drug for desired therapeutic action in brain is restricted by the blood brain barrier (BBB). Thus the nasal route facilitates direct targeting the brain via olfactory and trigeminal neural pathway by passing the BBB. Intranasal brain targeting drug

Publication201915

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Approved by AICTE, New Delhi (F.No.06/07/MS/PHARMA/2004/047, DTE.Mumbai (2/NGC/2004/342)
Government of Maharashtra No. TEM/2004(235/04) TE-1, Pharmacy Council of India (32-347/2012-PCI),
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Business Council P.E. Society, Pune

CRITERIA III

Key Indicator 3.3 - Research Publication and Awards

3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during 2018

Research Publication 2018

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RESEARCH PUBLICATION 2018

Year	Sr. No.	Name of Faculty	Title of the Paper	Name of Journal	Year, Vol, Page No, Issue	ISSN No.
2018	1	Prof. Dr. S. N. Dhole	Design of telmisartan loaded nanoparticles mu three square factorial design approach	International Journal of Pharmaceutical and Phytopharmacological Research	2018, 8 (4), 53-62	ISSN 2250-1029 (Print)
2018	2	Dr. V. S. Kashikar	Docking, synthesis, adme prediction and β-lactamase inhibitory activity of some 2-(5-h/ chloro-((piperazin-1-ylmethyl)- 2-oxoindolin-3-ylidene)-n-substituted hydrazinecarbothioamides	Inventi Impact: Med Chem	2018 (1), 10-15, Jan- Mar 2018	0976-3821
2018	3	Ms. V. S. Tambe	Formulation and Evaluation of Sustained release mucoadhesive microspheres of lornoxicam by using novel isolated polymer of fruit artocarpusheterophyllus	International Journal of Pharmaceutical Chemistry and Analysis	Jan-March 2018; Vol- 5, Issue-1, 43-51.	2394-2797
2018	4	Ms. V. S.Tambe	Development and validation of absorption correction method for simultaneous estimation of paracetamol and nimesulide in bulk and combined tablet dosage form	Asian Journal of Pharmaceutical Analysis	2018, 8(1), 33-38	2231-5667 (Print)
2018	5	Mr. O. M, Bagade	An investigation into formulation and processing strategies to derive microspheres obtained from ionic gelation technique	Asian Journal of Pharmaceutical Science and Technology	2018, 8(1), 28-37	e-ISSN 2248-9185 Print- 2248-9177
2018	6	Dr. S. D. More, Ms. M. C. Upadhye	Comparitive qualification of flavonoid content and antioxidant potential of indigenous medicinal plants	Journal of Pharmacognosy and Phytochemistry	2018, 7(1), 343-345	2278-4136
2018	7	Dr. V.S. Kashikar	Development and validation of spectroscopic method for simultaneous estimation of pitavastatin calcium and metformin hydrochloride combination in bulk	Inventi Rapid: Pharm Analysis & Quality Assurance	Vol. 2018, Issue 2, 1-5, April- June 2018	0976-3813
2018	8	Mr. H. P. Alhat	Analytical methods development & validation for simultaneous estimation of lopinavir & ritonavir in pharmaceutical formulation by simultaneous equation method using uv spectrophotometry	International research journal of pharmacy	2018, 9 (8), 57-62	ISSN 2230 –8407

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International Journal of Pharmaceutical and Phytopharmacological Research (eIJPPR) | August 2018 | Volume 8 | Issue 4 | Page 53-62
Raksha Laxman Mhetre, Design of Telmisartan Loaded Nanoparticles by Three Square Factorial Design Approach

Design of Telmisartan Loaded Nanoparticles by Three Square Factorial Design Approach

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ABSTRACT

Telmisartan as an antihypertensive drug has poor solubility and high permeability. In the current study, efforts were taken to improve the solubility of telmisartan by the formulation of nanoparticulate drug delivery system. Nanosuspension was prepared by combining ionic gelation-ultrasonication technique. Later, nanosuspension was converted to powder by freeze drying technology. Three square factorial design approach was used for the investigation of the effect of concentration of trimethyl chitosan polymer and the rate of stirring on particle size and solubility of nanoparticles. The optimum condition was found to be 3.5 mg/ml of trimethyl chitosan and 9000 rpm stirring rate. All data was best fitted in quadratic model with high determination coefficient and F value. The average particle size of 281.5 nm was confirmed by dynamic light scattering. Differential scanning calorimetry and powder X-ray diffraction revealed reduced crystallinity of telmisartan. Freeze-dried nanoparticles were spherical-shaped under field emission scanning electron microscopy. The value of zeta potential was + 35.2 mV. In vitro dissolution study was performed by dialysis bag to investigate the improvement of the dissolution rate. The stability of developed nanoparticle was confirmed by the accelerated stability study of developed nanoparticles. Thus, the saturation solubility and dissolution rate were increased due to the particle size reduction and amorphous nature of the drug.

Key Words: *Nanoparticles, Ionic Gelation, Ultrasonication, Freeze Drying.*

eIJPPR 2018; 8(4):53-62

HOW TO CITE THIS ARTICLE: Raksha Laxman Mhetre, Vishal Bhanudas Hol, Shashikant N Dhole (2018). "Design of Telmisartan loaded nanoparticles by three square factorial design approach", International Journal of Pharmaceutical and Phytopharmacological Research, 8(4), pp.53-62.

INTRODUCTION

Solubility is a very important characteristic of drugs; it mainly influences the efficacy of drugs in biological fluids. One of the major challenges in dosage form development of the drug molecule is its weak aqueous solubility [1]. According to the literature, two types of drugs that have low solubility and dissolution rate are grease ball and brick dust [2]. Grease ball molecules are highly lipophilic with log P value more than 4 and have weak intermolecular forces. Lipid-based formulation can be prepared for grease ball molecules to achieve maximum therapeutic effect. Whereas, brick-dust molecules are less lipophilic with low log P value, and have high intermolecular forces. Therefore, permeability is the rate-limiting step to get the therapeutic effect of brick dust molecules [3]. The solubility of such poorly soluble drugs can be improved by solid dispersion technique, complexation with cyclodextrin, co-crystal approach, micronization, nanosization, etc. [4-7].

Nanosization has been the recent and most widely used approach for solubility enhancement of drug molecules, in which the effective surface area of drug particles increases due to the reduction of drug particle size. There have been various techniques for nanoparticle formulation such as anti-solvent precipitation, high-pressure homogenization, ionic gelation, double emulsification, etc [8, 9]. Most of the technologies used agitation, heat, sonication and organic solvents for the formulation of nanoparticles. However, this study mainly focused on ionic gelation technique because it is a simple and less time-consuming technique without using vigorous agitation, heat and organic solvent, and has industrial applicability [10]. A wide variety of natural and synthetic polymers have been used for the

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest .
Received: 21 July 2018; **Revised:** 23 August 2018; **Accepted:** 25 August 2018

ISSN (Online) 2249-6084 (Print) 2250-1029 www.eijppr.com

Publication20181

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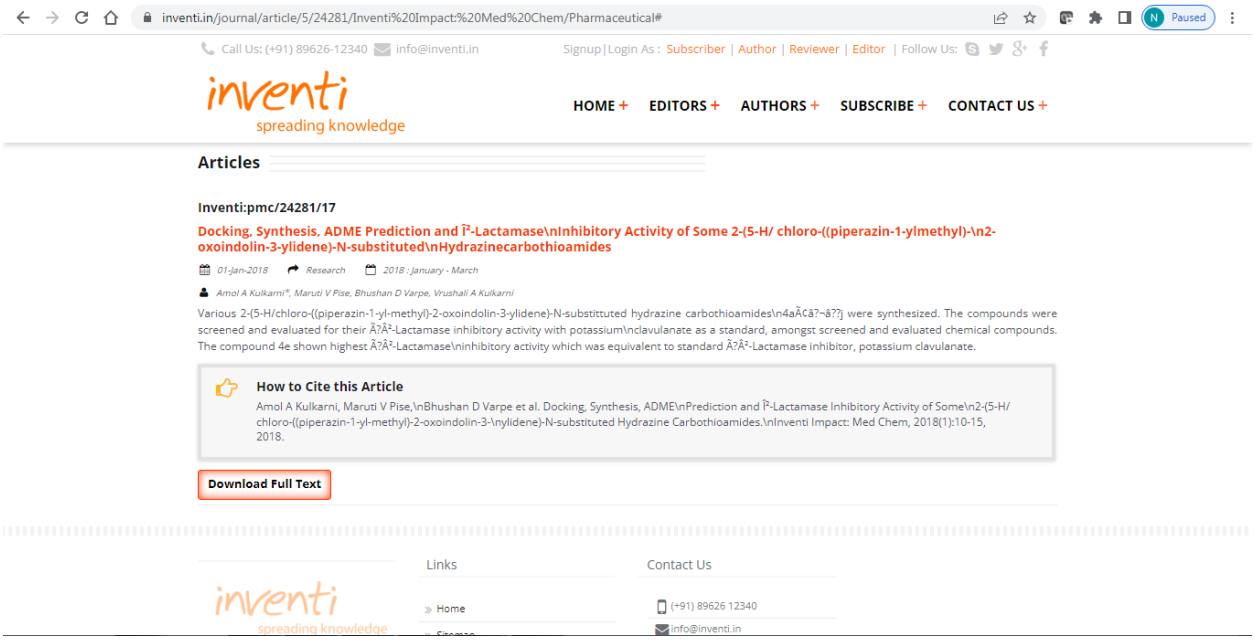

Publication20182

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Original Research Article DOI: 10.18231/2394-2797.2018.0008

Formulation and evaluation of sustained release mucoadhesive microspheres of lornoxicam by using novel isolated polymer of fruit *artocarpus heterophyllus*

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Abstract

Objective: To investigate the potential of novel polymer isolated from fruit *Artocarpus heterophyllus* for mucoadhesion and sustained release action. Microspheres containing Lornoxicam formulated using isolated polymer offered a suitable, practical approach to achieve a prolonged therapeutic anti-inflammatory effect by continuously releasing the medication over extended period of time.

Materials and Methods: D-Optimal design was applied to optimize the fruit polymer and sodium tripolyphosphate concentration which was used as a cross-linking agent.

Result: Fruit polymer and sodium tripolyphosphate concentration has significant impact on % entrapment efficiency, mucoadhesivity, and in vitro release. Differential scanning calorimetry and infrared spectroscopy results indicates that no interaction between drug and excipients. Polynomial models were validated using one way ANOVA and results indicated that isolated fruit polymer and sodium tripolyphosphate used have significant effect on selected response ($p<0.05$). Contour plots and three dimensional response surface curves were drawn. In vivo studies were carried out for the optimized formulation. Furthermore, the pharmacokinetic parameters of the Lornoxicam microspheres showed constant release with minimum fluctuation in plasma drug concentration. The in vivo pharmacokinetic studies clearly demonstrate that microspheres of Lornoxicam shows sustained release action for 24 hrs.

Conclusion: From the result of the present work, it was concluded that preparation of Lornoxicam loaded microspheres by ionic gelation technique using novel isolated polymer from fruit of *Artocarpus heterophyllus* might be promising approach for sustained release mucoadhesive formulations.

Keywords: *Artocarpus heterophyllus,* Ionic gelation, In-vivo, Mucoadhesion.

Introduction

Microsphere is defined as a spherical particle with size varying from 1-1000µm, containing a core substance.[1] Microspheres are normally free flowing powders.[2]

The success of novel sustained formulation is limited due to their short residence time at the site of absorption. Therefore, it would be beneficial to have means for providing an intimate contact of the drug with the absorbing mucous membranes. It can be achieved by coupling mucoadhesion characteristics to microspheres. Mucoadhesive microspheres show an extended residence time at the site of absorption and make possible an intimate contact with underlying absorption mucous membrane and thus contribute to better therapeutic performance of drug.[3]

Lornoxicam is a non-steroidal anti-inflammatory drug that belongs to the oxicam class and is used for the management of pain. Lornoxicam acts by decreasing prostaglandin synthesis by inhibiting cyclo-oxygenase, exhibiting antipyretic, analgesic, and anti-inflammatory effects.[4] It can be effectively used for symptomatic relief of inflammation of the joints in rheumatic disease.[5-7] Lornoxicam shows very less solubility in acidic conditions.[8] Lornoxicam has good intestinal tolerability as compared with other oxicams.[9] Lornoxicam is well absorbed in the lower GIT, but has a very short biological half-life of 3-5 hrs.[10] This formulation is tailored to achieve sustained drug release in the intestine using a novel excipients obtained from fibrous part of fruit *Artocarpus heterophyllus*. This also reduces dosing frequency, gastric irritation associated with anti-inflammatory agents.

Materials and Methods

Materials

Lornoxicam was obtained as gift sample from Kores India Limited, Navi Mumbai. Chitosan, Sodium tripolyphosphate were purchased from Loba chemie Pvt Ltd, Mumbai.

Collection of fruit: Jackfruit was collected from local market and authenticated by Botanical survey of India.

Isolation of polymer from jackfruit: To remove dirt and debris fruit was thoroughly washed with water. Incisions were made on fruit, left over night and then cut into pieces. The seeds present inside the fruit were removed. The fibre part of the fruit was crushed and soaked in water for 4-5 hours, boiled for 30 min, and left to place for 1 hour to allow total release of polymer into the water. The polymer was extracted using muslin cloth to remove the marc from the solution. Ethanol (three times volume of filtrate) was used to precipitate the polymer. The polymer was separated, dried at 45^0C,

Publication20183

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ISSN 2231–5667 (Print)
2231–5675 (Online)
DOI: 10.5958/2231-5675.2018.00006.6

Vol. 08| Issue-01|
January -March 2018

Available online at
www.anvpublication.org
www.asianpharmaonline.org

Asian Journal of Pharmaceutical Analysis
Home page *www. ajpaonline.com*

RESEARCH ARTICLE

Development and Validation of Absorption Correction Method for Simultaneous Estimation of Paracetamol and Nimesulide in Bulk and Combined Tablet Dosage Form

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ABSTRACT:
The present paper describes simple, accurate, rapid, precise and sensitive UV spectrophotometric absorption correction method for the simultaneous determination of paracetamol and nimesulide in combined tablet dosage form. This method is more simple than reported methods and is based on use of 0.1 N NaOH as a solvent. The wavelengths selected for the analysis were 257 nm and 393 nm. Beer's law was obeyed in the concentration range of 4-18 µg/ml and 10-30 µg/ml for paracetamol and nimesulide respectively. The mean percentage drug content for paracetamol and nimesilide were found to be 100.03% w/w and 101% w/w respectively. The % RSD value was found to be less than 2 which shows the precision of method. The high recovery and low coefficients of variation conforms it's suitability for the routine quality control analysis of paracetamol and nimesulide in pure and tablet dosage forms.

KEYWORDS: Paracetamol, Nimesulide, Spectrophotometric absorption correction method.

INTRODUCTION:
Paracetamol (PARA Fig 1a) is N-(4 – hydroxyphenyl) acetamide, a para-aminophenol derivative, with analgesic, antipyretic properties and weak anti-inflammatory activity. The log P value of PARA is 0.31. It is insoluble in water, very soluble in ethanol and it's pka value is 9.5. It is official in Indian Pharmacopoeia[1] and British Pharmacopoeia [2,3]B.P.

Received on 06.12.2017 Accepted on 18.02.2018

Asian J. Pharm. Ana. 2018; 8(1): 33-38.
DOI: 10.5958/2231-5675.2018.00006.6

The I.P. and B.P. both suggest titrimetric and UV spectrophotometric assay method for PARA in bulk and tablet formulations. Nimesulide (NIME Fig 1b) chemically is [N-(4-nitro-2-phenoxyphenyl)] methanesulfonamide. It is non steroidal antiinflammatory drug with good analgesic and antirheumatic properties. The log P value of NIME is 2.7. It is soluble in ethanol, DMSO and DMF and sparingly soluble in aqueous buffer. It has pka value of 6.46. Combination of PARA and NIME is available in tablet dosage form. Some HPLC[4, 5] and spectrophotometric[6,7,8] methods have been reported in literature for it's estimation. UV and HPLC methods have been reported in literature for determination of PARA and NIME combination[4-12]. There are two UV spectrophotometric methods for simultaneous

Publication20184

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Vol 8|Issue 1| 2018|28-37.

Asian Journal of Pharmaceutical Science & Technology

www.ajpst.com

e-ISSN: 2248 – 9185
Print ISSN: 2248 – 9177

AN INVESTIGATION INTO FORMULATION AND PROCESSING STRATEGIES TO DERIVE MICROSPHERES OBTAINED FROM IONIC GELATION TECHNIQUE

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ABSTRACT

The present study was all about the formulation of sodium alginate microspheres of Olmesartan Medoxomil by ionic gelation method. **Objective**: The objective of the study was to fabricate, formulate & evaluate the microspheres and its optimization. These micro particles were prepared by using different concentration of sodium alginate and calcium chloride with respect to drug concentration. Microspheres were collected in the solution of calcium chloride of required concentration with constant stirring. The prepared microspheres were evaluated for physical characterizations and micromeritics properties. Some parameters like orifice diameter of needle used to pass the solution. **Results:** It was observed that microspheres were more spherical and rigid with needle gauze number 26 out of 21, 24 and 26 gauze number needle. Thus, it was observed that the Formulation 5 was prepared by using needle gauze number 26 furnished to be the best among all the batches with drug entrapment efficiency (96±1.46%), particle size (200.99 ±5.56µ) and percentage yield (98.50±0.5060%) etc. Also the swelling index was found tobe (0.53 ± 0.0577). **Conclusion:** Thus, it was concluded that, by applying a systematic approach for the possible formulations one can reach to the optimize formulation in less time with greater scale up.

Key words: Particle Size, Entrapment efficiency, Swelling Index, Surface area, Drug Loading.

INTRODUCTION

Olmesartan Medoxomil is an angiotensin II receptor antagonist which is used for treatment of high blood pressure. Drugs having shorter half-life require frequent dosing. Option for such drugs is sustained and controlled release formulations which gives sustain release and maintain effective drug concentration. But oral drug delivery may have the limitation of gastric retention time which may result in decrease efficacy of administered dose. To overcome this limitation micro particulate drug delivery systems are recommend.

Microspheres have got considerable attention due to release at controlled rate and less chances of dose dumping. Bio adhesive microspheres have advantage of efficient absorption and also enhance bioavailability as it gives intimate contact with mucus layer for longer time. Bioadhesion can be obtained by using natural polymers as they are nontoxic for oral use and also gives protective effect for upper GIT. The dried microsphere shows swelling in aqueous medium and thus acts as sustain release system. The target for study was to develop microspheres of Olmesartan Medoxomil and study the effect of variables on quality of microspheres [1-4].

MATERIAL AND METHOD

Materials

Carriers such as calcium chloride and sodium alginate were obtained from Lobachemi, Mumbai.

Formulation of microspheres using sodium alginate (Ionic Gelation Method)

Method used for microsphere formation was ion Gelation Method which includes reaction between calcium and sodium alginate to produce sodium alginate. Drug and sodium alginate were taken in the proportion of 1:3 and 1:5 and dissolved in distilled water separately. This solution was added drop wise in the solution of calcium chloride with the help of needle of different orifice diameter from the certain height. This was kept aside for 20 min. Prepared Microspheres were collected by decanting the solution and washed with distilled water to remove excess calcium chloride and then microspheres were oven dried sufficiently[5].

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Publication20185

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Journal of Pharmacognosy and Phytochemistry 2018; 7(1): 343-345

Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(1): 343-345
Received: 15-11-2017
Accepted: 17-12-2017

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Comparative quantification of flavonoid content and antioxidant potential of indigenous medicinal plants

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Abstract
Medicinal plants are considered as rich sources of ingredients which can be used in drug development either pharmacopeial, non-pharmacopeial, or synthetic drugs. Some plants are considered as important sources and as result of that they are recommended for their therapeutic values. The present investigation describes the phytochemical analysis, flavonoid contents, *in vitro* antioxidant activity of *Cissus quarangularis* and*Muntingia calabura* plant extracts. The flavonoid content was estimated by spectrophotometric method & antioxidant propertyof aqueous & alcoholic extracts of these plants estimated by % Hydrogen Peroxide (H_2O_2) scavenging activity. Ethanolic extract of *Muntingia calabura* leaves revealed the presence of high flavonoid content. All extracts showed significant antioxidant activity in correlation to phytoconstituents of the extracts. Results showed that the ethanolic and aqueous extract of *Cissus quadrangularis* exhibited a higher antioxidant activity as compared toalcoholic & aqueous extract of *Muntingia calabura*.

Keywords: *Cissus quadrangularis, Muntingia calabura*, phytocontituents, flavonoid content, antioxidant activity

Introduction
Nature has provided a complete storehouse of remedies to cure all aliments of mankind, this is where, nature provides various drugs in the form of herbs, plants and algae's to cure the incurable diseases without any toxic effects. Our own Ayurvedic system has given solution to all kind of disease which was considered even impossible for other field of medical science [1]. Oxidation is essential for productions of energy in biological system. Free radicles, radicle derivatives are useful during oxidation but hazards to living organism at high concentration and may cause to cellular constituents. In several countries a medicinal property of plants are investigated to identifying phytochemicals with potential therapeutic effects [2]. *Cissus qudrangularis L*., belongs to Vitaceae family, is an indigenous medicinal plant of India. The stem of *Cissus qudrangularis* is also reputed In Ayurveda as alterative, anthelmintic, dyspeptic, digestive, tonic, analgesic in eye and ear diseases, asthma, and in complaints of the back and spine [3]. *Muntingia calabura* L., belongs to Muntingeaceae family, is a fast-growing plant all over India. The leaves are rich in flavanoidal compounds like flavones, flavanones, flavans and biflavans as the major constituents, possessing antidiabetic and cytotoxic activities. Ithas found to contain alkaloids, proteins, flavonoids, anthraquinone glycosides. Other parts like roots, flowers used as antidyspeptic, antispasmodic, diaphoretic to treat headaches, dyspepsia and spasm [4]. In view of above facts, in present investigation, we have carried out the phytochemical analysis, flavonoid content andantioxidant activity of aqueous and ethanolic extracts of *Cissus quadrangularis* and *Muntingia calabura* plants. And comparative studies of phytochemical analysis, flavonoid content andantioxidant activity of aqueous and ethanolic extracts of *Cissus quadrangularis* and *Muntingia calabura* plants.

Materials and Methods
Collection and drying of plants
The stem powder of *Cissus quadrangularis* plant was purchased from Manakarnika Aushadhalaya (CA-1549) Chinchwad. After authentication from Botanical survey of India, *Muntingia calabura* leaves were collected from local areas in Moshi. Further these plant materials were subjected to drying in shed. The dried leaves of *Muntingia calabura were* powdered by pulverization and were stored in air tight container.

Extraction
Aqueous extract of both plants was obtained by maceration techniquewhere as ethanolic extract of both plants was obtained by using soxhlet extraction [5].

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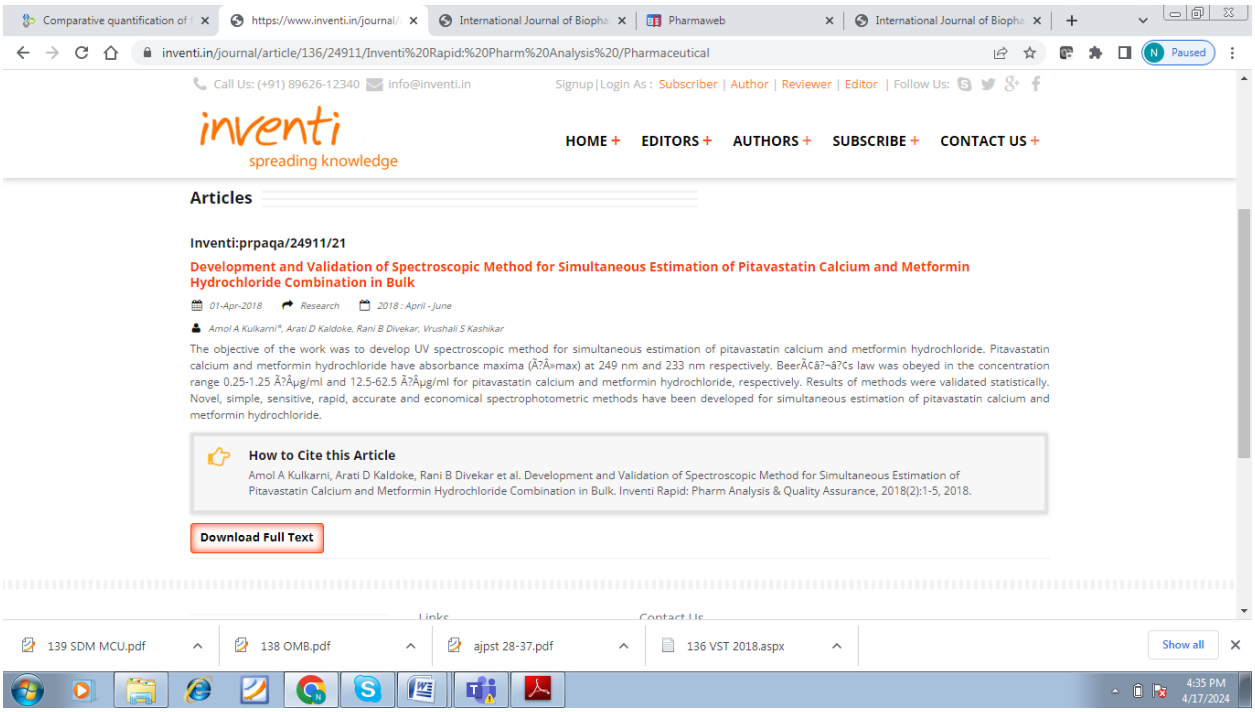

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INTERNATIONAL RESEARCH JOURNAL OF PHARMACY
www.irjponline.com
ISSN 2230 – 8407

Research Article

ANALYTICAL METHODS DEVELOPMENT & VALIDATION FOR SIMULTANEOUS ESTIMATION OF LOPINAVIR & RITONAVIR IN PHARMACEUTICAL FORMULATION BY SIMULTANEOUS EQUATION METHOD USING UV SPECTROPHOTOMETRY

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Article Received on: 04/07/18 Approved for publication: /07/18

DOI: 10.7897/2230-8407.098165

ABSTRACT

The present work deals with the simultaneous estimation of Lopinavir and Ritonavir in bulk and pharmaceutical dosage form using the UV method. Shimadzu UV system was used for analysis. The solvent selected for analysis was acetonitrile: water (30:70v/v). The wavelength of Lopinavir and Ritonavir were found 257.5 nm and 240.0 nm respectively. The Linearity for simultaneous equation method was studied by plotting a graph Conc. Vs. absorbance, Linearity was observed in the concentration range 80-180µg/ml for Lopinavir and 10-60 µg/ml of Ritonavir Coefficient of correlation (R^2) was found to be 0.997 and 0.998 for Lopinavir and Ritonavir respectively. The LOD was found to be 2.379µg/ml and 0.66 µg/ml for Lopinavir and Ritonavir respectively. LOQ was found to be 7.21µg/ml and 2 µg/ml for Lopinavir and Ritonavir respectively. The developed method was employed for the analysis of marketing formulation. The amount of drug obtained was in accordance with label claim. The recovery studies were carried out at three levels, i.e.80 %, 100% and 120% by the standard addition method. The precision of the proposed method was also established. The method was found to be accurate and precise.

Keywords: Lopinavir, Ritonavir, Simultaneous Equation Method, UV Spectrophotometer, Validation.

INTRODUCTION

Lopinavir and Ritonavir are antiretroviral drugs from a protease inhibitor class. The drugs have been proved to be effective in anti-HIV treatment. Chemically Lopinavir is (2S)-N-[(2S,4S,5S) -5-[2- (2,6dimethylphenox acetamido] -4-hydroxy-1,6-iphenylhexan-2-yl] -3-methyl-2-(2-oxo-1,3-diazinan-1-yl) butanamide and its empirical formula is $C_{37}H_{48}N_4O_5$ with a molecular weight of 628.80 (Figure 1 A) [1-3] and Ritonavir (5s, 8s, 10s,11s)-10-hydroxy-2-methyl-5-(1-methylethyl) -1-[2-(1-methylethyl)-4-thiazolyl]-3,6-dioxo-8,11-is (phenylmethyl) -2,4,7,12-etraazatridecan-13-oic acid 5-thiazolyl methyl ester of molecular formula $C_{37}H_{48}N_6O_5S_2$ and its molecular weight is 720.95 (Figure 1 B) [1-3]. Ritonavir is the most potent protease inhibitor, it has an ability to inhibit CYP-450 and efflux pump-P-glycoprotein as a result the potential for severe drug interaction is quite great because of strong CYP-450 the inhibiting effect of ritonavir. The drug has found value when used in fixed dosage form combination with other Pharmaceutical Ingredients to block their metabolism and acts as a booster for these drugs. In these cases, ritonavir is used in a sub therapeutic dose, but boosts the effectiveness of the co administered drug. [4-7]

Literature survey of lopinavir and ritonavir either single or in combination with ritonavir shows that several methods based on UV- spectrophotometry, HPLC and HPTLC were developed and validated. However, there are few UV- spectrophotometric method for simultaneous determination are available which are costly and time consuming. The present method was validated as per ICH guideline.

MATERIALS AND METHODS [8-17]

Instrument

An UV –visible double beam spectrophotometer of make JASCO, model V-530 with a pair of 1cm matched quartz cell, spectral bandwidth of 2cm and Shimadzu balance, AUX-220 were used for experimental purpose.

Chemicals

Acetonitrile-AR, Distilled water

Method

The stock solutions were prepared as follows-

Preparation of stock solution of Lopinavir

An accurately weighed 100 mg of Lopinavir was transferred to 100ml volumetric flask. Dissolved and made up to the volume with a mixture of acetonitrile: water (30:70v/v) which is previously prepared and sonicated for 10min., obtain the concentration of 1000µg/ml. Stock solution was sonicated for 15 min and filtered it. From this stock solution pipette out 0.8ml, 1ml,1.2ml, 1.4ml, 1.6ml in 10ml volumetric flasks and made the volume with a mixture of Acetonitrile : water (30:70v/v) to get final concentration range 80-160µg/ml.

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