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

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

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
2022	5	Ms. Rutuja Aher	Role of chlorophyll in cosmeceuticals: an overview	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (8), 1660-1670.	2456-3315
2022	6	Ms.Rutuja Aher	A Review: Retinol-Infused Products By Microsponge Technology	International Journal for Research Trends and Innovation (IJRTI)	2022, 7 (9), 24-35	2456-3315
2022	7	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
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
2022	9	Ms.BhagyashreeParande	Diversified outlook on Pharmacognosy and Pharmacological activities of BerberiesAristata:ADelinated Review	World Journal of Pharmacy and Pharmaceutical Sciences (WJPPS)	2022, 11 (7), 567-580.	2278-4357
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

2022	11	Ms.PallaviKakade	Evaluation of Antihypertensive Activity of PunicaGranatum 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
2022	12	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
2022	13	Ms. Neve TD	Enhancement of Dissoluion Profile of Torsemide by solid dispersion technique	International Journal of Pharma Research and Technology		0975-5357
2022	14	Shashikant N. Dhole	ANTI-DIABETIC AND WOUND HEALING POTENTIAL OF JASMINUM GRANDIFLORUM	World Journal of Pharmaceutical Research	2022, 11 (05)	2277-7105
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 related Substances in Oral Suspension	Indian Drugs	2022, 59 (11), 65-72	0019462X
2022	17	Dr. Vrushali Tambe	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
2022	18	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
2022	19	Dr. Nilesh Kulkarni, Ms. Priyanka Shinde	An occular Route of Administration for Drugs through Novel Approach of self- microemulsifying Formulation-	Asian Pacific Journal of Health Sciences	2022, 9 (4); 414-418	2350-0964

			Asystematic review			
2022	20	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
2022	21	Dr. Mohini Upadhye, Sonali Chintamani	Antimicrobial Activities of the different fractions from MomordicaDioicaRoxb Fruit	International Journal of Research and Analytical Reviews	2022, 9 (3), 746-750.	2349-5138
2022	22	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
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
2022	24	Dr. Vijaya Vichare, Dr. S N Dhole	Cytotoxicity Testing of TinosporaCordifolia Extracts against Human Kidney Cancer Cell Line	International Journal of Pharmaceutical Sciences and Nanotechnology	2022, 15 (5), 6140-6146.	0974-3278
2022	25	Dr. RakshaMhetre	Formulation and Appraisal of innovative Acyclovir emulsion	Neuroquantology	2022, 20 (11), 6968-6980	1303-5150
2022	26	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	2022; 5 (13): 2959	2229-7723
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
2022	28	Dr. VijayaVichare, Ms.BhagyashreeParande, Dr. S N Dhole	A Review on Anticancer Potential of Berberisaristata and	Journal of Preventive, Diagnostic and Treatment Strategies	2022, 1 (2), 67-75.	2949-6594

			Berberinewith Focus on Quantitative Methods	in Medicine (JPDTSM)		
2022	29	Amruta Shinde	DEVELOPMENT AND EVALUATION OF BOVINE COLOSTRUM INTERMEDIATEPRODUT	THE JOURNAL OF ORIENTAL RESEARCH MADRAS		0022-3301
2022	30	Amruta Shinde	DESIGN AND EVALUATION OF DOSAGE FORM CONTAINING PREBIOTICS AND PROBIOTICS	THE JOURNAL OF ORIENTAL RESEARCH MADRAS		0022-3301
2022	31	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
2022	32	Dr. Ms. M.C. Upadhye	Biopolymers: A comprehensive review	Open Access Research Journal of Science and Technology	2022, 04(01), 013–018	2782-9960
2022	33	Dr. Ms. M.C.Upadhye, Dr, Ms. R. R. Pujari	Antidiabetic Potential of Ficusglomerata 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
2022	34	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	2022, 12 (2), 135-141	2231-5675
2022	35	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–	Journal of Planar Chromatography	2022, 35, 61–71.	1789-0993

			QTOF–MS/MS			
2022	36	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
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 RPHPLC Applying Experimental Design Approach	Indian Drugs	2022, 59(05),48-57	0019-462X
2022	38	Dr. Ms. R.L. Mhetre, Mr. R. R. Chanshetti, Dr. Prof. S. N. Dhole	Optimization Of Cilnidipine Nanoparticles Using Box-Behnken Design In-Vitro Toxicity And Bioavailability Assessment	Materials Technology	2022, 37 (11),	1753-5557
2022	39	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
2022	40	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
2022	41	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	42	Dr. Ms. S.D. More	Review article TDDS	World journal of pharmacy and pharmaceutical sciences	2022, 11(1), 248-272	2278 – 4357
2022	43	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
2022	44	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
2022	45	Dr. Nilesh S. Kulkarni	Insight on development and	Asian Journal of Pharmacy and	2022; 12 (2), 129-135	2231-5705

			evaluation of nanosponge drug delivery for improved therapeutic effectiveness	Technology		
2022	46	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.

Original Article

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

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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 Ɣ 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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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]

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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,

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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.

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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,

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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].

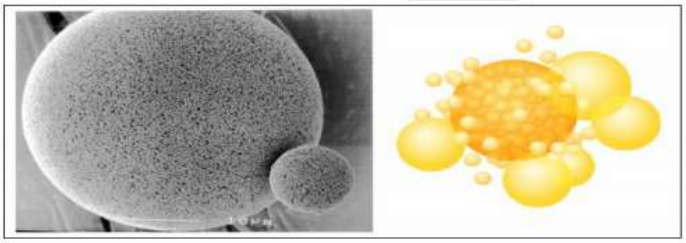

Figure 1: Porous microsphere [10]

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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.

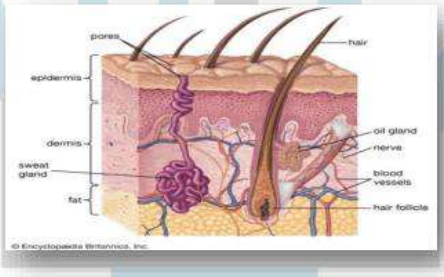
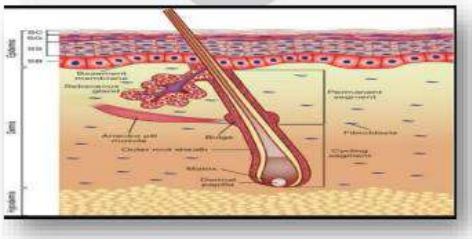


Fig.1. structure of the skin.

FIG 2: Verticle section of the skin



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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.

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

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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.

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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

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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

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ANTI-DIABETIC AND WOUND HEALING POTENTIAL OF JASMINUM GRANDIFLORUM

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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

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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

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

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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.

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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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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

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

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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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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

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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.

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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

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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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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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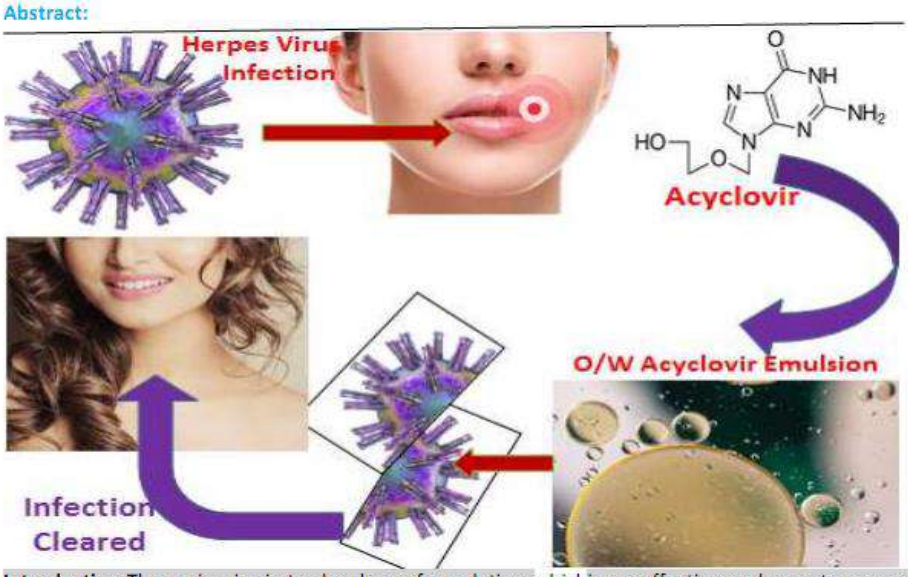
Abstract:



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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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.

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Review Article

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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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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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(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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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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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.

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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]

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

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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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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.

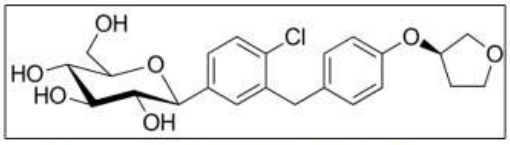

Fig. 1: Chemical structure of empagliflozin (EN)

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

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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.

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

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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.

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.

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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

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REVIEW ARTICLE TDDS

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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

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

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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

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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.

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Review Article

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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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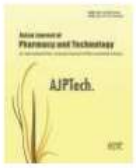

RESEARCH ARTICLE

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

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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.

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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