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Proof of Research Papers

AN UPDATE ON MORPHOLOGY, MECHANISM, LETHALITY, AND MANAGEMENT OF DHATURA POISONING

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Abstract

Dhatura is a part of the Solanaceae family and belongs to the genus Datura, which is thought to have both poisonous and therapeutic characteristics due to the diverse variety of bioactive ingredients. The Dhatura plant's common names are thorns apple and Jimson Weed, mad apple, and moonflower. Plants are used to cure a variety of human diseases. Alkaloids, sugars, cardiac glycosides, tannins, flavonoids, amino acids, and phenolic substances were identified in the preliminary phytochemical analysis of the Datura plant extract. Additionally, it contains dangerous tropane alkaloids like hyoscyamine, atropine, and scopolamine. Even while some research on D. stramonium has suggested possible pharmacological effects, the toxicity of the organism is still mostly unknown. Additionally, toxic symptoms have been brought on by the regular misuse of D. stramonium for recreational purposes. Therefore, its use's harmful effects and potential hazards must be understood. This paper aims to provide an overview of the plant Datura's, phytochemical makeup, pharmacological properties, toxicological properties, and treatment of Dhatura poisoning.

Keywords: Dhatura, toxic, Alkaloids, toxicological properties.

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Comparative Study of Antioxidant Potential of *Colebrookea oppositifolia* Root and Aerial Parts

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Abstract: Oxidative stress is an important factor contributing to the aetiology of many degenerative diseases and is brought on by an imbalance between pro-oxidants and antioxidants in an organism. Free radicals have the ability to alter DNA as well as biomolecules like protein, lipids, polyunsaturated fatty acids, carbohydrates, and nucleic acids. The oxidation of biomolecules can be effectively delayed by antioxidants. Food-derived antioxidants can delay or stop oxidation by preventing the initiation and dissemination of oxidizing chain reactions. Since ancient times, medicinal plants have been used to treat illnesses because plants contain several kinds of antioxidant compounds like flavonoids, phenolics, thiol and steroids. Colebrookea oppositifolia Sm. (CO) traditionally has been used in treatment of various disorders associated with stress. In this study, the radical scavenging abilities of 1,1-diphenyl-2-picrylhydrazyl (DPPH) and hydroxyl radicals were compared to L-ascorbic acid, which served as the standard, in order to determine the in vitro antioxidant activity of plant extract. In addition to that total phenolic content and total flavonoid content were also estimated. The obtained results revealed that roots of plant exhibited strong antioxidant properties than the aerial parts and the study recommend that root extract may be used in In-vivo studies against associated oxidative stress-mediated complications.

Keywords: Anti-oxidant, *Colebrookea oppositifolia* Sm., DPPH, H_2O_2, total flavonoid content, Total phenolic content

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Abbrevations:

CO: *Colebrookea oppositifolia* Sm., DPPH: 1,1-diphenyl-2-picrylhydrazyl; H_2O_2: Hydrogen peroxide; MACO: Methanolic Aerial extract of *Colebrookea oppositifolia* Sm., MRCO:

Assessment of Free Radical Scavenging Activity of *Acorus Calamus* Linn. and Alpha-Asarone Using in Vitro Models

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Abstract: The present study aimed to evaluate the free radical scavenging activity of *Acorus calamus* Linn. and its major bioactive compound, alpha-asarone, using in vitro models. The plant extract and alpha-asarone were subjected to various antioxidant assays such as DPPH, H_2O_2, total phenolic content, and total flavonoid content assay to determine their scavenging activity against free radicals. The results of the study indicated that both A. calamus extract and alpha-asarone showed significant antioxidant activity in a concentration-dependent manner. The DPPH assay showed IC_{50} values of 48.89 ± 0.31 µg/mL and 55.91 ± 0.28 µg/mL for A. calamus extract and alpha-asarone, respectively. The H_2O_2 assay showed IC_{50} values of 46.29 ± 0.31 µg/mL and 56.02 ± 0.33 µg/mL for A. calamus extract and alpha-asarone, respectively.

In conclusion, the study provides scientific evidence for the potential use of A. calamus extract and alpha-asarone as natural antioxidants in the prevention and treatment of oxidative stress-related diseases. Further in vivo studies are required to validate these findings and assess their therapeutic potential.

QSAR, MOLECULAR DOCKING, AND ADME STUDIES OF BENZIMIDAZOLE DERIVATIVES AS ANTIBACTERIAL AGENTS

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ABSTRACT

In the field of medicinal chemistry, benzimidazole is a useful pharmacophore and shows a broad range of biological activities. Modern drug development commonly use the molecular docking technique for understanding drug-receptor interaction. Various computational techniques, including 2D QSAR, molecular docking, and ADME studies of benzimidazole derivatives against ***Escherichia Coli*** and ***Staphylococcus aureus,*** were used in this research study. Molecular descriptors used in 2D QSAR studies, include topological index Balaban (J), electronic parameters like Vamp Lumo & Kier's second order alpha shape index ($k\alpha^2$) against ***Escherichia Coli*** microorganism. The antibacterial activity of benzimidazole derivatives is governed by topological parameters like third-order molecular connectivity index ($^3\chi$) against ***Staphylococcus aureus*** microorganism. According to molecular docking studies, compounds **15, 2, 4, 7** and **24** have the best docking scores against the protein **Topoisomerase II (PDB ID: 1JIJ)** and compounds **14, 27, 2, 25** and **15** have the best docking scores against the protein **DNA Gyrase (PDB ID: 1KZN)**. The Lipinski rule of five was used to determine an excellent ADME profile based on QSAR, molecular docking data, and binding interaction analysis. According to the study, these compounds may be used as lead structures for more investigation of antimicrobial resistance.

Keywords: Benzimidazole, Antimicrobial activity, QSAR, Molecular Docking, ADME, DNA Gyrase & Topoisomease II

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Review article

Phytoimmunomodulators: A review of natural modulators for complex immune system

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ABSTRACT

In the past few decades, the medicinal properties of plants and their effects on the human immune system are being studied extensively. Plants are an incredible source of traditional medicines that help cure various diseases, including altered immune mechanisms and are economical and benign compared to allopathic medicines. Reported data in written documents such as Traditional Chinese medicine, Indian Ayurvedic medicine support the supplementation of botanicals for immune defense reactions in the body and can lead to safe and effective immunity responses. Additionally, some botanicals are well-identified as magical herbal remedies because they act upon the pathogen directly and help boost the immunity of the host. Chemical compounds, also known as phytochemicals, obtained from these botanicals looked promising due to their effects on the human immune system by modulating the lymphocytes which subsequently reduce the chances of getting infected. This paper summarises most documented phytochemicals and how they act on the immune system, their properties and possible mechanisms, screening conventions, formulation guidelines, comparison with synthetic immunity-enhancers, marketed immunity-boosting products, and immune-booster role in the ongoing ghastly corona virus wave. However, it focuses mainly on plant metabolites as immunomodulators. In addition, it also sheds light on the current advancements and future possibilities in this field. From this thorough study, it can be stated that the plant-based secondary metabolites contribute significantly to immunity building and could prove to be valuable medicaments for the design and development of novel immunomodulators even for a pandemic like COVID-19.

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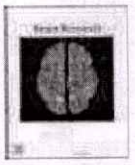

Antioxidative and neuroprotective potential of *Acorus calamus* linn. and *Cordia dichotoma* G. Forst. In Alzheimer's type dementia in rodent

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ABSTRACT

The goal of this research study was to see how plant extracts of *Acorus calamus* Linn. and *Cordia dichotoma* G. Forst. overcome scopolamine-induced Alzheimer's type dementia in mice by activating the cholinergic system, anti-oxidant and protection of neuronal death in the brain (hippocampus region). Scopolamine (1 mg/kg i.p.) reduced mice's routine in behavioral parameters such as Morris Water Maze (MWM), Elevated Plus Maze (EPM), and also the locomotor activity. It also decreases antioxidant levels such as Reduced glutathione (GSH) and also Superoxide dismutase (SOD) but also increases the level of Acetylcholinesterase enzyme (AChE) in brain. Assessment of various behavioral, and biochemical parameters (AChE, SOD, GSH, and Nitrite level) were compared with each group. *Acorus calamus* (hydro-alcoholic 1:1) 600 mg/kg p.o. and the combination (*Acorus calamus* 600 mg/kg p.o. + *Cordia dichotoma* 750 mg/kg p.o.) group showed significant results as compared to *Cordia dichotoma* 750 mg/kg p.o.in behavioral as well as in biochemical parameters. Histological studies showed significant neuroprotection in the *Acorus calamus*-treated group and the combination-treated groups. In the future, the *Acorus calamus* and the combination are possibly helpful in the treatment of various cognitive disorders or it may be valuable to investigate the pharmacological potential of such plant extracts during the treatment of neurodegenerative disorders.

1. Introduction

Dementia is a condition in which brain processes (memory loss and cognition) are impaired, affecting or interfering with people's capacity to operate daily. Dementia, in other terms, is a disease that impairs people's ability to do normal routine work such as at the household, or in other public interactions. Neurodegeneration is thought to be the major cause of dementia. The most familiar type of neurodegenerative dementia is Alzheimer's disease (AD), affecting first and foremost the elderly people (5 to 6 percent) of the respondents of those aged 65 and up, and approximately to 30percent of those aged 85 and up) (Hebert et al.,2013). Early-onset Alzheimer's disease is believed to account for around 5 % of all instances of the illness in those under the age of 65 (Mendez, 2017). AD is a complicated illness with a variety of fundamental causes. The reason, for the characteristics of the human brain, the lack of relevant experimental models, other investigate tools, and the whole pathology of Alzheimer's disease remains unknown. Numerous Alzheimer's hypotheses are discovered such as the cholinergic hypothesis, tau, and Amyloid (Aβ) hypothesis, oxidative stress hypothesis as well as the Hyperactivation of glial cells in the brain (Malik et al.,2022). Acetylcholine (ACh), a neuro-transmitter produced by cholinergic neurons, is significant for a variety of physiological processes including

Abbreviations: Aβ, Amyloid Beta; AC, *Acorus calamus*; ACh, Acetylcholine; AChE, Acetylcholinesterase; AD, Alzheimer's disease; CD, *Cordia dichotoma*; EPM, Elevated Plus Maze; GSH, Reduced Glutathione; ISM, Indian Systems of Medicines; MWM, Morris Water Maze; NFTs, Neurofibrillary Tangles; SOD, Superoxide dismutase; TCM, Traditional Chinese Medicine; TL, transfer Latency.

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Review

Exploring LIPIDs for their potential to improves bioavailability of lipophilic drugs candidates: A review

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ABSTRACT

This review aims to provide a thorough examination of the benefits, challenges, and advancements in utilizing lipids for more effective drug delivery, ultimately contributing to the development of innovative approaches in pharmaceutical science. Lipophilic drugs, characterized by low aqueous solubility, present a formidable challenge in achieving effective delivery and absorption within the human body. To address this issue, one promising approach involves harnessing the potential of lipids. Lipids, in their diverse forms, serve as carriers, leveraging their unique capacity to enhance solubility, stability, and absorption of these challenging drugs. By facilitating improved intestinal solubility and selective lymphatic absorption of porously permeable drugs, lipids offer an array of possibilities for drug delivery. This versatile characteristic not only bolsters the pharmacological efficacy of drugs with low bioavailability but also contributes to enhanced therapeutic performance, ultimately reducing the required dose size and associated costs. This comprehensive review delves into the strategic formulation

Abbreviations: LBF, Lipid based formulation; FA, Fatty Acid; BS, Bile Salt; IVIVC, In-vitro-In-vivo correlation; TGs, Triglycerides; TRL, TG's-rich lipoproteins; FDA, Food and Drug Administration; BCS, Biopharmaceutical Classification System; MGs, Monoglycerides; ER, Endoplasmic reticulum; FDA, Lipophilic drugs; SEDDS, Self-emulsifying Drug Delivery Systems; LCT, Long chain triglycerides; MCT, Medium chain triglycerides; SMEDDS, Self-Microemulsifying Drug Delivery Systems; CYP, cytochrome P450; CYP3A4, Cytochrome 450 3A4; FFA, Free fatty acids; CMC, Critical micelles concentration; LFCS, lipid formulation classification system; MLV, multilamellar vesicles; SUV, unilamellar vesicles; LUV, large unilamellar vesicles; SLN, Solid- Lipid Nanoparticles; P-gp, P-Glycoprotein; API, Active Pharmaceutical Ingredient; SI, Small Intestine; PUFA, Polyunsaturated Fatty Acid; HPMC, Hydroxy-Propyl Methyl Cellulose; HLB, Hydrophilic- Lipophilic Balance; SCF, Supercritical Fluid; DLS, Dynamic Light Scattering; EM, Electron Microscopy; SEM, Scanning Electron Microscopy; TEM, Transmission Electron Microscopy; AFM, Atomic Force Microscopy; ELS, Electrophoretic Light Scattering; HPLC, High-Performance Liquid Chromatography; DSC, Differential Scanning Calorimetry; XRD, X-ray Diffraction; NMR, Nuclear Magnetic Resonance; NLC, Nanostructured Lipid Carriers; ADME, Absorption, distribution, metabolism, and excretion; Cmax, maximum plasma concentration; Tmax, Time to reach maximum plasma concentration; AUC, area under the curve; t1/2, elimination half-life; PET, positron emission tomography; SPECT, single-photon emission computed tomography; USP, United States Pharmacopeia; NF, National Formulary; EP, European Pharmacopoeia; USFA, Unsaturated Fatty Acids; USA-NF, United States Pharmacopeia in combination with National Formulary; USA/FA, United States Pharmacopeia/National Formulary; FCC, Food chemical codex; JSFA, Journal of the Science of Food and Agriculture; JPED, Japanese Pharmaceutical Excipients Directory; IIG, Inactive Ingredient Guide; JCIC, Japanese Cosmetic Ingredients Codex; LBODDS, Lipid Based Oral Drug Delivery System; GI, Gastrointestinal; GIT, Gastrointestinal Tract; CL, Cholesterol; PL, Phosphotidylcholine.

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Review Article

Comprehensive Review on Synthesis, Applications, and Challenges of Graphene Quantum Dots (GQDs)

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Carbon-based nanomaterials are contemporary and are outpacing the technology platform. Graphene quantum dots (GQDs) had a significant impact on the subject of bioengineering, pharmaceuticals, biomedicine, biosensors, fuel, energy, etc. Depending on how quickly this field is developing, it is important to recognize the new difficulties that GQDs have to overcome. This is incredibly significant because many novel applications and innovations that have made GQD synthesis easier recently have not been systematically evaluated in prior studies. Their ability to combine the benefits of quantum dots, sp^2 carbon materials (large specific surface area), and have rich functional groups at the edge makes them special. The naturally occurring inert carbon helps to stabilize chemical and physical characteristics and makes significant advancements in the creation of benchmark photocatalysts. Moreover, current challenges and potential of these rapidly developing GQDs are emphasized. The future of GQD research is limitless, according to the assessment in this review, notably if future research focuses on simplicity of purification and ecofriendly synthesis. This feature article offers a realistic summary on recent developments in the synthesis, characteristics, and uses of GQDs. Frequent review articles focusing on the progress of GQDs for specific applications are published but a thorough review article on GQDs for their numerous uses has not yet been published. The recent trends of scientific research based on new optical biosensing applications, including the comprehensive applications of different zero-dimensional nanomaterials, specially GQDs are discussed in this study.

1. Introduction

Fullerene, carbon nanofiber, diamond, grapheme, carbon nanotubes, and GO are all carbon nanomaterials that have been thoroughly investigated for a variety of potential applications [1–3]. Nanotechnology is the focus of contemporary scientific and technical research, and it promises to revolutionize industries such as transportation, medicine, environment, information technology, electronics, and solar energy. Nanotechnology's outstanding skills in shaping materials structures at extremely small sizes to achieve the desired qualities, allow us to realize the true promise of this

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Review Article

Nanoemulsion: An Emerging Novel Technology for Improving the Bioavailability of Drugs

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The pharmaceutical sector has made considerable strides recently, emphasizing improving drug delivery methods to increase the bioavailability of various drugs. When used as a medication delivery method, nanoemulsions have multiple benefits. Their small droplet size, which is generally between 20 and 200 nanometers, creates a significant interfacial area for drug dissolution, improving the solubility and bioavailability of drugs that are weakly water-soluble. Additionally, nanoemulsions are a flexible platform for drug administration across various therapeutic areas since they can encapsulate hydrophilic and hydrophobic medicines. Nanoemulsion can be formulated in multiple dosage forms, for example, gels, creams, foams, aerosols, and sprays by using low-cost standard operative processes and also be taken orally, topically, topically, intravenously, intrapulmonary, intranasally, and intraocularly. The article explores nanoemulsion formulation and production methods, emphasizing the role of surfactants and cosurfactants in creating stable formulations. In order to customize nanoemulsions to particular medication delivery requirements, the choice of components and production techniques is crucial in assuring the stability and efficacy of the finished product. Nanoemulsions are a cutting-edge technology with a lot of potential for improving medication bioavailability in a variety of therapeutic contexts. They are a useful tool in the creation of innovative pharmaceutical formulations due to their capacity to enhance drug solubility, stability, and delivery. Nanoemulsions are positioned to play a crucial role in boosting medication delivery and enhancing patient outcomes as this field of study continues to advance.

1. Introduction

Nanoemulsions, also known as nanometric-sized emulsions, are fine water-in-oil (w/o) and oil-in-water (o/w) dispersions of two immiscible fluids, as opposed to the milky-white hue concomitant with coarse dispersion. These 20–200 nm droplets are stabilized by adding the appropriate amphiphilic emulsifiers or emulsifiers. Consequently, nanoemulsions are also known as mini-emulsions. Due to kinetic stability, nanoemulsions (NE) are stable on heterogeneous systems, in contrast to microemulsions (ME). Although nanoemulsions are unique due to their extended physical constancy and are also known as "potential thermodynamic stability," they do not appear to aggregate or flocculate. The history of nanoemulsions can be traced back to the early 20th century when researchers first began

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Phenolic Acids - Versatile Natural Moiety with Numerous Biological Applications

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Abstract

Background: Medicinal uses of natural phenolic acids and their synthetic derivatives have been augmented in recent years. Phenolic acids are chemically defined secondary plant metabolites and being moieties or leads are much versatile in nature with a wide scope of biological activities which seek the attention of researchers across the world to synthesize different derivatives of phenolic acids and screen them for their various biological properties. These compounds are of meticulous interest due to the properties they possess and their occurrence. Based on the convincing evidence reported in the literature, it is suggested that phenolic acids and their derivatives are promising molecules as a drug.

Objectives: The present review article aims to bring together the information on the biosynthesis, metabolism, and sources of phenolic acids and emphasize the therapeutic potential of phenolic acid and its synthetic derivatives to comprehensively portray the current scenery for researchers interested in designing drugs for furthering this study.

Conclusion: Phenolic acids being moieties or lead, are much versatile in nature as they possess a wide range of biological activities like antimicrobial, antioxidant, antiviral, antiulcer, antiinflammatory, antidiabetic, anticancer and many more offers researchers to explore more about these or many untapped benefits in the medicinal field. The information mentioned in this article will be helpful to the forthcoming researchers working in this area. Phenolic acids have massive potential to be investigated for novel medicinal possibilities and for the development of new chemical moieties to treat different diseases of clinical importance.

Keywords: Anticancer; Antidiabetic; Antimicrobial; Phenolic acids; Plant metabolites; Therapeutic applications.

NANOVESICLES AS EFFECTIVE CARRIERS FOR TRANSDERMAL GRANISETRON DELIVERY: A COMPREHENSIVE REVIEW"

Sharda Sambhakar[1], Sushila Rathee[2], Preeti[3], and Geeta[4*]

Abstract

Granisetron, a drug commonly used to prevent chemotherapy-induced nausea and vomiting, is difficult to administer due to its low oral bioavailability and potential side effects. Transdermal drug delivery offers a promising alternative to overcome these limitations. Liposomes, spherical lipid vesicles capable of encapsulating both hydrophilic and lipophilic drugs, have proven to be efficient vectors for transdermal delivery. This comprehensive review focuses on potential liposomes as vehicles for the transdermal delivery of Granisetron. Various liposome formulation techniques such as hydration and thin film sonication and their impact on the size, efficiency, and stability of liposome encapsulation are discussed. In addition, strategies to improve penetration will be explored, including the use of chemical and physical methods to improve skin penetration. In vitro and in vivo evaluations of liposomal Granisetron administration, including drug release kinetics, skin penetration studies, and therapeutic efficacy are summarized. In addition, the safety and biocompatibility aspects of liposomes as well as strategies to minimize potential toxicity and skin irritation are discussed. In addition, a comparison with other delivery systems such as oral tablets and intravenous infusion was performed to highlight the advantages and limitations of transdermal liposomal delivery. Future prospects and challenges associated with the administration of liposomal Granisetron are discussed, including the search for new lipid formulations and the need for clinical trials to demonstrate efficacy and safety. Overall, liposomes are proving to be effective vehicles for the transdermal delivery of Granisetron, offering improved bioavailability, fewer side effects, and better patient compliance.

Keywords: Liposomes, Transdermal delivery, Granisetron, Drug delivery systems, Chemotherapy-induced nausea and vomiting

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Nisoldipine, Antihypertensive Drug with Solubility Enhancement: Formulation and Evaluation

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Abstract

A nanoemulsion is a thermodynamically or kinetically stable liquid dispersion made up of two immiscible liquid phases, such as an oil phase and a water phase. The use of a Poly-decalactone Polymer offers a potential strategy to improve this limitation because the technological approach for hydrophilic medium polar drugs is less effective. The formulation that had been optimized using the formulation variables was then further optimized using the process variable. Particle size decreased with changes in stirring time and speed. The optimized formulations have a particle size between 583-615 nm; PDI of0.657±1.8, 0.552±1.05, and 0.734±1.51were selected for loading of the drug for final formulations. The particle size and shape of nanoemulsions were not changed after drug encapsulation. the values of NNE1, NNE2, NNE3, and NNE5 formulation were found to be 6.3±0.04, 7.4±0.08, 6.7±0.06, and 7.0±0.09 units only. In all cases, pH showed the smallest changes. The pH value of the optimized nanoemulsion formulation NNE3 was found to be 6.6±0.06. demonstrating its suitability for oral administration. Drug entrapment efficiencies of different formulations i.e. NNE1, NNE2, NNE3, NNE4, and NNE5 were found to be 71.33±1.62%, 82.4±0.24%, 99.95±1.35%, 90.12±0.34%, and 79.03that showed to affect the encapsulation of drug. Stability studies were carried out at 4^0C and 25^0C.

Keywords: Nisoldipine, Solubility Enhancement, Bioavailability Enhancement, Tween-80

INTRODUCTION

NANOEMULSION

A nanoemulsion is a liquid dispersion comprising two immiscible liquid phases, such as an oil phase and a water phase, The Kelvin effect is responsible for Ostwald ripening,

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Formulation, Development, and Characterization of Tadalafil Ethosomes for Transdermal Delivery: In Vitro Evaluation of Ethosomes Pharmaceutical Potentia

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Abstract:
The present research purpose was to develop ethosomes for transdermal delivery of Tadalafil, a recently approved phosphodiesterase-5 (PDE5) inhibitor, indicated for the treatment of erectile dysfunction by using various concentrations of phospholipids and ethanol. FT-IR studies confirmed that there was no chemical interaction between drug and excipients used in the formulation. The prepared formulations were evaluated for their vesicle size, shape, surface morphology, entrapment efficiency and in vitro drug permeation study. The ethosomes were spherical and discrete in shape. The size of vesicle was found to be in the range and sensible for skin penetration. Ethosomes of average size of 148.3 µm with a spherical shape bearing smooth surface were observed by transmission electron microscopy and surface electron microscopy. The maximum entrapment of ethosomes was found to be 72.37±0.55. The ethosomes showed highest entrapment efficiency and rapidly penetrate through the skin because of tiny vesicular size. The % Cumulative amount of drug permeated through the biological membrane was found to be in the range of 0.24±0.05to 0.45±0.09 mg/cm2. The highest drug release leads to the increase in the bioavailability which indicates that the ethosomes are advanced nanoparticles. The stability study carried out for the period of 45 days showed negligible changes at room temperature. The result of in vitro release and characterization studies revealed that Tadalafil ethosomal formulation can deliver the drug more efficiently than conventional dosage form with no first pass metabolism and for a prolonged period of time.

Keywords: Transdermal, Ethosomes, Phospholipids, Ethanol, Stability, Particle size

Introduction

Tadalafil is a recently approved phosphodiesterase-5 (PDE5) inhibitor, indicated for the treatment of erectile dysfunction. In comparison to other PDE5 inhibitor, it is the most potent and at least 9000 times more selective than other PDE5 inhibitor [1].Compared with sildenafil and vardenafil, tadalafil is much less inhibitory for PDE6, consequently, tadalafil has less than 0.1% occurrence of vision abnormalities .Due to its therapeutic window of 36 hours and minimum potential to cause vision abnormalities, tadalafil has gained wide clinical acceptance for the treatment of erectile dysfunction even in difficult-to-treat cases [2].However, tadalafil with low-solubility and high-permeability is classified as Class II drug, which leads to its poor dissolution in the gastrointestinal tract, resulting in variable bioavailability .It has the slowest absorption of the available PDE5 inhibitors with a mean of 2 hours to reach its maximum concentration, compared with about 50 min for

An Overview of Recent Advances on Transungual Drug Delivery System: An Optimistic Way to Treat Nail Disease, Assorted Hindrance and Assorted Progresses

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Abstract

The goal of this review is to look into the challenges of drug permeability over the nail plate and how to improve antifungal drug bioavailability. Because of its limited effects and increased adherence, transungual treatment is considered particularly desirable for the treatment of nail problems. As a result, there are less unfavourable systemic effects. Despite this, topical application's efficacy is limited due to reduced medication penetration across the nail plate. Topical application is limited to mild diseases such as onychatrophia, onychomycosis, leuconychia, and onychogrypos because nail permeability is low. Onychomycosis, a disorder that mostly affects the nails, is best treated with a combination of systemic and topical medication. As a result, drug entry into the nail entity, toward the nail plate, is very desirable for treating nail problems. Drug molecules should be small and non-ionic in order to get the best transungual penetration and drug uptake. The internal structure of a human nail, diseases associated with the nail plate, changing the nail plate barriers using chemical methods, permeation enhancers, and physical and mechanical processes used to increase the topical bioavailability of drugs are all covered in existing reviews on nail permeation. To improve transungual penetration, complicated procedures such as photodynamic treatment, Iontophoresis, and ultra sound have been used. This review includes a brief discussion of nail problems, alternative procedures, and transungual medication administration evaluation. The limitations of transungual drug permeability investigations, along with current topical therapies, are also reviewed.

Keywords: Onychomycosis, Nail plate, Leuconychia, Bioavailability, Antifungal, Nail barrier.