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RESEARCH ARTICLE

Development and Evaluation of Taste Masked Azithromycin by Crystal Engineering

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ABSTRACT

Purpose: Cocrystallisation is a promising technique for altering important physicochemical properties of drugs such as solubility and dissolution. The present study thus aims to utilize this technique to improve the drug solubility and study its effect on taste masking.

Method: Azithromycin co-crystals were formulated by solvent evaporation technique utilizing a synthetic sweetener neotame as the coformer. The study of microscopic characters characterized the formulated co-crystals, Fourier transforms infrared spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), Scanning electron microscopy (SEM), and Xray diffraction studies (XRD). Other evaluation parameters included taste evaluation, drug content determination, solubility, angle of repose, Carr's index, Hausner's ratio, and dissolution studies.

Results: The study revealed that the prepared co-crystals showed a marked improvement in taste and physicochemical properties. Co-crystals prepared in the ratio of 1:1 of drug and neotame displayed a nearly two-fold increase in solubility, improvement in flow properties, and a tremendous improvement in the taste as compared to the pure drug.

Conclusion: Thus, co-crystallization can be effectively used for solubility improvement and taste masking of poorly soluble bitter drugs such as azithromycin.

Keywords: Azithromycin, Bitter taste, Co-crystals, Neotame, Taste masking.

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INTRODUCTION

Drug administration by the oral route is the most popular due to the ease of self-administration, manufacturing, and good stability on storage compared to the other dosage forms. However, a major drawback of the oral dosage form is the difficulty in swallowing and bitter taste, leading to a severe pediatric and geriatric patient in compliance. Taste arises from the stimulation of taste buds present on the surface of the tongue.[1,2] Taste masking is necessary for an active ingredient with an unpleasant taste for increased patient compliance.

Taste masking has been done by various techniques like adding flavoring and sweetening agent,[3] ion-exchange resin complex,[4] micro-encapsulation,[5] prodrug approach,[6] inclusion complexation,[7] granulation, multiple emulsion technique, gel formation. However, very little work has been done using co-crystallization as a method of taste masking. This method not only improves the bitter taste but also improves the physicochemical properties of the drug.[8] Co-crystals are coordination types of molecular complexes involving noncovalent interaction between the drug and coformer and their complementary functional groups.[9] Thus, it involves drug and coformer that self-assemble by noncovalent interactions such as electrostatic interactions and hydrogen bonding in a well-defined stoichiometry. Such a development of co-crystal of an API leads to improved properties such as stability, solubility, drug release rate and taste.[10-12]

Azithromycin, with an IUPAC name 9-deoxo-9a-aza-9a-methyl-9a-homoerythromycin, belongs to the *azalide* subclass of macrolides. It consists of a 15-membered ring, and methyl-substituted nitrogen at the 9a position on the aglycone ring, which is responsible for preventing its metabolism. Such a type of structure makes azithromycin different from other types of macrolides azithromycin is a broad-spectrum macrolide antibiotic having a long half-life and a high degree of tissue penetration.[13]

Azithromycin is structurally related to erythromycin[14] and is commonly used for the treatment of infections of the respiratory and genitourinary tract as well as for enteric infections and may be used for sexually transmitted infections. It is a BCS Class II drug with an extremely bitter taste and a poor water solubility. Therefore the present work was aimed at using the co crystallisation technique of crystal engineering for the purpose of masking the bitter taste of the drug.

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CURRENT UPDATED REVIEW ON PRONIOSOMES AS A NOVEL APPROACH FOR DRUG DELIVERY

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ABSTRACT

Proniosomes are one of the novel provesicular drug delivery systems which are dry formulations coated with carrier such as non-iconic surfactants. Proniosomes are formulated in such a manner that they can overcome the drawbacks of niosomes such as physical instabilities, fusion and aggregation. Proniosomes can be administered by various routes like oral, intravenous, buccal, topical, transdermal, ocular etc. Proniosomes are liquid crystalline compact niosome hybrids which upon hydration form niosomes. They help in reducing physical stability problems involved with niosomes such as leaking, fusion, aggregation and provide convenience in dosing, distribution, transportation and storage showing improved results than conventional niosomes.

KEYWORD: Proniosomes, provesicular drug delivery systems, niosomes, intravenous, buccal, topical, transdermal, ocular.

INTRODUCTION

Proniosomes are dry formulation of water-soluble carrier particles that are coated with surfactant. They are rehydrated to form niosomal dispersion immediately before agitation in hot aqueous media within minutes. The fundamental object of development controlled and targeted release dosage form is that improve the therapeutic effect of drug improve drug safety margin of high potency drugs by the increases plasma concentration, and also decrease side effects.[1] Main object of Novel vesicular drug delivery system is that drug rate work on need of body throughout the period of treatment and controlled and targeted effect on the site of action, drug is encapsulated in to vesicles that manner prolonged drug action.[2]

Various type of carriers are utilized to carry drugs at the target site in the body part like tissue organ which include, Niosomes, proniosomes, liposomes, microsphere, electrosomes, phytosomes etc.[3] Vesicular drug delivery like a colloidal particle in which amphiphilic molecule made a concentric bilayer covered by aqueous compartment. The amphiphilic molecules like surfactants (non-ionic), phospholipid (phosphatidylcholine, phosphatidylserine etc.,) is adding combination or separately with cholesterol.[4] Proniosomes evaded the problems associated with niosomes like fusion, aggregation, physical stability, sedimentation, aggregation leakage of drug. Proniosomes are dry free- flowing formulation of surfactants- coated carrier, which can be rehydrated by brief agitation is hot water to form multillamellar niosomes.[5]

Proniosomes can deliver both the hydrophilic and hydrophobic drug. Proniosomes can be converted into niosomes upon hydrating with hot water right before the use. As niosomes are associated with various drawbacks such as physical instabilities like fusion, aggregation of particles and leakage of the drug these are formulated into proniosomes. The principle advantage of proniosomes is that the amount of carrier required for maintaining the surfactant ratio can be easily adjusted. Proniosomal gels are the very recent provesicular drug delivery systems which offer the drug delivery through topical or transdermal route in a versatile manner. Proniosomal gels are becoming more popular because of a wide range of applications and better percutaneous absorption compared to other semi solid preparations.[6] Niosomes have received great attention as an alternative potential drug delivery system to conventional liposomes. Niosomes are uni or multilamellar spheroid structures composed of amphiphilic molecules assembled into bi-layers. They are considered primitive cell models, cell like bioreactors and matrices for bio-encapsulation. They are alternative to liposomes as they possess greater stability and overcome the problems associated with liposomes like chemical instability, variable purity of phospholipids and high cost.[7] The additional merits with niosomes are low toxicity due to nonionic nature, no requirement of special precautions and conditions for formulation and preparation.[8] Niosomes are non-organic surfactant vesicles that can entrap a solute in a manner analogous to liposomes. They are osmotically active, and are stable on their own, while also increasing the stability of the entrapped drugs. The size of niosomes

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CURRENT UPDATES AND REVIEW: SYNERGISM BETWEEN ESSENTIAL OIL WITH ANTIBIOTICS FOR MANAGEMENT OF SKIN CONDITION

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ABSTRACT

With the increase of antibiotic-resistant microorganism and the lack of recent antibiotics being delivered onto the marketplace, alternative strategies want to be observed to address infections as a consequence of drug-resistant bacteria. A feasible solution may be to combine current antibiotics with essential oil to increase the efficacy of antibiotics. A group of phytochemicals this is said to have such consequences, according to in vitro research, is important oils (EOs) and their additives. Amongst others, EOs containing phytochemical they show a synergistic effect in aggregate with antibiotics. Several modes of action were recommended by which antibiotics and the essential oil additives may additionally act synergistically, such as through affecting a multiple target; through physicochemical interactions and inhibiting antibacterial-resistance mechanisms. Many pronounced assays display additivity or moderate synergism, indicating that EOs may also provide opportunities for minimizing antibiotic use for management of skin condition.

KEYWORDS: Synergism, resistance, antibiotics, infection, microorganism.

INTRODUCTION

Infectious diseases are the leading purpose of dying global; this has turn out to be a worldwide difficulty. The extensive use of antibiotics within the treatment of bacterial infections has led to the emergence and spread of resistant lines; even very low concentrations of antibiotics released into the environment can enrich the population of resistant strains.[1] There is an urgent and vital need to develop novel therapeutics, new practices, and antimicrobial strategies for the treatment of infectious diseases due to multidrug-resistant microorganisms. This has intensified the search for novel healing leads towards fungal, parasitic, bacterial, and viral infections. The discovery of latest antibacterial compounds as suitable substitutes for conventional antibiotics might to be a possible solution to this problem.[2] For many years, a various chemical and synthetic compounds have been used as antimicrobial agents in food to lessen the incidence of meals poisoning and spoiling, and to control the boom of pathogenic microorganisms. However, the full-size indiscriminate use of chemical preservatives has brought about many ecologic and clinical issues, such as allergic reaction, hypersensitivity, and immune suppression[3] which make it vital to look for techniques which can be accessible, easy to use, and secure.[4] There are main modes of drug discovery: the first is through using chemical synthesis for pharmaceutical purposes and the second one is the use herbal products as a basis for drug discovery.[5] The improvement of bacterial resistance to many current antibiotics has severe outcomes, as shown in Figure1. Antibiotics are designed to kill microorganisms, which then adapt to antibiotics, making them less powerful and resulting in antibiotic resistance through some of mechanisms of specific activity because they're notably secure, increase the shelf existence of meals, are broadly frequent via consumers, and have the potential to be exploited for multiple uses.[6]

ANTIBIOTICS AND ITS RESISTANCE

Multidrug-resistant (MDR) microorganism have end up greater widespread in recent times because of the inappropriate and irrational use of antibiotics, which presents favourable situations for the selection of antibiotic-resistant mutants.[7] Resistance towards all classes of antibiotics has been defined, which leads to a steady need for the development and production of new pills. However, problems inside the identity of new materials with each high effectiveness and low toxicity have led to only some new antibiotic classes being discovered because the 1970s.[8] MDR microorganism have become abundant, especially in nosocomial infections. Many medical institution infections are now resulting from methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin resistant *enterococci* (VRE), *Escherichia coli* and *Pseudomonas aeruginosa* proof against fluoroquinolones; *Klebsiella pneumoniae* proof against ceftazidime; MDR *Acinetobacter baumannii*; and different MDR microorganism. The medical results of infections due to MDR bacteria are deteriorating, as a result of the reduced treatment options.[9] A high incidence of nosocomial infections due

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Original Research Article

Formulation and evaluation of herbal gel for management of mouth ulcers

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ABSTRACT

Background: *Aphthous stomatitis* or mouth ulcers is the most common condition that we encounter. Clinically the lesions are single or multiple superficial and deep sealed and are associated with microbial invasions.

Aim: This study was conducted with the aim of evaluating the effectiveness of herbal drugs for treatment of *Aphthous stomatitis.*

Materials and Methods: In the research work, mouth ulcer gels were formulated incorporating the *ethanolic* extracts of as *Aloe barbedensis, Ocimum tenuiflorum* and *Azadirachta indica* using *carbopol* 934 as the gelling agent. Seven batches were formulated by varying the concentration of the herbal ingredients (F1 to F7)The prepared formulations were evaluated for various parameters like physical appearance, pH, *Spreadability,* Homogeneity and antimicrobial activity against fungi and bacteria. The antimicrobial activity was also compared with a marketed gel formulation.

Results and Discussion: All the prepared formulation using different concentration of plant extract showed the pH values in between 6.1±0.2 to 7.0±0.1. The *spreadability* values ranged between the 5.0 to 8.0 cm. Out of all the formulations, formulation F7 containing all the three herbal extracts showed a good *spreadability* and very promising antimicrobial activity comparable with a marketed gel.

Conclusion: Thus stable, effective gels containing herbal ingredients for management of mouth ulcers can be developed.

1. Introduction

Apthous stomatitis or mouth ulcer is an ulcerative condition that is related to the oral mucosa and is characterised by repeating ulcers in the throat and oral cavity.[1] Mouth ulcers are usually generated by a number of causes, such as biting the inner layer of cheek, food allergies, hard teeth brushing, hormonal changes, vitamin deficiencies, bacterial infection and diseases.[2] Treatment of mouth ulcers may include soothing/ antiseptic mouthwashes, such as *chlorhexidine* mouthwash or *povidone* iodine mouthwash or use of antibiotic or *anaesthetic* gel formulations[3] Semi-solid formulations include gel having a liquid phase which are then thickened by other components. Topical gels are intended for the application on skin or to certain *mucosal* surfaces for local action or *percutaneous* penetration of medicament preparations.[4] A large number of Indian medicinal plants are attributed with various pharmacological activities as they contain diversified classes of phytochemicals. As the conventional synthetic drugs suffer from a numerous side effects, these herbal ingredients provide a good alternative.[5]

Leaves of *Aloe barbedensis* commonly called as aloe vera, belonging to family Asphodelaceae, are very commonly used in skin care products. They are rich in phytoconstituents such as aminoacids, anthraquinones,

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Abstract

REVIEW: A THERAPEUTIC APPLICATIONS OF MICROSPONGE DRUG DELIVERY SYSTEM

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Abstract

More and more developments are being employed in the drug delivery systems to optimize its efficacy and cost-effectiveness of drug therapy. Peptides, proteins and DNA-based therapeutics can not be effectively delivered through conventional means. AMicrosponges drug delivery system is a highly cross-linked, porous, polymeric system consisting of porous microspheres that can entrap and release them into the skin layers over a long period of time. Microsponges drug delivery system provides extended release with reduced irritation, improved thermal, physical and chemical stability. Microsponges drug delivery technology is used currently in cosmetics, skin care products, sunscreens and prescription products. One of the best feature of microsponge delivery system is it is self-sterilizing. Current review is focused on the method of preparation, characterization and various therapeutic applications of microsponges.

Keywords: Drug delivery System, Therapeutic Applications, Microsponges, quasiemulsion diffusion solvent method, suspension polymerization, controlled release system.

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TOICAL DRUG DELIVERY SYSTEM: FORMULATION AND EVALUATION OF CREAM

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ABSTRACT

Creams are considered an important part of cosmetic product as topical preparations from time immemorial due to their ease of application to the skin and also their removal. From cosmetic purposes, Pharmaceutical creams have a variety of applications such as cleansing, beautifying, altering appearance, moisturizing etc. to skin protection against bacterial, fungal infections as well as healing cuts, burns, wounds on the skin. These semi solid preparations are safe to use by the public and society. cream with suitable methods of preparation of creams, their classification based on their function, their advantages and disadvantages, characteristics and the various types of creams, ingredients used in the formulation of creams and their various evaluation parameters.

KEYWORDS: Skin, Topical drug delivery, Cream, Types of cream, Evaluation.

1. INTRODUCTION

The appearance and function of the skin are maintained by an important balance between the water content of the stratum corneum and skin surface lipids.[1-2] The skin represents the most superficial layer of the body, and so it is constantly exposed to different environmental stimuli.[3] Exposure to external factors as well as endogenous factors may disrupt this balance.[4-6] In addition, frequent use of soaps, detergents and topical irritants such as alcohol and hot water can remove the skin surface lipids.[7] Disruption of skin barrier led to the various type of skin problems most common condition is a loss of water content which leads to dryness of skin such as roughness, scaling, cracks, redness and an uncomfortable feeling of tightness, sometimes with itching and stinging.[8] Treatment with moisturizer aims at

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A COMPREHENSIVE REVIEW ON EMULGEL: MODERN APPROACH FOR TOPICAL DRUG DELIVERY

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ABSTRACT

Considering NDDS (Novel Drug Delivery System), Emulgel is one of the recent technology used topically having characteristics of dual control release i.e. emulsion as well as gel. When gels and emulsions are used in combined form the dosage form are known as emulgel. Limitation of gels in the delivery of hydrophobic drugs through the skin. Overcome this limitation an emulsion based approach is being used so that even a hydrophobic therapeutic moiety can exhibit the unique properties of gels. Emulgel is prepared by different polymers which act as an emulsifying agent and thickening agent because the gelling capacity of these polymers give rise to stable emulsions by decreasing interfacial and surface tension while at the same time increasing the viscosity of the aqueous phase. Emulgel are having major advantages on novel vesicular systems as well as on conventional systems considering various aspects. The emulgel provide several favourable properties for its dermatological use such as greaseless, thixotropic, easily spreadable, emollient, easily removable, non-staining, water soluble, longer shelf life, transparent, bio-friendly and pleasing appearance.

KEYWORDS: Emulgel, Emulsion based gel, Hydrophobic drugs, Topical drug delivery system.

INTRODUCTION

Topical formulations are prepared in different consistency such as solid, semisolid, and liquid. The topical delivery system is failed in the administration of hydrophobic drug. In each formulation with the active ingredients many excipients are used. Sometimes more than

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Review Article

CURRENT UPDATES ON HERBAL OIL VS SYNTHETIC ANTIBIOTICS USE FOR TOPICAL APPLICATION

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ABSTRACT

Topical skin infections represent some of the most common infectious sicknesses globally. Prevention and treatment of skin infections can involve utility of a topical antimicrobial, which may be an herbal oil and synthetic antibiotic drug. However, there's restricted evidence to aid the widespread prophylactic or healing use of topical agents. Challenges concerned inside the use of topical antimicrobials encompass growing costs of bacterial resistance, local allergy reactions. We evaluate the proof for the foremost scientific makes use of herbal oil and topical synthetic antibiotics. Herbal oils are traditional herbal treatments used to deal with several situations. 5% of plant oils used for dermatological usages, pores and skin moisturizing and skin care. The benefits of this sort of therapeutics encompass properly availability, local cultural elements and individual choices. the growing demand for herbal and organic merchandise, and the already established synergistic consequences of natural oil. Synthetic antibiotics are beneficial for topical administration to treating topical skin condition rather than the oral administration because of minimising the side effect of oral administration. Nowadays topical antibiotics is widely accepted effective and safe treatment for bacterial infection. In this review article comparison of the herbal oil Vs synthetic antibiotic drug for topical use.

Keywords: Herbal Oil, Antibiotics, Synthetic, Antibacterial, Topical, Resistance

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INTRODUCTION

The skin is the body's largest mechanical barrier against the external environment and invasion by microorganisms. It is responsible for numerous functions such as heat regulation and protecting the underlying organs and tissue.[1] The uppermost epidermal layer is covered by a protective keratinous tissue which lets in for the removal of microorganisms through sloughing off of keratinocytes and acidic sebaceous secretions. This produces adversarial surroundings for microorganisms.[2] In addition to those defences, the pores and skin additionally includes herbal microflora which offers extra protection via inhibiting pathogenic bacterial growth by competing for nutrients and attachment sites for producing metabolic products that inhibit microbial growth.[3] The pores and skin's natural microflora consists of species of Corinne bacterium, staphylococci, streptococci and Candida as well as Propionibacterium.[4] Topical skin infections generally require topical treatment; however, because of the potential of microbes to evolve and because of the overuse and incorrect prescribing of the modern available conventional antimicrobials, there was emergence of resistance in not unusual pores and skin pathogens which include Staphylococcus aureus ensuing as methicillin-resistant Staphylococcus aureus (MRSA) and other such traces. Treatment has therefore emerged as a mission and is often no longer a success.[5,6] In a few areas of the sector, infections are unresponsive to all recognized antibiotics.[7] This risk has end up so severe that simple ulcers now require treatment with systemic antibiotics.[8] A simple reduce at the finger or easy removal of an appendix should bring about loss of life via contamination. The World Health Organization (WHO) has warned that commonplace infections can be left without a therapy as we're headed for a future without antibiotics.[9] Therefore, one of the answers available is to make use of one of the oldest sorts of remedy, herbal merchandise, to deal with pores and skin infections and wounds.[10]

HERBAL OIL

Oils are one of the most ancient forms of natural herbal medicines.[11] Since the start of civilization, herbal, animal and mineral medicaments were used to deal with

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Review article

Relationship between coronavirus and mucormycosis disease

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ABSTRACT

As the human-to-human communicated infection, Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2), has been a crisis worldwide general wellbeing event. Mucormycosis is a genuine, irregular however cosmopolitan, uncommon artful contagious contamination brought about by a gathering of molds called mucormycetes. These molds live throughout all the climate. It most normally influences the sinuses or the lungs in the wake of breathing in parasitic spores from the air. Mucormycosis is an uncommon disease, which when recognized early can be controlled. The connection among Coronavirus and mucormycosis of the paranasal sinuses should be given genuine thought. Uncontrolled diabetes and over-ardent utilization of steroids are two primary variables irritating the ailment, and both of these should be appropriately checked.

Keywords: Covid-19, Mucormycosis, Fungal infection, Corticosteroids, Diabetes mellitus

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INTRODUCTION

COVID-19

Coronavirus disease 2019 (Covid-19) is a contamination brought about by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2)[1,2]. Since the main case was recognized, in December 2019 in Wuhan, China, there have been different turns and contorts as far as its pathophysiology, conclusion, the board, sequelae and complications[3-6].The Covid-19 manifestation range has extended since the primary days of the illness show, which at first included just a dry hack and high evaluation fever, to moreover incorporate different multisystem issues like breathlessness, anosmia, ageusia, looseness of the bowels, summed up discomfort, intense cardiovascular injury and optional contaminations and a few patients were seen with asymptomatic side effects. Early recognition of these high-morbidity conditions is urgent for ideal treatment and improved outcomes [7-9].

Covid-19 virus are positive-sense, single-stranded RNA infections having an area with the order Nidovirales, suborder Cornidovirineae, family Coronaviridae and subfamily Orthocoronavirinae [10,1]. The subfamily Orthocoronavirinae is additionally separated into Alpha-, Beta-, Gamma and Delta-Coronavirus [11]. Alpha-and Beta-Coronavirus are pathogenic to well evolved creatures, including individuals, bats, pigs, mice, and felines. Gamma-and Delta-Coronavirus are typically pathogenic to birds yet infrequently irresistible to mammals [12].

As of late, we have noticed another relationship among ENT and Covid, a more perilous and conceivably destructive one: that of intrusive parasitic sinusitis coming about because of mucormycosis.

Mucormycosis

Mucormycosis is an intrusive contagious contamination brought about by mold fungi of the genus Mucor, Rhizopus, Rhizomucor and Absidia, which are in the Mucorales order of the Zygomycetes class [13]. The most well-known sort is Rhizopus Oryzae and around 60% of mucormycosis cases in people; it is liable for 90% of the rhino cerebral form [14]. It is as often as possible found in conditions where the insusceptible framework is stifled like uncontrolled diabetes, haematological malignancy (acute leukemia), solid organ relocate, undeveloped cell transplant, neutropenia, deferoxamine treatment and corticosteroid treatment. It is infrequently seen in strong individuals [15,16].

The most well-known clinical infections are with rhinocerebral, followed by cutaneous, pulmonary, disseminated and gastrointestinal tract involvement [16]. The space of association can be influenced by the fundamental condition. While rhinocerebral association is seen in diabetic patients. Because the development of the organisms is invigorated by a high blood glucose focus, infection is uncommon in patients with all around controlled blood glucose levels [17]. It is a type of infection that can spread to the brain.

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Review Article

A review on synthetic study and biological activities of tetrahydrop derivatives

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ABSTRACT

The process of drug discovery involves the identification, synthesis, cha screening, assay and development of new chemical entities that are suitable for pharmaceutical use. 2-thioxo-1, 2, 3, 4-tetrahydropyrimidine (THPM) are compound & represents are markable pharmacological efficient moieties and a range of therapeutic properties. Synthetically they were synthesized using Mul reactions like Biginelli reaction or either microwave and conventional metho multiple benefits of the time consuming and get high yield. In this review, recent developments on THPMs and recently developed as antimicrobial, ant inflammatory, analgesic, antifungal, antibacterial, anti-tubercular, antil analgesic, anticonvulsant, antioxidant, etc. given a potent biological and pha activity.

Keywords: Drug discovery; 2-thioxo-1, 2, 3, 4-tetrahydropyrimidine; Bigin antioxidant activity; antihypertensive activity

INTRODUCTION

Pharmaceutical chemistry is the core branch of pharmacy education and research. It can be categorized as synthesis of new drug molecule, its analysis and pharmacological studies. The chemistry of heterocyclic compounds is important for the discovery of novel drug. The process of drug discovery involves the identification, synthesis, characterization, screening, assay and

suitable for medical and pharmaceu a result of remarkable pharmacolo of pyrimidine derivatives, intensiv been focused on anti-inflammato pyrimidine nucleus. The present re the synthesis & biological activity derivatives [2]. During the last two pyrimidine derivatives have been chemotherapeutic agents and hav clinical applications, which a

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CURRENT UPDATED REVIEW ON ROLE OF PHARMACIST IN COVID-19

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ABSTRACT

COVID-19 has become a major health problem causing severe acute respiratory illness in humans. It has spread rapidly around the globe since its first identification in Wuhan, China, in December 2019. The causative virus is called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and the WHO named the new epidemic disease Coronavirus Disease 2019 (COVID-19). Italy was the first western country facing an outbreak of COVID-19. The various factors integral to the understanding of pathophysiology and susceptibility, diagnostic challenges with RT-PCR assays, therapeutic controversies, intrauterine transmission, and maternal-fetal complications. As an essential service, community pharmacists have been enacting a key role in patient counseling and supply of essential medicines and protective equipment. Pharmacists are considered the most accessible primary care providers, so it is crucial for patients to know that pharmacists are there to support them throughout the pandemic. Pharmacists are medication experts providing patient care in a variety of settings including hospitals, clinics, community pharmacies, long-term care, physician offices, and national and public health, this included implementation of tele-health programs for comprehensive medication management. As ambulatory care clinical pharmacists continue to expand the services they provide in response to COVID-19. The COVID-19 pandemic impacts daily lives of families globally. Health extends into physical, social, emotional, spiritual, and psychological health. Interventions including mask-wearing and physical distancing are intended to prevent viral spread, but have unintended negative effects on mental health and child development and mental health and give practical interventions to foster resilience in youth and their families.

SYNTHESIS AND BIOLOGICAL EVALUATIONS OF SOME NOVEL MANNICH BASES OF BENZIMIDAZOLE AND THEIR DERIVATIVES

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ABSTRACT

The present research work was carried out with a series of Mannich bases of substituted benzimidazole and their derivatives were prepared by both conventional heating and microwave assisted techniques. Benzimidazole and their derivatives were prepared through condensation between *o*-phenylenediamine and six different substituted aliphatic acids in presence of hydrochloric acid, then the product undergone Mannich reaction in presence of formaldehyde, ethanol, primary amines and ethanol to obtained six different substituted Mannich bases of benzimidazole derivatives. All the synthesized compounds were subjected to TLC to find out the purity. The synthesized derivatives were characterized by spectroscopic data and were evaluated for antimicrobial activity and antioxidant activity by using Cup plate method and DPPH free radical scavenging assay respectively. The results of antimicrobial activity (*in-vitro*) revealed that the compounds (2a, 2b, 2c & 2f) possessed significant antimicrobial activity. Among the compound tested, the compound (2d) compound (2d) had shown the highest antibacterial & antifungal activity which was comparable to that of ciprofloxacin and fluconazole respectively. The substituent of amino group on benzimidazole ring contributed significantly towards amino acid. This study suggested that microwave assisted method can be appropriate for the synthesis of benzimidazole and their derivatives with better purity, yield and ecofriendly method.

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CURRENT SCENARIO IN ANTICANCER DRUG THERAPY

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Abstract:

Disease is presently the subsequent driving reason for death internationally and is relied upon to be answerable for around 9.6 million passings in 2018. With a remarkable comprehension of the atomic pathways that drive the turn of events and movement of human diseases, novel focused on treatments have become an energizing new improvement for hostile to malignancy medication. These focused on treatments, otherwise called biologic treatments, have become a significant methodology of clinical therapy, by acting to hinder the development of disease cells by explicitly focusing on atoms needed for cell development and tumorigenesis. Because of their particularity, these new treatments are required to have better adequacy and restricted unfriendly results when contrasted and other treatment choices, including hormonal and cytotoxic treatments. Various advancements are right now under assessment in clinical preliminaries or have been now brought into clinical practice. While nanomedicine is adding to the improvement of biocompatible materials both for demonstrative and remedial purposes, bioengineering of extracellular vesicles and cells got from patients has permitted planning impromptu frameworks and univocal focusing on methodologies. In this audit, we will give a top to bottom investigation of the most creative advances in essential and applied malignancy research.

Keywords: Cancer, tumorigenesis, vesicles, targeted therapy, immunotherapy, gene therapy, thermal ablation, radiomics, pathomics

Introduction:- Malignant growth is one of the primary driver of death around the world, and in the previous decade, many exploration considers have zeroed in on discovering new treatments to diminish the results brought about by customary treatments.

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Review Article

A review on current strategies and emerging treatments in management of silicosis: An ayurveda perspective

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ABSTRACT

Background: Silicosis is a possibly deadly, irreversible, fibrotic pneumonic sickness that may create resulting to the inward breath of a lot of silica dust over the long haul. As a rule, silicosis just creates resulting to significant word related presentations. The sickness has a long idleness period and may clinically present as an intense, quickened, or ongoing infection.
Main Body: In this audit the medicines that can lessen the aggravation and scarring in which are as nodular injuries in the upper projections of the lungs. The principle point of audit is to the likely home grown treatment for silicosis. This survey zeroed in on different medicines which incorporate natural plants, neutraceuticals, polyherbals, and herbominerals and furthermore cell based treatment for silicosis.
Conclusion : From that review we presume that the natural treatment which is utilized in treatment of silicosis is potential treatments which incorporate huge quantities of home grown plants, polyherbals, neutraceuticals and herbominerals likewise incorporate the new treatment for silicosis is the cell based treatment.

1. Introduction

Silicosis is a type of word related lung infections brought about by inward breath of glasslike silica. It is set apart by irritation and scarring as nodular injuries in the upper projections of the lungs. It is a kind of pneumoconiosis. Silicosis (especially the intense structure) is portrayed by windedness, hack, fever, and cyanosis (somewhat blue skin). It might regularly be misdiagnosed as aspiratory bowel purge (liquid in the lungs), pneumonia, or tuberculosis.[1] Silicosis brought about 102 passings in USA.[2]

Silicosis is a possibly lethal, irreversible, fibrotic pneumonic infection that may create resulting to the inward breath of a lot of silica dust over the long haul. The sickness has a long inertness period and may clinically present as an intense, quickened, or ongoing infection.

The pathophysiology of constant silicosis includes persistent aggravation emerging because of the gathering of different fiery go between and fibro genic variables. Affected by these variables, aspiratory silicoproteinosis (a rapidly fatal pneumoconiosis occurring several weeks to months after massive exposure to silica dust, characterized by the presence of proteinaceous fluid in the air spaces) creates as eosinophilic proteinaceous material aggregates in the pneumonic alveolar spaces. The pace of illness movement seems to rely on the pace of silica affidavit in the lungs, just as the aggregate sum of glasslike silica that is really held in the lung. At times, silicosis might be related with the attending improvement of different

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Amalgamation of Solid Dispersion and Melt Adsorption Technique: Improved *In Vitro* and *In Vivo* Performance of Ticagrelor Tablets

Mukesh Yadav, Jayant Sarolia, Bhavin Vyas, Manisha Lalan, Shubhada Mangrulkar & Pranav Shah

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Abstract

Ticagrelor (TG) suffers from low peroral bioabsorption (36%) due to P-gp efflux and poor solubility (10 μg/mL). TG solid dispersion adsorbates (TG-SDAs) were formulated using an amalgamation of solid dispersion and melt adsorption techniques which were simple, economic, scalable, and solvent-free. FTIR indicated no incompatibility between drug and excipients. DSC, XRD, and SEM suggested a reduction in TG crystallinity. Q_{30min} from TG-SUSP and TG-conventional tablets was only 2.30% and 6.59% respectively whereas TG-SDA-based tablets exhibited a significantly higher drug release of 86.47%. Caco-2 permeability studies showed 3.83-fold higher permeability of TG from TG-SDAs. TG-SDA-based tablets exhibited relative bioavailability of 748.53% and 153.43% compared to TG-SUSP and TG-conventional tablets respectively in rats. TG-SDA-based tablets were devoid of any cytotoxicity as indicated by MTT assay and

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Review Article

Bioentrepreneurship: A venture for commercializing biotechnological knowledge

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ABSTRACT

The term "biotechnology" is widely used and encompasses many different technologies. Consulting firms provide common definitions of modern biotechnology. The term "modern biotechnology" refers to all innovative methods, processes or products, including the use of living organisms or their cellular compartments, and the use of biochemistry, molecular biology, immunology, virology, microbiology, cell biology or environmental sciences and engineering. Biotechnology and entrepreneurship are intrinsically linked together, and are studied biotechnology at the regional, firm, and individual level of analysis The concept of "bioentrepreneurship", is described as a wealth created by applying the life sciences to a business environment. Bioentrepreneurs seek business value in the technologies they use to conduct biotechnology research. Some well-known bio startups are based on multiple companies. Biotechnology and entrepreneurship are essentially linked. In recent years, a large number of articles in the business literature have studied biotechnology at the level of analysis of regions, companies and individuals. This review article will encourage stakeholders to address the research space which have been recognized and will help more progress in this captivating area of interest in the field of biotechnology and entrepreneurship.

1. Introduction

In the current years, entire world is in the surge of innovation. Everyday new ideas lead to the development and reformation of any material which can be natural or synthetic. Biotechnology is one of those areas where wave of new ideas brought several products of agricultural, environmental, medical and pharmaceutical applications.

2. Definitions and Concepts

2.1. Biotechnology

The term "Biotechnology" was first used by "Karl Ereky" in 1919, meaning the production of products from raw materials with the aid of living organisms.[1] The era of biotechnology-enhanced agriculture began in the 1990s with government approval for commercial deployment of biotech soybeans, corn, cotton, canola, and papaya. Because of their tremendous production advantages, biotech crops have become the most rapidly adopted technology in the history of agriculture.

The word “biotechnology” is extensively applied and covers a number of different technologies. A commonly used definition of modern biotechnology is provided by the

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Preparation And Evaluation of Herbal Tea Powder

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Abstract
Tea is a prevalent and focal point for cultural and social gathering. It is a preparation which boosts up immunity, keeps active, rejuvenates cells it relieves stress, fatigueness, tiredness and anxiety. The aim of present study is to prepare herbal tea with new combination of medicinal plants i.e. star anise, tulsi, black pepper, amla, stevia, lemon grass with the possibility to have maximum therapeutic benefits and suitable consumption. The medicinal plants selected here are reported for various activities such as anti-influenza, immunostimulant, anti- bacterial, bioavailability enhancer, vitamin C supplement, sweetner, flavorant and colorant respectively. The decoction of tea powder containing the above medicinal plants is evaluated for qualitative and quantitative estimations for carbohydrate, ascorbic acid, protein, tannins, and phenolic acid. The antioxidant activity has also been performed.

Keywords
Herbal tea, immunity, antioxidant, anti-anxiety.

*****

INTRODUCTION:
Tea is a prevalent and focal point of cultural and social gathering. Tea is the most generally consumed beverage after water. It has cooling, slightly bitter, and astringent flavor that many people enjoy. Tea is one of the most popular beverages, consumed daily in all domestic, social and official meeting. It is a preparation which boosts up immunity, keeps active, rejuvenates cells, relieves stress, fatigueness, tiredness, anxiety and many more[1].
British introduced tea into India in an attempt to break the Chinese monopoly on tea [2]. Herbal tea or tisane is any beverage made with the infusion or decoction of herbs, spices, or other plant material in hot water, and usually does not contain caffeine[3]. These drinks are distinguished from caffeinated true teas which are prepared from the cured leaves of the tea plant, Camellia sinensis, as well as from decaffeinated tea, in which the caffeine has been removed. In addition to serving as a beverage, many herbal teas are also consumed for their apparent medicinal benefits [4]. Herbal tea is in fact a catch all term used for any non-caffeinated beverages made from the infusion or decoction of herbs, spices, or other plant material, hence in some countries like in Europe, tisanes or herbal teas are also known as infusions.

Herbal Tea Varieties:
Depending on the plant used and on the method of preparation the beverage, there are many varieties of herbal tea. Many more herbal tea varieties can be found than tea varieties for one simple reason: tea is extracted from one plant, tisane is made from many. ***Anise tea*** is well-liked in the Mediterranean region and in the Southwest Asia where the anise plant is native. It is sweet and highly aromatic, notable by its characteristic flavor.

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A review on synthetic study and biological activities of tetrahydropyrimidinone derivatives

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Keywords: Drug discovery, 2-thioxo-1, 2, 3, 4-tetrahydropyrimidine, Biginelli reaction, antioxidant activity, antihypertensive activity

ABSTRACT

The process of drug discovery involves the identification, synthesis, characterization, screening, assay and development of new chemical entities that are suitable for medical and pharmaceutical use. 2-thioxo-1, 2, 3, 4-tetrahydropyrimidine (THPM) are heterocyclic compound & represents are markable pharmacological efficient moieties and are with wide range of therapeutic properties. Synthetically they were synthesized using Multi-component reactions like Biginelli reaction or either microwave and conventional methods, having a multiple benefits of the time consuming and get high yield. In this review, we highlight recent developments on THPMs and recently developed as antimicrobial, anticancer, anti- inflammatory, analgesic, antifungal, antibacterial, anti-tubercular, antihypertensive, analgesic, anticonvulsant, antioxidant, etc. given a potent biological and pharmacological activity.

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ORIGINAL ARTICLE

Exploring the active constituents of *Oroxylum indicum* in intervention of novel coronavirus (COVID-19) based on molecular docking method

Sapan Shah[1] · Dinesh Chaple[1] · Sumit Arora[2] · Subhash Yende[3] · Keshav Moharir[4] · Govind Lohiya[4]

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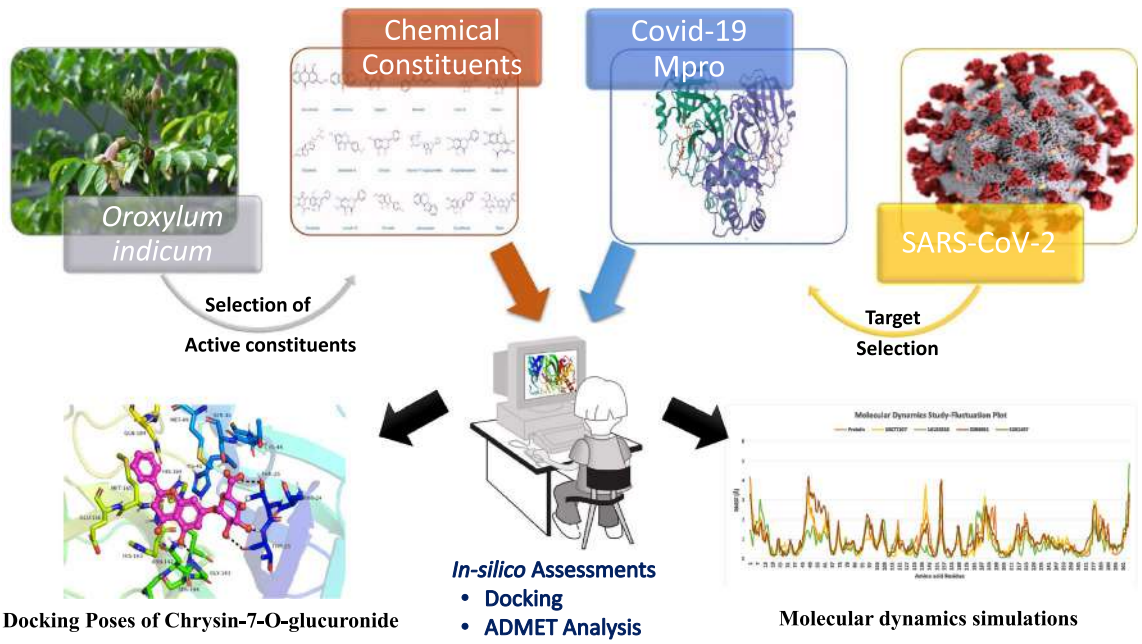
Abstract

The severe acute respiratory syndrome COVID-19 declared a global pandemic by WHO has become the present wellbeing worry to the whole world. There is an emergent need to search for possible medications. We report in this study a molecular docking study of eighteen *Oroxylum indicum* molecules with the main protease (M^{pro}) responsible for the replication of SARS-CoV-2 virus. The outcome of their molecular simulation and ADMET properties reveal four potential inhibitors of the enzyme (Baicalein-7-*O*-diglucoside, Chrysin-7-*O*-glucuronide, Oroxindin and Scutellarein) with preference of ligand Chrysin-7-*O*-glucuronide that has the second highest binding energy (− 8.6 kcal/mol) and fully obeys the Lipinski's rule of five.

Graphical abstract



Keywords COVID-19 · *Oroxylum indicum* · Molecular docking · Molecular dynamics · ADMET study

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Review Article

Novel Drug Delivery System of Phytopharmaceuticals: A Review

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Abstract

Herbal extracts and isolated bioactives from plants have proven their therapeutic activities, as evidenced by preclinical and clinical research. However, there seems some disconnect in their clinical utility as marked by a lack of proper delivery mechanism at desired sites of action. This glitch nowadays is a task for global research activity and being addressed in novel drug delivery systems. Steady progress is observed in integrating novel techniques of drug delivery with successful incorporation of phytochemicals marked by scores of advantages. Limitations of conventional drug delivery systems have overcome to a considerable extent by innovative drug delivery methods which show improvement in targeted drug delivery, drug distribution, protection of active substance, prolonged action, and stability. The perspective of this review thus focuses on the progress in novel drug delivery systems with a spotlight on nanocarriers for active herbal agents, their preparation methods with types, examples of active ingredients incorporated, and biomedical applications.

Keywords: Herbal bioactives, novel drug delivery systems, phytopharmaceuticals, plant extract.

Graphical Abstract

Novel drug delivery system of phytopharmaceuticals.

REVIEW ARTICLE

Challenges and Progress in Vaccine Development for COVID-19 Coronavirus (SARS-CoV-2): A Review

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In silico prediction of phytoconstituents from *Ehretia laevis* targeting TNF-*α* in arthritis

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ABSTRACT

Objective Rheumatoid arthritis (RA) is an autoimmune disease involving the synovial lining of the major joints. Current therapies have noteworthy side effects. Our study involved *in silico* evaluation of *Ehretia laevis* (*E. laevis*) phytoconstituents targeting tumor necrosis factor-*α* (TNF-*α*).

Methods Molecular docking studies performed to investigate the binding pattern of the plant *E. laevis* phytoconstituents along with the crystal structure of TNF-*α* (PDB ID: 2AZ5) using AutoDock Vina followed by a study of interacting amino acid residues and their influence on the inhibitory potentials of the active constituents. Further the pharmacokinetic profile and toxicity screening carried out using SwissADME and pkCSM.

Results The docked results suggest that lupeol (– 9.4 kcal/mol) and *α*-amyrin (– 9.4 kcal/mol) has best affinity towards TNF-*α* compared to standard drug thalidomide (– 7.4 kcal/mol). The active chemical constituents represents better interaction with the conserved catalytic residues, leading to the inhibition/blockade of the TNF-*α*-associated signaling pathway in RA. Furthermore, pharmacokinetics and toxicity parameters of these phytochemicals were within acceptable limits according to ADMET studies.

Conclusion The binding potential of phytoconstituents targeting TNF-*α* showed promising results. Nonetheless, it encourages the traditional use of *E. laevis* and provides vital information on drug development and clinical treatment.

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AN OVERVIEW OF REGULATORY AFFAIRS IN PHARMACEUTICAL INDUSTRIES

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Abstract: Pharmaceutical drug regulatory affairs cowl extraordinary registration parameter of pharmaceutical product. As it's miles the new career which changed into developed from the favored of everywhere in the international to protect the general public fitness through providing correct excellent of drugs such as safety and efficacy within the region of now not handiest pharmacy however also inside the area of the veterinary medicinal drug, scientific tool, pesticides, pesticides, agrochemical, beauty and complementary medication. It also made the interface among the pharmaceutical company and the regulatory organizations. it is also liable for keeping the appropriateness and accuracy of the product data. And its principal role to behave as a liaison with regulatory groups, supplying information and regulatory intelligence in translating regulatory requirement into sensible practicable plan, advising the corporation on regulatory aspects and climate that might affect their proposed activities. Regulatory affairs in the pharmaceutical industry play an essential position because the Pharmaceutical area is rising very hastily and there's a need of regulatory affairs specialists to provide the current desires of industries for the worldwide opposition. A regulatory affair is a profession which acts as the interface among pharmaceutical industries and authorities internationally. The goal of the regulatory affairs professional is the protection of human health, ensuring safety, efficacy, and quality of drugs, making sure appropriateness and accuracy of product facts. This gift article discusses the evolution of Regulatory Affairs, its role inside the pharmaceutical enterprise and its involvement for the implementation of regulatory suggestions which improve the increase of the industry.

Keywords: Regulatory Affairs, Pharmaceutical industries, regulatory bodies.

Introduction: The modern Pharmaceutical enterprise is well prepared, systematic and compliant to international regulatory standards for manufacturing of Chemical and biological tablets for human and veterinary intake in addition to scientific gadgets, conventional herbal merchandise and cosmetics. Stringent GMPs are being accompanied for blood and its by-product in addition to controlled production for classic herbal drug treatments, Cosmetics, food and dietary products which became in any other case otherwise a century before. Each regulatory gadget had confronted certain occasions which brought about modern-day well-defined managed regulatory framework. This has resulted into systematic manufacturing and advertising of secure, efficacious and qualitative pills. With the boom of enterprise, the legislation from each area have come to be increasingly complex and created a need for regulatory specialists.[1]

Regulatory Affairs (RA), also known as Goverment Affairs, is a profession inside regulated industries, including pharmaceuticals, clinical gadgets and so on. RA profession at its heart is all about gathering, studying and speaking the dangers and advantages of health care products to regulatory organizations and public all around the international.

AN OVERVIEW ON COVID 19 TREATMENT BY HERBAL MEDICINES

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ABSTRACT

Herbal-based traditional medicines or phytomedicines play a significant role in disease management in Africa and are widely used as alternative medicines. Therefore, it is important to evaluate both the safety and efficacy of these indigenous botanical assets in medicine prior to endorsing their use by the medical community and the public. There have been several declarations by institutions in Member States on the use of herbal-based traditional medicine for the prevention of SARS-CoV-2 transmission or treating people with a presumptive or definitive diagnosis of corona virus disease 2019 (COVID-19). Many of the claims are difficult to verify because of the lack of documented evidence showing that these remedies prevent or clear SARS-CoV-2 infection and/or improve clinical outcomes of those suffering from COVID-19. As the pandemic continues to spread in Africa, there are increasing messages promoting the use of herbal-based traditional medicines for COVID-19. Currently, no herbal remedy has been validated for use to prevent or treat COVID19. Herbal remedies or medicines are naturally occurring, plant-derived substances that are developed mostly through a process with minimal or no respect for good clinical practice (GCP).The current pandemic of COVID-19 that is spreading across countries originated in Wuhan, China .The single cause of this highly communicable disease is a novel corona virus, called severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), which is the seventh known virus of the Corona viridae family capable of infecting humans.The latest report from the World Health Organization cited that there are now over 19 million confirmed cases and over 700,000 deaths worldwide caused by this virus. The United States of America now has the highest number of COVID19 cases (over 4 million cases), followed by Brazil (almost 3 million cases) and India (over 2 million cases). The fast propagation of this disease is mainly through close contact with infected individuals via respiratory droplets from either sneezing or coughing. Furthermore, there are two other ways of transmitting the virus, including contact and aerosol transmission.

Keywords: Phytomedicines, Herbal Remedies , Covid Treatment ,Respiratory syndrome

INTRODUCTION

The disease is typically confirmed by reversetranscription polymerase chain reaction (RT-PCR) reverse Real-Time PCR assay (RRT-PCR), which can be carried out using a variety of clinical specimens, including Bronchoalveolar lavage fluid, fibro bronchoscope

AN OVERVIEW ON ANTIDIBETICS BY VARIOUS ANALYTICAL TECHNIQUES

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ABSTRACT

Its a meglitinide simple is an oral indication intended to regular hour aldohexose outings. Through not an antidiabetic, it acts in A comparable to way by restricting to antidiabetic receptor moreover on elective one particular receptor-» conclusion of adenosine triphosphate subordinate K+ channel-» of depolarization-» inner discharge unharnesses. Repaglinide prompts quick beginning short-enduring inner emission released. It is directed antero each fundamental supper to balance out postprandial hyperglycemia; the portion should be radiated if a food material is inconceivable. In light of less perpetual activity, it maybe had a lower hazard of the reality of hypoglycemia. Repaglinide is shown exclusively in type-II DM as another to sulfonylureas, or to enhance metformin/long inside discharge. It should be kept away from in sickness. This audit conveys a detail portrayal very surprising of different scientific ways were printed for the assessment of repaglinide and its mix medication in physician recommended drugs and natural grids. This appraisal incorporates distinctive logical ways like compound examination ways, forceful fluid movement (HPLC), predominant slender layer action (HPTLC), fluid chromatography-mass spectroscopic investigation (LC-MS), and ultra-execution fluid action (UPLC), GC-MS, [LC-ESI-MS-MS], slim action (CE), titrimetric and synthetic science strategy, and assignment concentrate for the assessment of repaglinide and along with a combination

Keywords: Biological frameworks, Chromatography, Repaglinide, Analytical strategies, Type-II diabetic medications Presentation

INTRODUCTION

Repaglinide is another carboxymethyl benzoic corrosive subordinate, otherwise called 2-ethoxy - 4-[2-[[3-methyl-1-[2-(1-piperidinyl) phenyl] butyl] amino]-2-oxoethyl] (Fig. 1). It is a novel prandial glucose controller for the treatment of type-II diabetes mellitus [1]. It diminishes fasting glucose focuses in patients with type-II diabetes mellitus. It assists with controlling the glucose levels by pancreas builds insulin levels. Repaglinide is an oral enemy of hyperglycaemia specialist utilized for the treatment of non-insulin-subordinate diabetes mellitus (NIDDM). It has a place with the meglitinide is an enemy of Diabetic sort II class drug with of short-acting insulin secretagogues, which act by restricting to the β cells of the pancreas, and it animates and delivers the insulin discharge levels [2]. Repaglinide actuates an insulin reaction to early suppers decreasing the postprandial blood glucose levels. May be multi month of a course is required for a lessening in fasting blood glucose levels is seen. Meglitinides may commonly affect slight development in weight. The complete normal weight acquire brought about by meglitinides seems, by all accounts, to be lower than that is brought about by sulfonylureas. Because of their own instrument of activity, meglitinides it might in light of the fact that hypoglycemia [3]. The danger is believed to be lower than that of sulfonyl urea's since their activity is presence on glucose-subordinate. As well as diminishing postprandial and fasting glucose, meglitinides are appeared to diminish glycosylated hemoglobin (HbA1c) levels, which are intelligent of the last 8–10 weeks of glucose control. Repaglinide is altogether used in the liver and discharged in bile salts. Roughly 90% of a solitary orally controlled portion is disposed of in the face and 8% in pee. The substance equation of C27 H36N2 O4 and it is solvent in methanol and methylene chloride. However, for all intents and purposes insoluble in water-dissolvability of around 20

"COMPUTER-AIDED DRUG DESIGN (CADD) & MOLECULAR MODELLING IMPORTANCE IN PHARMACEUTICAL SCIENCES."

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Abstract

Computer-aided drug design (CADD) depends on the extent of structure and other information available regarding the target (enzyme/receptor/protein) and the ligands. The theoretical basis of CADD involves molecular mechanics, quantum mechanics, molecular dynamics, structure-based drug design (SBDD), ligand-based drug design (LBDD), homology modeling, ligplot analysis, molecular docking, de novo drug design, pharmacophore modeling and mapping, virtual screening (VS), quantitative structure-activity relationships (QSARs), In silico ADMET (absorption, distribution, metabolism, excretion and toxicity) prediction etc. CADD centre was created to foster collaborative research between biologist, biophysicists, structural biologists and computational scientists. The major goal of the CADD centre is to initiate these collaborations leading to the establishment of research projects to discover novel chemical entities with the potential to be developed into novel therapeutic agents.

Keywords: Bioinformatics, Softwares, Homology modeling, Ligplot analysis, Molecular docking, De novo drug design, Pharmacophore modeling, Virtual screening (VS), Quantitative structure-activity relationships (QSARs), Lipinski's rule.

❖ INTRODUCTION

Advances in the field of biochemistry, molecular biology and mobile biology, facilitated by using traits in genomics and proteomics, are producing a massive wide variety of novel organic goals that may be exploited for therapeutic intervention. To facilitate the discovery of novel healing marketers, rational drug design methods in mixture with structural biology provide wonderful capability. The trendy technological advances are (QSAR/QSPR, shape-based totally layout and bioinformatics). Drug discovery and developing a brand new medicine is an extended, complicated, high-priced and exceptionally unstable procedure that has few friends in the commercial global. This is why laptop-aided drug design (CADD) tactics are being widely used inside the pharmaceutical industry to accelerate the method. The value benefit of using computational equipment within the lead optimization section of drug improvement is full-size. On an average, it takes 10-15 years and US $500-800 million to introduce a drug into the marketplace, with synthesis and trying out of lead analogues being a large contributor to that sum. Therefore, it's far beneficial to apply computational equipment in hit-to-lead optimization to cowl a wider chemical space at the same time as reducing the quantity of compounds that should be synthesized and examined in vitro.

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PHARMACEUTICAL CO-CRYSTAL: A TECHNIQUE FOR ENHANCEMENT OF PHYSICOCHEMICAL PROPERTIES OF DRUGS

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ABSTRACT

In development of new product major constraints are poor aqueous solubility and low oral bioavailability. Crystallization emerge as potential technique for enhancement of solubility of poorly aqueous soluble drugs also helps to improve physicochemical with preserving the pharmacological properties of the API. Cocrystals are solids that are crystalline single-phase materials composed of two or more different molecular and/or ionic compounds generally in a stoichiometric ratio which are neither solvates/hydrates nor simple salts. It is multicomponent system in which one component is API and another is called coformer. Coformer selection is the main challenging step during cocrystal synthesis, so various screening methods for the selection of coformers was explained. This article also summarizes differences between cocrystals with salts, solvates and hydrates along with the implications and limitations of cocrystals. It also provides a brief review on different methods of cocrystal formation and characterization technique of cocrystals.

KEYWORDS: Pharmaceutical cocrystals, Cocrystallization, Coformers, Solubility, Stability, Bioavailability, Dissolution, Grinding, Supramolecular synthons.

INTRODUCTION

Pharmaceutical cocrystals are solids crystalline single-phase materials composed of two or more different molecular and/or ionic compounds generally in a stoichiometric ratio which are neither solvates nor simple salts. Thus, it is a multiple component crystal modified by intermolecular interaction such as hydrogen bonding, van der waals force, π–π interactions, and halogen bond between an active pharmaceutical ingredients (drug) and coformer.[1,2]

As a promising formulation, pharmaceutical cocrystals can improve some of the physicochemical properties of APIs, such as the solubility, dissolution rate, bioavailability, and stability, without altering their inherent chemical structures.[3,4,5] Meanwhile, the guidance for industry regulatory classification of pharmaceutical cocrystals announced by the U.S. Food and Drug Administration (FDA) claims that cocrystals, as a drug product intermediate or a fixed-dose combination product, should substantially dissociate before reaching the site of pharmacological activity.[6,7]

Actually, cocrystals are metastable solids because of their weak intermolecular interaction and easily dissociate into their respective components in solution.[8,9]

It is essential to explore the detailed behaviours of pharmaceutical cocrystals between their dissolved and dissociated processes, which will be beneficial to advance the development and application of pharmaceutical cocrystals.

Pharmaceutical cocrystal solubility commonly comprises a dissolution–dissociation process, and its evaluation is based on kinetic solubility, thermodynamic solubility, and the intrinsic dissolution rate. Kinetic solubility usually indicates a dynamic process such that the concentration fluctuations vary with time during cocrystal dissolution and depends on parameters such as the surface area, particle size and distribution, fluid dynamics, and experimental apparatus.[10] However, thermodynamic solubility focuses on the dissolved extent of the cocrystal when all the cocrystal components achieve dynamic equilibrium in the solution phase entirely.[11] The intrinsic dissolution rate concentrates on how the powder compacts affect the drug dissolution under a constant temperature and surface condition, which will contribute to approximately simulating the *In-vivo* behaviours of drug formulation.[12]

The process of solvation is a vital factor for the cocrystal dissolution–dissociation process in the human gastro-intestine that is related to coformer solubility, the type and concentration of surfactants, and the ion concentration in dissolution media. In addition, cocrystal solubility is influenced by the strength of the crystal lattice that is associated with the crystal stacked form and intermolecular distances of API and CCF.[13]

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A REVIEW: USE OF THE HERBAL MEDICINAL PLANTS AS AN IMMUNOMODULATOR FOR COVID 19

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❖ ABSTRACT

The severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is a highly infectious virus that spreads quickly from person to person and has never been seen in humans before. The World Health Organization (WHO) designated the infection COVID-19 (coronavirus disease-2019) on February 11, 2020, and declared the outbreak pandemic on March 11, 2020. It impacts everyone, without exception. The elderly and those with impaired immune systems, on the other hand, are more vulnerable. Coughing, sneezing, or touching infected hands to eyes, nose, or mouth spread the virus mostly through droplet infection from an infected person to a healthy person. The infection's symptoms range from moderate to severe. Fever of high grade (104^{o}F), dyspnea, pneumonia, and severe acute respiratory syndrome may emerge in severe cases (about 14% of cases). There is currently no particular therapy or vaccine available for new coronavirus-2019. We know from past and recent experiences that herbal remedies are effective against a variety of severe viral illnesses. This study's findings on immune-boosting herbs could be extremely beneficial to the body's fight against COVID-19 infection.

KEYWORDS: SARS-CoV-2, Antiviral, Herbal medicine, Immunomodulator drug.

❖ INTRODUCTION

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or 2019 novel coronavirus (2019-nCoV) is rapidly spreaded from its origin in Wuhan, Hubei Province, China, to the rest of the world. Till 7 /8/ 2021 around 202,693,744 cases of coronavirus disease 19 and 4,295,952 death have been reported. India has reported 31,913,083 cases till date.[1,2] The first case of COVID-19 in India was an imported case from Wuhan, China on

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SYNTHETIC STUDY OF INDOLE AND IT'S DERIVATIVES; AS POTENT ANTINEOPLASTIC AGENTS

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1. ABSTRACT

Cancer is a disease that entails a loss of genomic stability and seems to have a high global mortality rate. Since its revealed, several people have been searching for an effective treatment, evaluating numerous compounds for their anticancer properties. Whereas, indoles are natural compounds with antineoplastic activities due to their propensity to trigger cell death in a variety of cancer cell lines. An indole is an aromatic heterocyclic composite which has its heterobicyclic configuration as a six-membered ring fused to a five-membered pyrrole ring. 'Indole' is the name given to all indole derivatives which have an indole ring system. Indole derivatives possess various biological activities, i.e. antiviral, anti-inflammatory, anti-cancer, anti-HIV, antioxidant, antimicrobial, anti-tubercular, antidiabetic, anticholinesterase, antimalarial activities, etc., prompting researchers to explore variety of indole derivatives. This review addresses the synthesis of indole and its various derivatives, facilitated induction and recent studies with indoles as showing potential chemotherapeutic activity.

KEYWORDS: Indoles, heterobicyclic configuration, indole derivatives, biological activities, anti-cancer agents.

2. INTRODUCTION

According to several discoveries, cancer has become one of the most difficult diseases to treat, and according to World Health Organization figures, it has now surpassed heart disease as the second leading cause of death worldwide. Nearly 10 million people died from cancer

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Exploring the active constituents of *Oroxylum indicum* in intervention of novel coronavirus (COVID-19) based on molecular docking method

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Abstract

The severe acute respiratory syndrome COVID-19 declared a global pandemic by WHO has become the present wellbeing worry to the whole world. There is an emergent need to search for possible medications. We report in this study a molecular docking study of eighteen *Oroxylum indicum* molecules with the main protease (M^{pro}) responsible for the replication of SARS-CoV-2 virus. The outcome of their molecular simulation and ADMET properties reveal four potential inhibitors of the enzyme (Baicalein-7-*O*-diglucoside, Chrysin-7-*O*-glucuronide, Oroxindin and Scutellarein) with preference of ligand Chrysin-7-*O*-glucuronide that has the second highest binding energy (- 8.6 kcal/mol) and fully obeys the Lipinski's rule of five.

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Keywords: ADMET study; COVID-19; Molecular docking; Molecular dynamics; Oroxylum indicum.

Figures

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Research Articles

Prospecting for *Cressa cretica* to treat COVID-19 via *in silico* molecular docking models of the SARS-CoV-2

Sapan Shah, Dinesh Chaple, Sumit Arora, Subhash Yende, Chetan Mehta & Usha Nayak

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Abstract

The severe acute respiratory syndrome COVID-19 declared as a global pandemic by the World Health Organization has become the present wellbeing worry to the whole world. There is an emergent need to search for possible medications. *Cressa cretica* is reported to show antitubercular, antibacterial and expectorant property. In this research, we aim to prospect the COVID-19 main protease crystal structure (M^{pro}; PDB ID: 6LU7) and the active chemical constituents from *Cressa cretica* in order to understand the structural basis of their interactions. We examined the binding potential of active constituents of *Cressa cretica* plant

to immensely conserved protein M^{pro} of SARS-CoV-2 followed by exploration of the vast conformational space of protein–ligand complexes by molecular dynamics (MD) simulations

Research Article | Published: 06 January 2021

Phytophospholipid Complex of Caffeic Acid: Development, *In vitro* Characterization, and *In Vivo* Investigation of Antihyperlipidemic and Hepatoprotective Action in Rats

Shubhada Mangrulkar, Pranav Shah, Sonali Navnage, Priyanka Mazumdar & Dinesh Chaple

AAPS PharmSciTech **22**, Article number: 28 (2021)

Abstract

Caffeic acid (CA), a hydroxycinnamic acid possessing a variety of pharmacological activities, has caused a growing interest for the treatment of hyperlipidemia and associated conditions. This work endeavored to develop a novel formulation of CA-Phospholipon® 90H complex (CA-PC) using a solvent evaporation method. Scanning electron microscopy (SEM), differential scanning calorimetry (DSC), Fourier transform infrared spectrophotometry (FTIR), and powder X-ray powder diffraction (PXRD) was carried to confirm the formation of CA-PC. The CA-PC was functionally evaluated in terms of solubility, *in vitro* and *ex vivo* drug release, and *in vivo* bioavailability and efficacy studies. SEM, DSC, FTIR, and XRD studies indicated the physical interaction of CA with Phospholipon® 90H to form a complex. Dynamic light scattering (DLS) studies described particle size of 168 ±

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Abstract

A NEW FUTURE APPROACH IN NOVEL DRUG DELIVERY SYSTEM THROUGH MICRO-EMULGEL: REVIEW

Shah Maitri*, Dr. Dixit Modi and Dr. Dhiren Shah

ABSTRACT

Emulgel is one such a unique feature of topical delivery system for drug make the localized administritation and direct acceptability of the drug anywhere in the body through ophthalmic, vaginal, skin& rectal routes. Topical preparation includes wide variety of formulations for cosmetic or dermatological application for a healthy as well as diseased skin. Topical preparations can be formulated in different forms like solid, semisolid or liquids. Among the various groups of semisolid preparations, the use of gel has expanded both in cosmetics and in pharmaceutical preparations. Despite of gel have a limitation in delivery of hydrophobic drug moiety. This moiety can be overcome by the use of novel drug delivery system i.e. EMULGEL. Emulgel is one of topical drug delivery system that incorporates properties of both gel and emulsion and shows dual release control system. Emulsions in gel have emerged as one of the most interesting topically drug delivery system. The main objective behind emulgel is delivery of hydrophobic drug via skin so that hydrophobic moiety can enjoy the unique properties of gels. Currently many drugs of antimicrobial, antifungal, non steroidal anti inflammatory category are studied for their topical delivery through emulgel formulation. The objective of this project was to develop an emulgel for a control delivery for hydrophobic drug.

Keywords: Micro emulgel, Topical drug delivery, Hydrophobic drugs.

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Abstract

FORMULATION AND EVALUATION OF HERBAL TEA

Meera A. Ingale*, Dr. Gouri R. Dixit, Dr. Dinesh R. Chaple and Rohit T. Durge

ABSTRACT

Herbal tea is essentially an herbal mixture made from leaves, seeds and/ or roots of various plants. As per popular misconception, they are not derived from the usual tea plants, but rather from what are called as _tisanes'. There are several kinds of tisanes (herbal teas) that have been used for their medicinal properties. Some of them being consumed for its energizing properties to help induce relaxation, to curb stomach or digestive problems and also strengthen the immune system. Some of the popular herbal teas are Green tea, Star anise tea, Ginger tea, Tulsi tea, Cinnamon tea, Turmeric tea, Lemon grass tea, Cardamom tea, Stevia tea etc. Some of these herbal teas possess extremely strong medicinal benefits such as, Green tea is a _non-fermented' tea, and contains more catechins, than black tea or oolong tea. Catechins are in vitro and in vivo strong antioxidants. In addition, its content of certain minerals and vitamins increases the antioxidant potential of this type of tea. Recent human studies suggest that green tea may contribute to a reduction in the risk of cardiovascular disease and some forms of cancer, as well as to the promotion of oral health and other physiological functions such as anti-hypertensive effect, body weight control, antibacterial and antiviruses activity.

Keywords: Tisanes, Herbal tea, Herbal remedies, Herbal medicine.

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Abstract

NANOBURRS: A NOVEL APPROACH IN THE TREATMENT OF ATHEROSCLEROSIS AND CVS DISEASE

Madhav Korde*, Suparna Bakhle and Tejaswina Fulzele

ABSTRACT

The field of nanotechnology has crossed significant milestones from the systemic delivery of nanomedicines. However the ability to achieve spatiotemporal control may be essential to many medicinal applications. Nanotechnology has created a new horizon in diagnostic as well as therapeutic areas spreading itself to even molecular levels because of its adaptability for success at atomic scale. Several delivery systems are being proposed worldwide over the last several years. Nanosystems include dendrimers, magnetic nanoparticle, liposomes, quantum dots, nanoburrs employed for the purposes like targeting cancer cells, tissue imaging, cancer therapy, virus detection, noninvasive vaccine delivery etc. We continue with advanced uses like nanoburrs here, which are nanoparticles coated with a sticky protein that make them cling onto artery walls while they slowly release drugs. This paper suggests nanotechnology has tremendous implications in the development of future both human medicine and veterinary treatment, and finds it to be hugely applicable both today and in the future. This review brings about the working and applications of nanoburrs.

Keywords: Nanotechnology, Nanoburrs, Nanoparticles, Cardiovascular Diseases, Atherosclerosis, CREKA Targeting micelles.

[Full Text Article]

Ravina N. Pounikar*, Dr. Mrs. Suparna S. Bakhale, Jayshree V. Motghare, Anuja Bhure, Madhav Korde

ABSTRACT

Poor solubility of drugs is a major challenge in the formulation development. Solid dispersion is introduced as a novel means for enhancement of solubility. Solid dispersion may be defined as a set of solid products comprising of at least two diverse components, usually hydrophilic matrix and hydrophobic drug. Depending on nature of carriers the immediate release solid dispersions and/or controlled release solid dispersions can be formulated. This matrix may be crystalline or amorphous in nature. As per biopharmaceutical classification system class II drugs are with low solubility and high permeability and are the promising candidates for improvement of solubility as well as bioavailability by means of solid dispersion. The carriers used previously were mostly synthetic one. Recent trend towards the use of natural carriers have replaced the use of synthetic carriers. This review is the overview of various synthetic, natural, semisynthetic, modified natural hydrophilic carriers used for formulation of solid dispersions. Since a solid dispersion is basically a drug–polymer two-component system, the drug–polymer interaction is the determining factor in its design and performance. In this review, we summarize our current understanding of solid dispersions both in the solid state and in dissolution, emphasizing the fundamental aspects of this important technology Practical aspects pertaining to preparation of solid dispersions, like the selection of carrier, drugs molecular arrangement in these preparations are discussed in this article. Proposed article highlights the various preparation techniques of solid dispersion, characterization, available recent technologies, marketed preparation, future prospective etc.

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Abstract

EMULGEL: POTENTIAL DRUG DELIVERY SYSTEM FOR TOPICAL DOSAGE FORM

Jayshree V. Motghare*, Dr. Mrs. Suparna S. Bakhale, Ravina Pounikar, Anuja Bhure, Madhav Korde

ABSTRACT

Emulgel have emerged as one of the most interesting topical delivery systems as it has dual control release system i.e., gel and emulsion. The topical applications of the drug offer the potential advantages of delivering the drug directly to the site of action and secondly delivering the drug for extended period of time at the effected site that mainly acts at the related regions. Emulgel have emerged as a promising drug delivery system for the delivery of hydrophobic drug. In comaprision among the other groups of semisolid preparations, the use of gels has been emerged both in cosmetics, and in pharmaceutical preparations because of its unique array of features. The use of gels and emulsions as combined dosage form results into formulation of emulgel. Emulgel is used to treat aches and pains caused by colds, headaches, muscle aches, backaches. The use of emulgels can be expanded in analgesics, anti-inflammatory, anti-fungal, anti-acne drugs. This review gives knowledge about emulgel including its properties, advantages, formulation considerations, and its recent advances in research field.

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Review Article

Cancer cachexia: Current strategies and future perspectives

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ABSTRACT

Cancer cachexia is complex, and can often occur in the presence of malnutrition, age-related changes in anabolism, physical deconditioning and comorbidity. These factors can also form potentially reversible components of the overall 'cachexia burden'. Separating cancer cachexia from the effects and complications after cancer therapy is often difficult. This review aims to briefly describe cancer cachexia and these novel biological agents currently under investigation for the treatment of cancer –related cachexia. Treatment that can be reduces the muscle wasting which is resulting into cancer cachexia. The main aim of review is to the potential treatment for cancer cachexia, which include Pharmacological, non-pharmacological, neutraceutical and investigational new treatments.

1. Introduction

Cachexia is a multifactorial infection portrayed by weight reduction through skeletal muscle and fat tissue misfortune, awkwardness in metabolic guideline, and decreased food consumption. It is brought about by components of catabolism delivered by tumours in the fundamental course as well as physiological factors, for example, the imbalanced fiery initiation, proteolysis, autophagy, and lipolysis that may happen with gastric, pancreatic, oesophageal, cellular breakdown in the lungs, liver, and entrails malignant growth. Disease cachexia not just adversely influences the personal satisfaction of patients with malignant growth yet additionally lessens the viability of hostile to disease chemotherapy and builds its poisonousness, prompting expanded malignancy related mortality and consumption of clinical assets. Right now, there are no powerful clinical intercessions to totally turn around cachexia and no endorsed drugs. Sufficient wholesome help is the principle strategy of cachexia treatment, while drugs that focus on the restraint of catabolism, cell harm, and extreme enactment of irritation are under examination.[1]

Cancer cachexia is an insidious syndrome that not only has a dramatic impact on patient quality of life, but is also associated with poor responses to chemotherapy and survival. Indeed, cachexia occurs in the majority of terminal cancer patients and, according to Warren, is responsible for the death of 22% of cancer patients.[1,2] Current therapies focus on palliation of symptoms and the reduction of distress of patients and families rather than cure.[3] In many cases, cachexia remains a largely underestimated and untreated condition. Approximately half of all patients with cancer experience cachexia, with the prevalence rising as high as 86% in the last 1-2 week of life, and with 45% of patients losing more than 10% of their original body weight over the course of their disease progression. Death usually occurs when there is 30% weight loss.[4] The best management strategy of cancer cachexia is to treat the underlying cancer as this will completely reverse the cachexia syndrome. Unfortunately, this remains an

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MICROWAVE ASSISTED SYNTHESIS OF BENZIMIDAZOLE AND ITS CHARACTERIZATION

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1. INTRODUCTION

Microwave technology opens up new opportunities to the synthetic chemist in the form of new reactions that are not possible using conventional heating. The interest in the microwave assisted organic synthesis has been growing during the recent years.[1-2]

The short reaction times provided by microwave synthesis make it ideal for rapid reaction scouting and optimization of reaction conditions, allowing very rapid progress through the hypotheses–experiment–results iterations, i.e. finding the optimum conditions for a specific reaction to obtain the desired products in good yields and purities. Since many synthesis reactions require at least one or more heating steps for long time periods, these optimizations are often difficult and time- consuming.[3]

Microwave-assisted heating under controlled conditions has been shown to be a valuable technology for any application that requires heating of a reaction mixture, since it often dramatically reduces reaction times – typically from days or hours to minutes or even seconds. Compounds can therefore be rapidly synthesized in either a parallel or (automated) sequential way using this new promising technology.[4]

Microwave-assisted organic synthesis has revolutionized organic synthesis. Small molecules can be built in a fraction of the time required by classical thermal methods. As a result, this technique has rapidly gained acceptance as a valuable tool for accelerating drug discovery and development processes.[5]