A.Y. 2020-21

opnaccess

International Journal of Pharmaceutical Research and Applications
Volume 6, Issue 3 May - June 2021, pp: 1300-1311 www.ijprajournal.com ISSN: 2249-778

A Review on Formulation and Evaluation of Herbal Anti-Dandruff Shampoo

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Date of Submission: 10-06-2021 Date of Acceptance: 25-06-2021

ABSTRACT : The aim of the present study is to formulate and evaluate herbal Anti dandruff shampoo containing natural ingredients with an emphasis on safety and efficacy. It clears dirt, dandruff, promotes hair growth, luster , strengthens and darkens the hair. The shampoo sector is probably the largest unit of among the hair care products. Since the shampoos are one of the cosmetic product used in daily as the hair is special and cherished feature of humans. Majority of ingredients in the shampoos are chemicals and hence have been under severe attack due to its potential risk of side effects with its usage. The main objective is to study how to eliminate harmful synthetic ingredients from anti-dandruff shampoo formulation and substitute them with safe natural ingredients. An attempt has been made to combine modern formulation technology into a formula based on natural ingredients. The shampoo was prepared by taking the extracts of Orange peel powder (Citrus Aurantium Dulcis-Rutaceae) (active ingredient), Curry Leaves (Murraya Koenigii-Rutaceae), Ginger (Zingiber Officinale-Zingiberaceae), Aloe vera (Aloe Barbadensis Miller-Asphodelaceae), Reetha (Sapindus Mukorossi-Sapindaceae) in different proportions. Several physicochemical tests were performed for visual assessment, wetting time, pH, assurance of solid contents, surface tension, detergency, dirt dispersion, conditioning performance, foam stability. The formulated herbal shampoo is black in color with demonstrable good froth stability, detergency, good cleansing, low surface tension, optimum pH and conditioning activity. All these are the ideal characters for good quality of the herbal shampoo to be used in daily life. However, further scientific investigation is required for validation of its overall quality.

KEYWORDS : pH,Herbal shampoo, Natural ingredients, Hair,Dandruff, Cleansing action, Dirt removal

I. INTRODUCTION :

➤Hairs are the integral part of human beauty.

➤Hair is a protein filament that grows from follicles on the dermis or skin.

➤Scientific name of hair is pili or pilus.

➤Hair is a component of the integumentary system and extends downward into the dermal layer where it sits in the hair follicle.

➤The presence of hair is a primary differentiator of mammals as a unique class of organisms. In humans, it is a cherished and highly visible indicator of health, youth, and even class.

➤ It has a sensory function, protects from cold and UV radiation, and can have a significant psychological impact when its growth or structure is deranged.

➤At a microscopic level, the variety in length, color, diameter, and cross-sectional shape of each hair creates the characteristic profiles seen across ethnic groups and among individuals.

Hair Anatomy:

➤Hair grows from hair follicles situated within the fatty layer of the scalp. Contrary to the popular belief that hair grows as single strands, hair follicles actually grow in groups of 1-4 hairs called "follicular units".➤At the base of each hair follicle is a hair bulb where the growth mechanism for producing hair occurs. Hair follicles get their nourishment from the blood vessels within the dermis. The cells divide and develop to produce the hair shaft.➤While the hair is still developing underneath the epidermis, it maintains a soft form. Once the pushes past the epidermis, its outside layer hardens into keratin.

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IJPSR (2021), Volume 12, Issue 11 (Review Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 19 September 2020; received in revised form, 15 May 2021; accepted, 25 May 2021; published 01 November 2021

GREEN NANOTECHNOLOGY AND NANOPARTICLES: AN ECO-FRIENDLY APPROACH

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Keywords:

Green Nanotechnology, Metallic Nanoparticles, Biomaterials, Green Synthesis

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ABSTRACT: The field of nanotechnology is one of the notable active analysis areas in modern material science. Recent advances in Nanoscience and nanotechnology have led to the development of nanoparticles, which ultimately decrease potential health and environment hazards. Interest in developing environmentally friendly procedures for the synthesis of metallic nanoparticles has been increased. The purpose is to minimize the negative impact of synthetic procedures, their accompanying chemicals, and derivative compounds. Nanoparticles produced by green technology are more superior when compared to those manufactured with physical and chemical methods based on it eliminates the use of most expensive chemicals and also use less energy along with formation of environmental byproducts. In the synthesis of metallic nanoparticles, natural resources have been used. The exploitation of different biomaterials for the synthesis of nanoparticles is considered a valuable approach in green nanotechnology. This review provides an overview of the mechanisms of green synthesis of metallic nanoparticles and their application.

INTRODUCTION: There have been enormous advancements in the arena of Nanotechnology within the recent years related to the green synthesis of nanoparticles using plant extracts, microorganisms and human genes. Green nanotechnology means the application of green chemistry and green engineering principles in the field of Nanotechnology. Nanoparticles can be synthesized using a variety of methods such as physical method, chemical method, biological method and hybrid method [1-3]. The production of nanoparticles through conventional (physical and chemical) methods results in toxic by-products that are environmental hazards.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.12(11).1000-10

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

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.12(11).1000-10

Additionally, these products cannot be used in medicine due to health-related issues [4]. Conventional methods can be used to produce nanoparticles in large quantities with defined sizes and shapes in a shorter period of time; however, these techniques are complicated, costly, and outdated.

In recent years, there has been growing interest in the synthesis of environmentally friendly nanoparticles that do not produce toxic waste [5, 6]. This can only be achieved through biological nature using biotechnological tools that are considered safe and ecologically good for fabrication as an alternative to conventional methods. Green nanotechnology is synthesizing the nanoparticles or nanomaterials using biological routes, as shown in **Fig. 1,** such as microorganisms, plants, viruses, or their by-products such as proteins and lipids. Nanoparticles produced by green technology are far superior to those manufactured with physical and chemical methods based on it eliminates the use of

open access

World Journal of Pharmaceutical Sciences
ISSN (Print): 2321-3310; ISSN (Online): 2321-3086
Available online at: http://www.wjpsonline.org/
Review Article

Lipid Based Drug Delivery Systems: Past, Present and Future Perspectives in Improving Drug Bioavailability

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Received: 26-05-2021 / Revised Accepted: 30-06-2021 / Published: 02-07-2021

ABSTRACT

Low oral bioavailability is due to low aqueous solubility of drugs is a growing challenge in the evolution of new pharmaceutical products. Lipid based formulations such as microemulsion, nanoemulsion, self-emulsifying drug delivery system (SEDDS), self-microemulsifying drug delivery system (SMEDDS) and self-nanoemulsifying drug delivery systems (SNEDDS) used to improve the oral bioavailability of BCS-II drugs were surveyed in many studies as an efficient approach for improving the bioavailability and dissolution rate. This review article focuses on the following topics. First, it presents an overview of lipid-based drug delivery systems and excipients involved in improving the solubility and bioavailability of poorly water-soluble drugs. Second, the article reviews selection of components in lipid-based drug delivery systems for oral use with their characteristics. Third, it brings a detailed description of the processing techniques necessary to obtain lipid-based formulation for oral delivery, along with brief discussion of their strategies to enhance the bioavailability and characterization perspectives.

Keywords: Lipid-based drug delivery system (LBDDS), BCS class II drugs, Bioavailability, Self-emulsifying drug delivery system, Self-microemulsifying drug delivery system, Self-nano emulsifying drug delivery system

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How to Cite this Article: Maimoona Aleem, Venu Madhav Katla, Kiranmai Mandhava. Lipid Based Drug Delivery Systems: Past, Present and Future Perspectives in Improving Drug Bioavailability. World J Pharm Sci 2021; 9(7): 31-44.

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UGC, PCI, Scopus, ICI

International Journal of Pharmaceutical Sciences and Nanotechnology
Volume 14 • Issue 3 • May–June 2021
Research Paper https://doi.org/10.37285/ijpsn.2021.14.3.7 MS ID: IJPSN-2-10-21-VENU-KATLA

Formulation and Evaluation of Ketoprofen Using β-Cyclodextrin Capped Silver Nanoparticles

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Received February 10, 2021; accepted March 20, 2021

ABSTRACT

The objective of the study was to develop silver nanoparticles loaded with Ketoprofen (Ag-KP) for increasing the drug solubility and thereby its bioavailability. Ag-KP were prepared by the solvent evaporation method using β-Cyclodextrin as a biodegradable polymer. Different formulations of Ag-KP were characterized for the drug entrapment efficiency, Fourier Transform Infrared Spectroscopy (FTIR), particle size analysis, X-ray diffraction studies (XRD), scanning electron microscopy (SEM) and *in-vitro* dissolution studies. The optimized formulation (F6) has shown an average particle size of 167.8 ± 3.46 nm, zeta potential of -23.7 ± 1.46 mV. FTIR revealed that the drug showed good excipient compatibility. XRD studies showed that the drug has changed from crystalline to amorphous state. In all formulations, F6 formulation (optimized) exhibited high drug entrapment efficiency (~93%). SEM studies indicated the shape of Ag-KP was roughly spherical with smooth surface. *In vitro* dissolution studies showed that Ag-KP from F6 formulation was 94.3 ± 4.9% but for the marketed formulation, it is only 84.6 ± 3.7% in 12 hours and F6 was found to be found stable for three months at both refrigerated and room temperature (RT).

KEYWORDS: Ketoprofen; Silver Nanoparticles; β-Cyclodextrin; Zeta sizer; *In-vitro* dissolution studies; Stability Studies.

Introduction

Nanoparticles (NP) are defined as natural, incidental or manufactured material containing particles, in an unboundstate or as an aggregate or as an agglomerate and where, for 50% or more of the particles in the number size distribution, one or more external dimensions is in the size range 1nm–100nm (Hood et al., 2004). Silver nanoparticles (AgNP) are among the engineered nanomaterials most often incorporated in nano functionalized consumer products (Zhang et al., 2011).

A primary function of Ag-NP is as a biocide, attributed to the well-documented antimicrobial properties of silver (Bone et al., 2012; Maillard et al., 2012). Additionally, the unique physicochemical properties of AgNPs, including a high electrical and thermal conductivity, are increasingly being applied in the areas of microelectronics and medical imaging (Zhang et al., 2011; Fabrega et al., 2011). The current worldwide consumption of AgNPs has been estimated in several studies, calculated that the median global consumption of AgNPs was 55 ton/year with other estimates from future markets estimating AgNP consumption to be as high as 360 tons to 450 ton/year (Lazareva et al., 2014).

Historically metal complexes of several drugs have been reported as antimicrobial agents and among these silver complexes have been most common ones. For example, silver sulfadiazine has been used in the clinics as a prophylactic and treatment for bacterial infections associated with skin burns (Rai et al., 2009; Marambio-Jones Cet al., 2009). Also, silver complexes of metronidazole (Kalinowska-Lis et al., 2015), nimesulide (De Paiva et al., 2012), and clotrimazole (Kalhapure et al., 2015) have been reported as anti-microbial agents. Silver complexes could be effective as broad-spectrum antibiotics due to their chemical nature. Moreover, due to multiple mechanisms of action of silver, the development of bacterial resistance to silver complexes is difficult (Prabhu et al., 2012).

Ketoprofen (KP) is one of the propionic acid class of Non-Steroidal Anti-Inflammatory Drug (NSAID) with

ABBREVIATIONS: Nanoparticles (NP), Silver nanoparticles (AgNP), Ketoprofen (KP), Non-Steroidal Anti-Inflammatory Drug (NSAID), β-Cyclodextrin (β-CD), Photon correlation spectroscopy (PCS), Fourier transform infrared spectroscopy (FTIR), Poly dispersity index (PDI), Zeta potential (ZP), Encapsulation efficiency (EE), Powder X-ray Diffraction studies (PXRD), Scanning electron microscopy (SEM), Room temperature (RT).

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UGC, PCI, Scopus

International Journal of Pharmaceutical Sciences and Nanotechnology
Volume 14• Issue 3 • May –June 2021
Research Paper https://doi.org/10.37285/ijpsn.2021.14.3.7 MS ID: IJPSN-2-10-21-VENU-KATLA

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UGC, PCI, EBSCO, Scopus
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International Journal of Pharmaceutical Sciences and Nanotechnology
Volume 13 • Issue 5 • September – October 2020
Research Paper https://doi.org/10.37285/ijpsn.2020.13.5.7 MS ID: IJPSN-5-10-20-KATLA

Fenofibrate Solid Dispersion for Improving Oral Bioavailability: Preparation, Characterization and *In vivo* Evaluation

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Received May 10, 2020; accepted June 12, 2020

ABSTRACT

Fenofibrate (FN) is used in the treatment of hypercholesterolemia. It shows poor dissolution and poor oral bioavailability after oral administration due to high liphophilicity and low aqueous solubility. Hence, solid dispersions (SDs) of FN (FN-SDs) were developed that might enhance the dissolution and subsequently oral bioavailability. FN-SDs were prepared by solvent casting method using different carriers (PEG 4000, PEG 6000, β cyclodextrin and HP β cyclodextrin) in different proportions (0.25%, 0.5%, 0.75% and 1% w/v). FN-SDs were evaluated for solubility, assay and *in vitro* release studies of the optimization SD formulation. Differential scanning calorimetry (DSC), powder X-ray diffraction (PXRD) and scanning electron microscopy (SEM) analysis was performed for morphology analysis. Further, optimized FN-SD formulation evaluated for pharmacokinetic performance in Wistar rats in comparison with FN suspension. From the results, FN-SD3 and FN-SD6 have showed 102.9 ± 1.3% and 105.5±3.1% drug release, respectively in 2 h. DSC and PXRD studies revealed that conversion of crystalline to amorphous nature of FN from FT-SD formulation. The oral bioavailability of FN-SD3 and FN-SD6 formulations exhibited 2.5-folds and 3.1-folds improvement when compared to FN suspension as control. Overall, SD of FN could be considered as an alternative dosage form for the enhancement of oral bioavailability of poorly water-soluble FN.

KEYWORDS: Fenofibrate; Solid dispersions; Solvent casting, *In vitro* dissolution; DSC; XRD; Oral bioavailability; Pharmacokinetics.

Introduction

Fenofibrate (FN) is a prodrug of fenofibric acid, an antilipemic agent that reduces both cholesterol and triglycerides in the blood and used in the treatment of hypercholesterolemia (Guay, 1999). Fenofibrate shows its efficacy by activating peroxisome proliferator activated receptor a (PPARa). This leads in increasing elimination of triglycerides from blood plasma by activating lipoprotein lipase and thereby reducing production of apoprotein C-III (Ming-Thau et al., 1994). It is chemically 2-(4-(4-Chlorobenzoyl) phenoxy)-2-methyl-propanoic acid 1-methylethyl ester of BCS class II drug, having log P of 5.24 and also insoluble in water. After oral administration it possesses aqueous solubility of less than 0.1 mg/mL owing to very less aqueous solubility and dissolution rate. Similarly, fenofibrate due to insufficient absorption it furnishes poor oral bioavailability from the aqueous environment of the GIT. Thus, the oral bioavailability of FN can be improved by increasing the aqueous solubility. Several formulation approaches were developed involving the use of surfactants (Pitta et al., 2017), co-surfactants (Venkatanaidu et al., 2015), lipids/oils (Thirupathi et al., 2017), permeation enhancers (Sam et al., 2019), co-solvents, cyclodextrins (Palem et al., 2016) and techniques like micronization (Kathroj et al., 2017), salt formation (Serajuddin, 2007), nanoparticles (Narendar and Kishan, 2016 and 2017), liquisolid formulations (Arun and Narendar, 2015) and solid dispersions (Narendar et al., 2016) have been employed to enhance the oral bioavailability of various hydrophobic drugs by promoting their aqueous solubility and dissolution rates (Badens et al., 2009; Yoshihashi et al., 2006; Leuner et al., 2000; Perrut et al., 2005).

Oral route is among the major route of delivery for most of the drugs in treatment of diseases. Nearly, 40% of new drugs exhibit poor aqueous solubility, which lead to poor oral bioavailability (BA), high intra and inter subject variability, lack of dose proportionality (Beneta, 2005). For increasing solubility of poorly water-soluble drugs, a new approach is formulating in the form of solid dispersion (SD) which involves incorporation of drug in a carrier which not only improve solubility but also

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International Journal of Advanced Science and Technology
Vol. 29, No. 7, (2020), pp. 13053 - 13057

A new pregnane steroid from the roots of *Caralluma umbellate*

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Abstract:

A new pregnane steroid was isolated from the root of Caralluma umbellata, together with three known steroid compounds. The structure of 1 was elucidated on the basis of spectral evidence including 2D NMR studies.

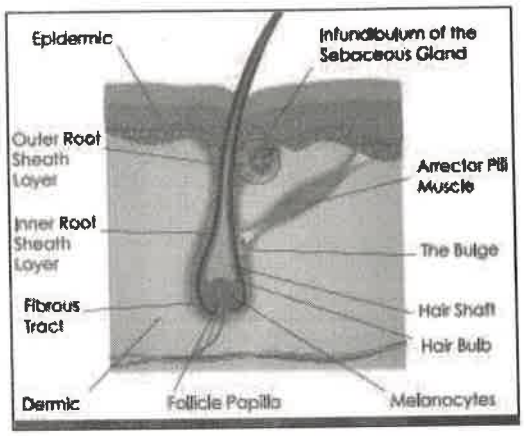
Keywords: *Caralluma umbellata; Boucerosia; Asclepiadaceae; pregnane steroid.*

1. Introduction

Caralluma umbellata (syn. *Boucerosia*) is an erect, branching, succulent perennial herb growing wild in Tirumala forest and surrounding places of Andhra Pradesh, India. It grows to a height of about 1 foot to 2 feet and the roots are fibrous. The plant, belonging to the family Asclepiadaceae, is medicinally important and rich in pregnane glycosides, which may possess different biological activities [1]. In folkloric medicine, as well as in unani and Ayurvedic systems of medicine, the plants of *Caralluma* are being used for the treatment of diabetic patients and rheumatism [2]. The pregnane steroid isolated from *C. umbellata* was shown to possess anti-inflammatory activity. Carumbelloside-I (3), isolated from *C. umbellata*, exhibited significant analgesic activity and antimicrobial activity [3]. A survey of the literature revealed that species of the genus *Caralluma* have been investigated on alcoholic extracts and found to be a source of steroids, triterpenes, and steroidal glycosides [4– 13]. The isolation and structural elucidation of three pregnane glycosides 2, 3, and 4 and one flavanone glycoside luteolin-4-*O*- neohesperidoside were reported from *C. umbellata* [14]. However, very few investigations were carried out on the extracts of non- polar solvents such as hexane . In order to search for any possible new compounds that could be extracted into non- polar

ISSN: 2005-4238 IJAST

International Journal of Pharmaceutical Research and Applications
Volume 6, Issue 3 May - June 2021, pp: 1300-1311 www.ijprajournal.com ISSN: 2249-778



Parts of the Hair:

Dermal papillae: Thedermal papilla is responsible for regulating the hair cycle and hair growth, and is also comprised of androgen receptors that are sensitive to the presence of DHT.

Matrix: The matrix surrounds the dermal papillae and contains all the active cells needed for hair growth and for the development of the different parts of the hair, particularly the outer root sheath, the inner root sheath and the hair shaft. Combined, the matrix and the dermal papillae make up the hair bulb.

Outer root sheath: The outer root sheath, or trichelemma, is the outermost part of the hair and is keratinized. It covers the entire hair follicle inside the dermis and then transitions through to the epidermis. providing the hair follicle with an opening from which to surface from.

Inner root sheath: inner root sheath is comprised of three parts: the Henley layer, Huxley layer, and cuticle. The Henley's and Huxley's layers are capsular layers that anchor onto each other with the purpose of stabilizing the hair. The cuticle, which is the innermost part that it closest to the hair shaft, is made from dead hardened cells and give the hair shaft added protection. This, together with the capsular layers that make up the Henley's and Huxley's layers, secures the hair and allows it to grow in length.

Hair shaft: The hair shaft is the solitary part of the hair follicle that fully exits the surface of the skin. The hair shaft is made up of three layers: the medulla, cortex, and the cuticle.

➤The **medulla** is described as an unsystematic and unstructured area located in the innermost region of the hair shaft and is not always present. ➤The **cortex**, in contrast to the medulla, is highly structured and organized.The cortex is made up of keratin and is responsible for giving hair its strength and durability, as well as its water uptake. The cortex also contains melanin and determines the color of hair based on thenumber,distributionand types of melanin granules present. ➤The **cuticle** is the hair's outer protective layer and is connected to the internal root sheath. It is a complex structure with a single molecular layer of lipids that helps hair repel water.

HAIR PHYSIOLOGY: ➤Anagen (growth phase): Most hair is growing at any given time. Each hair spends several years in this phase. ➤Catagen (transitional phase): Over a few weeks, hair growth slows and the hair follicle shrinks.➤Telogen (resting phase): Over months, hair growth stops and the old hair detaches from the hair follicle. A new hair begins the growth phase, pushing the old hair out.

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International Journal of Pharmaceutical Research and Applications
Volume 6, Issue 4 July-Aug 2021, pp: 137-139 www.ijprajournal.com ISSN: 2249-7781

Formulation and Evaluation of Hair Conditioner

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Date of Submission: 25-06-2021 Date of Acceptance: 07-07-2021

ABSTRACT: Hair conditioner is a hair care product used to improve the feel appearance and manageability of hair. Its main purpose is to reduce friction between strands of hair to allow smoother brushing or combing which might otherwise cause damage to the scalp. Conditioner is usually the second step to hair washing. While shampoo is formulated specifically to clean of sweat, dead skin cells and hair products. Conditioner makes hair softer and easier to manage. It also protects hair shafts from space damage. Most shampoos use chemicals that are rough on hair follicles. The truth is conditioning after shampoo is essential to having healthy, shiny hair. Conditioner smoothes the hair cuticle and adds body. Avoiding conditioner makes yours hair more prone to breakage, which can load to the appearance of thinning hair. Conditioning helps restore hair and protect it from damage. Unlike shampoo, you can condition your hair more than once a week and not worry about dryness or damage.

I. INTRODUCTION:

Hair conditioner is often a viscous liquid that is applied and massaged into the hair. Conditioner contain a variety of conditioning and moisturizing ingredients that are left behind on the hair after rinsing and affect the hair characteristics. The primary conditioning agents include quaternized surfactants (quats), cationic polymers, silicones, emollients, and humectants. Hair conditioners may contain moisturizers, oils and sunscreen, among other ingredients. Conditioners are frequently acidic, as low pH protonates the keratins amino acids. The hydrogen ions give the hair a positive charge and creates more hydrogen bonds among the keratin scales, giving the hair more compact structure. Organic acids such as citric acid are usually used to maintain acidity. They will act basically on shaft of the hair. The conditioner functions to impart manageability, gloss and antistatic properties to hair. Conditioners also attempt to recondition hair that has been damaged by chemical/mechanical trauma common sources of trauma. Include excessive brushing, hot blowing, drying, permanent hair waves, bleaching etc.

CLASSES OF CONDITIONER:

- Regular rinse off conditioner
- Intensive treatment conditioner
- Leave-in products
- Ordinary conditioner
- Hold conditioners

REGULAR RINSE-OFF CONDITIONER:

i. Normally applied after shampoo.
ii. Followed by a rinsing step.
iii. This is the most common form of conditioner sold.

INTENSIVE TREATMENT CONDITIONER:

i. Not for daily application.
ii. They are used for intensive treatment.
iii. Contain a higher level of active ingredients that are kept on the hair for a longer period of time.
iv. Sold as thicker creams to provide the perception of higher conditioning.

LEAVE-IN PRODUCTS:

i. Lighter and can potentially provide more significant benefits than rins-off products.
ii. Everything applied stays on the hair until the next shampoo. iii.
Come in various forms, such as detanglers, leave-in lotions, and sprays.
iv. They are marketed either for single application or multiple applications during the day.

ORDINARY CONDITIONER:

- It combines some aspects of both packs and leave in conditioners.
- These are generally applied directly after using shampoo, and manufactures usually produce a conditioner counterpart for different types of shampoos for this purpose.

HOLD CONDITIONERS:

- Hold conditioners are based on cationic polyelectrolyte polymers, hold the hair in a desired shape.
- These have a function and composition similar to diluted hair gels.

International Journal of Pharmaceutical Research and Applications
Volume 6, Issue 4 July-Aug 2021, pp: 137-139 www.ijprajournal.com ISSN: 2249-7781

Ingredients:

There are several types of hair conditioner ingredients, differing in composition and functionality:

- Moisturizers that hold the moisture in the hair. Usually these contain high proportions of humectants. These could also be provided by natural oils such as almond oil.
- Reconstructors, usually containing hydrolyzed protein. Their role is supposedly to penetrate the hair and strengthen its structure through polymer cross linking.
- Acidifiers, acidity regulators which maintain the conditioner's pH at about 3.5. In contact with acidic environment, the hair's somewhat scaly surface tightens up, as the hydrogen bonds between the keratin molecules are strengthened.
- Detangles, which modify the hair surface by pH as acidifiers, or by coating it with polymers, as glossers.
- Thermal protectors, usually heat-absorbing polymers, shielding the hair against excessive heat, caused by , e.g. blow drying, curling irons or hot rollers.
- Glossers, light-reflecting chemicals which bind to the hair surface. Usually polymers, silicones, e.g. dimethicone or cyclomethicone.
- Oils (EFAs- essential fatty acids), which can help dry/porous hair become more soft and pliable. The scalp produces sebum and EFAs are the closest thing to natural sebum.
- Surfactants - Approximately 97% of hair consists of a protein called keratin.

The surface of keratin contains negatively charged amino acids. Hair conditioners, therefore, usually contain cationic surfactants, which do not wash out completely. Because their hydrophilic ends strongly bind to keratin. The hydrophobic ends of the surfactant molecules then act as the new hair surface.

- Lubricants, such as fatty alcohols, panthenol, dimethicone, etc.
- Sequestrants for better function in hard water.
- Antistatic agents.
- Preservatives.
- Sunscreen, for protection against protein degradation and colour loss. Currently benzophenone-4 and ethylhexyl methoxycinnamate are the two sunscreens most commonly used in hair products. Cinnamidopyltrimonium chloride and a few others are used to a much lesser degree. The common sunscreens used on skin are rarely used for hair products due to their texture and weight effects.

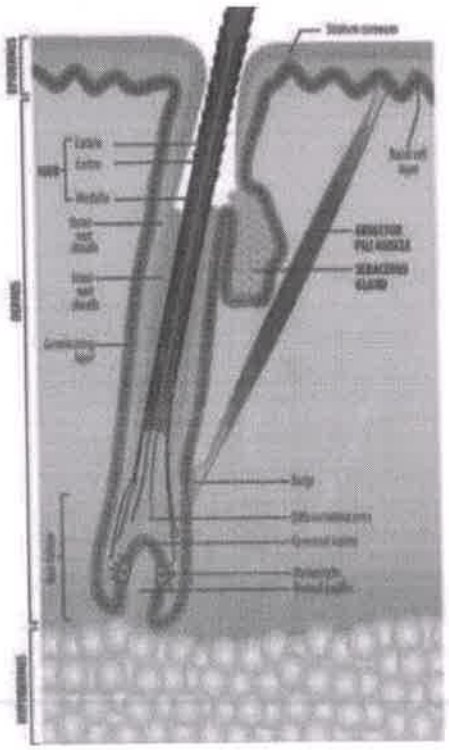
HAIR FIBER:

CENTRAL CORTEX:

- Responsible for the tensile properties of the hair.

CUTICLE:

- 8 to 10 layers of over lapping cells.
- Hair feel.
- Shine.
- Comb ability.



BENEFITS OF HAIR CONDITIONER:

- ✓ Reduce the forces associated with brushing of the hair.
- ✓ Provides colour retention benefits for colour-treated hair.
- ✓ The reduction or prevention of fly away hair.
- ✓ Increasing the ease of brushing.
- ✓ Repair of damaged hair.
- ✓ Strengthening of hair
- ✓ Repair of split ends.
- ✓ Increasing in hair shine.
- ✓ Feel softer.

International Journal of Pharmaceutical Research and Applications
Volume 6, Issue 4 July-Aug 2021, pp: 137-139 www.ijprajournal.com ISSN: 2249-7781

✓ Vitamin.

PURPOSE OF CONDITIONERS:

- ❖ Restoring moisture is one of the main important purpose.
- ❖ Hair should be manageable after wash.
- ❖ Its vital role is to be smoothing the hair follicles.
- ❖ Should maintain the pH of the hair.

FUNCTIONS OF HAIR CONDITIONER:

i. Non- irritant.
ii. Smooth and soften the hair.
iii. Texture.
iv. Protective sheath.
v. Tighten the cuticle scales.
vi. Provide bounce.

II. CONCLUSION:

Hair conditioner is one of the cosmetics which is widely used in daily life. They will act basically on shaft of the hair. The conditioner functions to impart manageability, gloss and antistatic properties to hair. Conditioners also attempt to recondition hair that has been damaged by chemical/mechanical trauma common sources of trauma. Include excessive brushing, hot blowing, drying, permanent hair waves, bleaching etc. This article gives an idea about hair parts, types , benefits, purpose, functions of conditioner and some commonly used ingredients in formulation of hair conditioner.

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WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 9, Issue 9, 1045-1053. Research Article ISSN 2277- 7105

Openaccess

DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF TAMSULOSIN HCL AND TOLTERODINE TARTRATE IN COMBINED PHARMACEUTICAL DOSAGE FORMS

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Article Received on
01 July 2020,
Revised on 23 July 2020,
Accepted on 12 August 2020,
DOI: 10.20959/wjpr20209-18442

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ABSTRACT

A simple and selective RP-HPLC method was developed for the simultaneous determination of Tamsulosin hydrochloride and Tolterodine tartrate tablet dosage forms. Chromatographic separation was achieved on an Inertsil ODS C18 column (4.6 mm × 250 mm, 5 µm) using mobile phase consisting of a mixture of phosphate buffer (KH_2PO_4) and Acetonitrile (CH_3CN) in the ratio 50:50 v/v, with detection of 214 nm. Retention time was estimated to be 2.81 min and 4.28 min for Tamsulosin Hydrochloride & Tolterodine tartrate respectively. Accuracy was found to be 100.46% and 99.6% for Tamsulosin HCL and Tolterodine tartrate respectively. The linearity was observed over a range of 0.25-0.75µg/ml for Tamsulosin HCl and 2.5-7.5µg/ml for Tolterodine tartrate. In precision relative standard deviation values for both was found to be less than 2.0%. The designed method was found to be simple, specific, accurate, linear and precise. It can be used for regular analysis for the simultaneous estimation of Tamsulosin hydrochloride and Tolterodine tartrate tablet dosage forms.

KEYWORDS: Tamsulosin HCl, Tolterodine tartrate, RP-HPLC, Method development, Validation.

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WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 10, Issue 7, 542-559. Review Article ISSN 2277– 7105

NUTRACEUTICALS FUNCTIONAL FOOD: A HOLISTIC APPROACH IN MANAGEMENT OF DIABETES

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Article Received on
03 May 2021,
Revised on 23 May 2021,
Accepted on 13 June 2021
DOI: 10.20959/wjpr20217-20834

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ABSTRACT

This study focussed on the role of Nutraceutical functional food in the management of Diabetes. Diabetes Mellitus is a major chronic metabolic disorder caused by an acquired deficiency in the production of insulin by the pancreas. About 422 million people worldwide have diabetes and 1.6 million deaths attributed to diabetes each year. For the management of Diabetes, Neutraceuticals functional food has been an attractive option over conventional therapies as it is of natural origin imposes fewer side effects, safer in use, and is of nutritional value. Medicinal plant-derived Neutraceutical functional food is defined as "food similar in appearance to conventional food have physiological benefits beyond basic nutritional function". Nutraceuticals comprise herbs, nutrients, dietary supplements, vitamins, and micronutrients. Functional food composed mainly of bioactive components of medicinal plant extracts containing anti-diabetic properties plays a significant role to combat chronic diseases like diabetes. Healthy antioxidants and nutrient-rich food incorporated into the diet of diabetic patients help to overcome diabetic-associated complications such as oxidative stress, obesity, etc. These also have major value in consumer demand and have become the promising approach in the management of Diabetes. This review summarizes Neutraceutical functional food ingredients and herbals extract bioactive phytochemicals with anti-diabetic properties benefiting the quality lifestyle of the diabetic population.

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WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 9, Issue 9, 1045-1053. Research Article ISSN 2277– 7105

DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF TAMSULOSIN HCL AND TOLTERODINE TARTRATE IN COMBINED PHARMACEUTICAL DOSAGE FORMS

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Article Received on
01 July 2020,
Revised on 23 July 2020,
Accepted on 12 August 2020,
DOI: 10.20959/wjpr20209-18442

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ABSTRACT

A simple and selective RP-HPLC method was developed for the simultaneous determination of Tamsulosin hydrochloride and Tolterodine tartrate tablet dosage forms. Chromatographic separation was achieved on an Inertsil ODS C18 column (4.6 mm × 250 mm, 5 µm) using mobile phase consisting of a mixture of phosphate buffer (KH_2PO_4) and Acetonitrile (CH_3CN) in the ratio 50:50 v/v, with detection of 214 nm. Retention time was estimated to be 2.81 min and 4.28 min for Tamsulosin Hydrochloride & Tolterodine tartrate respectively. Accuracy was found to be 100.46% and 99.6% for Tamsulosin HCL and Tolterodine tartrate respectively. The linearity was observed over a range of 0.25-0.75µg/ml for Tamsulosin HCl and 2.5-7.5µg/ml for Tolterodine tartrate. In precision relative standard deviation values for both was found to be less than 2.0%. The designed method was found to be simple, specific, accurate, linear and precise. It can be used for regular analysis for the simultaneous estimation of Tamsulosin hydrochloride and Tolterodine tartrate tablet dosage forms.

KEYWORDS: Tamsulosin HCl, Tolterodine tartrate, RP-HPLC, Method development, Validation.

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St. Pauls College of Pharmacy
Turkayamjal, R.R. Dist-501 510.

ISSN 2349-7203

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

HUMAN

Human Journals
Research Article
November 2020 Vol::19, Issue:4

SJF: 6.64

Development and Validation of an Analytical Method for the Simultaneous Estimation of Curcumin and Piperine in Bulk and Combination Dosage Form by RP-HPLC

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
HUMAN

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Submission: 20 October 2020
Accepted: 27 October 2020
Published: 30 November 2020

HUMAN JOURNALS
www.ijppr.humanjournals.com

Keywords: Curcuminoid and Piperine, RP-HPLC, validation

ABSTRACT

A rapid and precise Reverse Phase High Performance Liquid Chromatographic method has been developed and validated for the simultaneous estimation of curcumin and piperine, in bulk as well as in tablet dosage form. Separation was carried out on Inertsil-ODS C18 (250 x 4.6 mm, 5 µm) column using a mixture of Methanol: Buffer Ph 3:2, (80:20) as mobile phase at a flow rate of 1.0 ml/min. The detection was carried out at 252 nm. The retention times of the curcuminoid and piperine was found to be 3.048; 4.316 ± 0.02 min respectively. The method produces linear response in the concentration range of 5-25 µg/ml for curcumin and 50-250 µg/ml for piperine. The method was precise since the % RSD values of peak areas for five duplicate injection was found to be below "2". The % recovery values for the analyte were found to be 99.7% & 99.9% indicating the method was accurate. The LOD & LOQ of curcumin and piperine were found to be 0.12 µg/ml, 0.36 µg/ml & 0.14 µg/ml, 0.45 µg/ml. A series of trials were attempted to develop a sensitive RP-HPLC method and finally optimized with the mobile phase composition Methanol: Buffer pH 3:2 (80:20). The method was found to be rapid, linear, precise, accurate, sensitive that can be adopted for routine analysis.

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Development and Validation of RP-HPLC Method for the Simultaneous Estimation of Tamsulosin HCl and Dutasteride in Bulk and Tablet Dosage Form

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ABSTRACT

The aims of the present research work is to develop and validate RP-HPLC method for the simultaneous estimation of Tamsulosin HCl and Dutasteride in bulk and tablet dosage form. Chromatographic separation was achieved by using waters Inertsil -ODS C18 (250 x 4.6 mm, 5 µ) column with a flow rate of 1.0 ml/min. The injection volume was 20µl. The optimized mobile phase was phosphate buffer and methanol in the ratio of 55:45%v/v. UV detector wavelength monitored at 236 nm and the run time was 8 min. The retention time was found to be 3.617min for Tamsulosin and 5.013 min for Dutasteride. The linearity was obtained in the range of

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Development and Validation of an Analytical Method for the Simultaneous Estimation of Artemether and Lumefantrine in Bulk and Pharmaceutical Dosage Form

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Abstract

A rapid and a precise Reverse Phase High Performance Liquid Chromatographic method has been developed and validated for the simultaneous estimation of Artemether and Lumafantrine, in bulk as well as in tablet dosage form. Separation was carried out on HPLC –Waters Model NO.2690/5 Inertsil-ODS C18 (250 x 4.6mm, 5µm) column using a mixture of Methanol: water 45:55 as mobile phase at a flow rate of 1.0ml/min. The detection was carried out at 254nm.The retention times of Artemether and Lumafantrine were found to be 4.249 , 5.995 respectively. The method produces linear response in the concentration range of 20ppm to 80 ppm of target concentration .The method was precise since the %RSD values of peak areas for five duplicate injection was found to be below " 2".The % recovery values for the analyte were found to be "99.987% & 99.99%" indicating the method was accurate. The LOD & LOQ of artemether and lumefantrine were found to be

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

A REVIEW ON NIBS-IMATINIB- "MASTER IN ONCOLOGY"

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ABSTRACT:

The introduction of 20 years ago of imatinib ,the first tyrosine kinase inhibitor (TKI) ,has drastically improved the survival of patients with chronic phase (CP) chronic myeloid leucemia (CML) , Imatinib and other TKIs have become standard ontime therapy for cancer.

Imatinib is one of the first cancer therapies that has shown a potential for a novel approach in cancer treatment.Imatinib represents a therapeutic break through as a targeted therapy in the form of selective tyrosine kinase inhibitors(TKIs) specifically BCR-ABL, C-KIT, PDGFRA.It has become the first line drug in management of several cancers.Apart from its remarkable success in(ML, it has also shown promising results in the treatment of gastro-intestinal stroal tumors clonal eosinoptilic disorder phila delphia chromosome positive acute lymphatic leukemia and in steroud refractory chronic graft-versus-host disease because of its anti-PDGFR action.

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Turkayamjal, R.R. Dist-501 510.

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

DEVELOPMENT AND VALIDATION OF AN ANALYTICAL METHOD FOR THE SIMULTANEOUS ESTIMATION OF ERTUGLIFLOZIN AND SITAGLIPTIN IN BULK AND PHARMACEUTICAL DOSAGE FORM

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ARTICLE INFO

Key Words Ertugliflozin, Sitagliptin,RP-HPLC, validation

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

ABSTRACT

A rapid and a precise Reverse Phase High Performance Liquid Chromatographic method has been developed and validated for the simultaneous estimation of ertugliflozin and sitagliptin, in bulk as well as in tablet dosage form. Separation was carried out on HPLC –Waters Model NO.2695with Phenomenex Luna C18 (4.6mm×150mm, 5µm) column using a mixture of methanol: Buffer (35:65% v/v) as mobile phase at a flow rate of 1.0ml/min. The detection was carried out at 261nm.The retention times of ertugliflozin and sitagliptin were found to be 2.256, 5.427respectively. The method produces linear response in the concentration range of 60ppm to 140 ppm for ertugliflozin and 100ppm to 600 ppm for sitagliptin with respect to target concentration. The method was precise since the %RSD values of peak areas for five duplicate injection was found to be below " 2". The % recovery values for ertugliflozin and sitagliptin were found to be "100.35% &100.51%" respectively indicating the method was accurate. The LOD & LOQ of ertugliflozin and sitagliptin were found to be 2.63µg/ml, 3.02µg/ml &7.92µg/ml, 9.06. µg/ml. The method was found to be rapid, linear, precise, accurate, sensitive and suitable to adopted for routine quality control analysis.

INTRODUCTION

Ertugliflozin belongs to the class of potent and selective inhibitors of the sodium-dependent glucose cotransporters (SGLT), more specifically the type 2 which is responsible for about 90% of the glucose reabsorption from glomerulus. This drug was developed under the collaboration of Merck and Pfizer. It was FDA approved as monotherapy and in combination with Sitagliptin or Metformin hydrochloride on December 22, 2017. Ertugliflozin is very slightly soluble in water,Soluble in DMSO,soluble in ethyl alcohol and acetone, slightly soluble in ethyl acetate and Acetonitrile. The molecular formula is $C_{22}H_{25}ClO_7$ and molecular weight is436.89.

Sitagliptin is an oral dipeptidyl peptidase-4 (DPP-4) inhibitor used in conjunction with diet and exercise to improve glycemic control in patients with type 2 diabetes mellitus. The effect of this medication leads to glucose dependent increases in insulin and decreases in glucagon to improve control of blood sugar. Sitagliptin was granted FDA approval on October 16, 2006. It is soluble in water and N, N-dimethyl formamide, slightly soluble in methanol, soluble in ethanol, acetone and Acetonitrile and insoluble in isopropanol and isopropyl acetate.The molecular formula is $C_{16}H_{15}F_6N_5O$and molecular weight is 407.31.Literature revealed a few reported analytical methods on this drug individually and combination with some other drugs. A few

UGC SJIF 6.2

Development and Validation of RP-HPLC Method for the Simultaneous Quantification of Alogliptin and Metformin in Bulk and Formulation

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SCI UGC

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

DEVELOPMENT AND VALIDATION OF A STABILITY-INDICATING RP-HPLC METHOD FOR THE SIMULTANEOUS QUANTIFICATION OF METFORMIN AND TENELIGLIPTIN IN SOLID DOSAGE FORM

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ARTICLE INFO

Key Words
RP-HPLC,
Metformin,
Teneligliptin.

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

ABSTRACT

A simple, rapid, accurate, precise and economical reverse phase High performance liquid chromatographic method was developed for simultaneous quantification of two anti-diabetic drugs, viz., Metformin and Teneligliptin. The separation of both the drugs was achieved on an INERTSIL ODS column C8 (4.6mm x 250mm, 5µm particle size) using a mobile phase of phosphate buffer (at pH 3): Acetonitrile (50:50 v/v). The flow rate was 1.0 ml/min and detection was done at 240 nm. The retention time of Metformin and for Teneligliptin was 3.608 mins and 5.148 mins respectively. The proposed method was validated as per ICH guidelines. The linearity of the method was evaluated at a range of 250 to 1250µg/ml and 10 to 50µg/ml for Metformin and Teneligliptin respectively. The Correlation Coefficient of Metformin and Teneligliptin were 0.999 each. Precision studies were carried out and % RSD of peak areas of Metformin and Teneligliptin was about 0.4and 0.8 respectively. The percentage recoveries of both the drugs Metformin and Teneligliptin from the tablet formulation were 99.86% and 99.96% respectively. Results obtained for LOQ, LOD and Robustness were well within the acceptance criteria. Validation results indicated that the method is linear, accurate, precise, and robust. The simple mobile phase composition makes this method cost effective, rapid, and non-tedious and can also be successfully employed for simultaneous estimation of both drugs in commercial products.

INTRODUCTION

The Metformin and Teneligliptin fixed-dose combination is an anti-hyperglycemic agent used for treating non-insulin-dependent diabetes mellitus (NIDDM).

Metformin is biguanide derivative it improves insulin sensitivity and decreases insulin resistance by inhibiting complex of the mitochondrial respiratory chain and inducing AMP activated protein kinase dependent signaling.

Teneligliptin is peptidomimetic known as dipeptidyl peptidase-4 inhibitors or "gliptins".The mechanism of DPP-4 inhibitors is to increase incretin levels (GLP-1 and GIP), which inhibit glucagon release, which in turn increases insulin secretion, decreases gastric emptying, and decreases blood glucose levels.

Metformin is biguanide derivative with the chemical name (1-carbamimidamido-N, N-dimethylmethanimidamide). It is a White Crystalline powder, soluble in Water and Ethanol.**Teneligliptin** is pyrrolidine-based

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

UGC / SJIF-6.2

Development and Validation of RP-HPLC Method for the Simultaneous Quantification of Alogliptin and Metformin in Bulk and Formulation

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Research Article

Available Online at: www.ijpir.com

International Journal of Pharmacy and Industrial Research

ISSN Print 2231 – 3648
Online 2231 – 3656

openaccess

Preparation, Characterization and Evaluation of Pregabalin Microspheres

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ABSTRACT

In the present work, Microspheres of Pregabalin using PLGA, Ethyl cellulose and HPMC K4M as polymers were formulated to deliver pregabalin via oral route. The results of this investigation indicate that solvent evaporation method can be successfully employed to fabricate pregabalin microspheres. In this work an effort was made to formulate microsphere of pregabalin by using different polymers. Prepared formulations are evaluated for bulk density, tapped density, precent mucoadhesion, Percent compressibility, hausners ration, percentage yield, size and interaction study by Differential scanning calorimeter and *in vitro* drug release. Formulation which passed all the evaluation parameters was considered as best formulation of Pregabalin. The present study conclusively that pregabalin microsphere could be prepared successfully and formulation E5 was shows satisfactory result.

Keywords: Pregabalin, PLGA, Ethyl cellulose and HPMC K4M and Microspheres.

INTRODUCTION

Oral route drug administration is by far the most preferable route for taking medications. However, their short circulating half life and restricted absorption via a defined segment of intestine limits the therapeutic potential of many drugs. Such a pharmacokinetic limitation leads in many cases to frequent dosing of medication to achieve therapeutic effect. Rational approach to enhance bioavailability and improve pharmacokinetic and pharmacodynamics profile is to release the drug in a controlled manner and site specific manner. Microspheres are small spherical particles, with diameters 1 µm to 1000 µm. They are spherical free flowing particles consisting of proteins or synthetic polymers which are biodegradable in nature. There are two types of microspheres; microcapsules and micromatrices, which are described as, Microcapsules are those in which entrapped substance is distinctly surrounded by distinct capsule wall and micromatrices in which entrapped substance is dispersed throughout the matrix. Microspheres are sometimes referred to as microparticles. Microspheres can be manufactured from various natural and synthetic materials. Microsphere play an important role to

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Openaccess

World Journal of Pharmaceutical Sciences
ISSN (Print): 2321-3310; ISSN (Online): 2321-3086
Available online at: http://www.wjpsonline.org/
Review Article

Lipid Based Drug Delivery Systems: Past, Present and Future Perspectives in Improving Drug Bioavailability

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Received: 26-05-2021 / Revised Accepted: 30-06-2021 / Published: 02-07-2021

ABSTRACT

Low oral bioavailability is due to low aqueous solubility of drugs is a growing challenge in the evolution of new pharmaceutical products. Lipid based formulations such as microemulsion, nanoemulsion, self-emulsifying drug delivery system (SEDDS), self-microemulsifying drug delivery system (SMEDDS) and self-nanoemulsifying drug delivery systems (SNEDDS) used to improve the oral bioavailability of BCS-II drugs were surveyed in many studies as an efficient approach for improving the bioavailability and dissolution rate. This review article focuses on the following topics. First, it presents an overview of lipid-based drug delivery systems and excipients involved in improving the solubility and bioavailability of poorly water-soluble drugs. Second, the article reviews selection of components in lipid-based drug delivery systems for oral use with their characteristics. Third, it brings a detailed description of the processing techniques necessary to obtain lipid-based formulation for oral delivery, along with brief discussion of their strategies to enhance the bioavailability and characterization perspectives.

Keywords: Lipid-based drug delivery system (LBDDS), BCS class II drugs, Bioavailability, Self-emulsifying drug delivery system, Self-microemulsifying drug delivery system, Self-nano emulsifying drug delivery system

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How to Cite this Article: Maimoona Aleem, Venu Madhav Katla, Kiranmai Mandhava. Lipid Based Drug Delivery Systems: Past, Present and Future Perspectives in Improving Drug Bioavailability. World J Pharm Sci 2021; 9(7): 31-44.

Principal
St. Pauls College of Pharmacy
Turkayamjal, R.R. Dist-501 510.

ISSN 2349-7203

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

HUMAN

Human Journals
Short Communication
June 2020 Vol.:18, Issue:3

SJIF 6.64

Non Communicable Diseases in India - Prevalence & Prevention

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
HUMAN

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Submission: 24 May 2020
Accepted: 31 May 2020
Published: 30 June 2020

HUMAN JOURNALS
www.ijppr.humanjournals.com

Keywords: Non communicable diseases, socioeconomic development, risk factors, lifestyle modifications

ABSTRACT

Non communicable diseases (NCDs) are medical conditions or diseases that are not caused by infectious agents. These are chronic diseases of long duration and generally slow progression and are the result of a combination of genetic, physiological, environmental and behavioral factors. NCDs are one of the major challenges for public health in the 21st century, not only in terms of human suffering they cause but also the harm they show on the socio-economic development of the country. NCDs kills approximately 41 million people (71% of global deaths) worldwide each year, including 14 million people who die too young between the ages of 30 and 70. The majority of premature NCD deaths are preventable. Although morbidity and mortality from NCDs mainly occur in adulthood, exposure to risk factors begins in early life. Therefore, NCDs and its risk factors have great importance to young people as well. The present review focusses on the major NCDs in India, their risk factors and the preventable measures by simple lifestyle modifications.

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

A REVIEW ON LIPOSOMAL DELIVERY SYSTEM

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ARTICLE INFO

Key words:
Liposomes, drug delivery system, phospholipid vesicles, membrane permeability.

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

ABSTRACT

Liposomes are defined as closed bilayer phospholipid vesicles that act as drug carrier and have been successfully translated into real time clinical applications. Since the first development in 1965, liposomes have witnessed many technical advances in recent years. Various clinical studies have demonstrated the superiority of liposomal formulation over conventional delivery system and remarkable development with significant clinical applications enhancing the therapeutic index of various drugs by alter their biodistribution profile, increases the solubility, membrane permeation target delivery, controlled release. The liposomes are prepared by different methods and they vary from 30nm to several microns in size. Liposomes exhibit broad and potential application in different fields such as anticancer, anti-inflammatory, antifungal with their specific characteristics, nontoxic, fully biocompatible, high stability, optical properties and easy membrane permeability. In this review paper an attempt has been made to elaborate the types, drug delivery technology, preparation method, application and evaluation parameter of liposomes and their contribution in drug delivery system.

INTRODUCTION

Nanomedicine, a field of nanotechnology has various applications in human medicine such as, Targeted Drug Delivery, Controlled Release, Permeability Enhancement, increasing efficiency and solubility of drug along with reducing the toxicological effects. The fate of Drug molecules against biopharmaceutical properties such as ADME can be improved through nanotechnology. Numerous nanocarrier have been developed for transport of therapeutic to the targeted tissue. Significant advancements are done for preparation and characterization of nanoparticle to achieve increase stability and bioavailability of encapsulated drug contents. Liposomes being biocompatible and biodegradable along with their low Toxicity is efficient delivery material for therapeutic agents. Liposomes are closed microscopic spherical vesicles that are composed of phospholipids and sterols. Being amphipathic in nature liposomes can encapsulate lipophilic, amphipathic, hydrophilic drug substances into their inner aqueous phase. Generally a free drug achieves therapeutic level for shorter duration when reaches the systemic circulation, but the drug loaded in liposome achieve therapeutic activity for longer duration because of altered metabolism and excretion. Liposomes may vary in size from 30nm to several microns. Various preparation methods are developed for synthesis of liposomes. liposomes encapsulated a large number of drugs that

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IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
ISSN 2349-7203
HUMAN

Human Journals
Review Article
May 2021 Vol.:21, Issue:2

SJIF 6.64
open access

A Review on Polyherbal Shampoo Powder

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
HUMAN

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Submitted: 25 April 2021
Accepted: 02 May 2021
Published: 30 May 2021

HUMAN JOURNALS
www.ijppr.humanjournals.com

Keywords: Hair, Powdered polyherbal shampoo, *Barbadensis miller*, Hair disorder, Ayurvedic ingredients, Physicochemical evaluation

ABSTRACT

The shampoo sector is probably the largest unit among the hair care products. Shampoos are one of the cosmetic products used daily as the hair is a special and cherished feature of human being which beautifies the look of every individual. Day by day dependency of people is raising on herbal formulations not only for a chronic ailment but also for several acute problems. The assurance therapy with minimal side effects has been proven with ayurvedic formulations. In the scenario of changing food habits, stress, and dependent environment conditions, several hairs and skin disorders are encountered. In case of hair disorders like dandruff, hair fall, dull hair, split ends, etc, a proper selection of ayurvedic ingredients with the required amount, the dosage form can be formulated to fight against hair problems. This polyherbal shampoo was formulated by using natural ingredients like Aloe vera (*Barbadensis miller*), Neem leaves (*Azadirachta indica*), Reetha fruit (*Sapindusmukurossi*), Shikakai (*Acacia concinna*), Amla fruit (*Emblica officinalis*), Hibiscus leaves (Hibiscus *rosa- sinensis*) with proven efficacy. The combination of such ingredients has made it possible to secure highly effective dry powder shampoo. The formulation at laboratory scale was evaluated for several organoleptic properties, general powder characteristics and physicochemical evaluation to ensure the safety and efficacy of the formulation.

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346-363

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DEVELOPMENT AND VALIDATION OF A NEW STABILITY INDICATING ANALYTICAL METHOD FOR THE SIMULTANEOUS ESTIMATION OF ALFATRADIOL AND DEXAMETHASONE BY RP-HPLC IN BULK AND PHARMACEUTICAL DOSAGE FORM

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ABSTRACT

A new analytical simple, accurate, precise, robust and rapid reverse phase high-performance liquid chromatographic (RP-HPLC) method has been developed and validated for the simultaneous estimation of Alfatradiol and Dexamethasone in active pharmaceutical ingredient and marketed pharmaceutical dosage form. The separation was done on a Phenomenex Gemini (C18) (150mm x 4.6mm, 5µm) column with a mobile phase consisting of Acetonitrile: Phosphate Buffer in the ratio of 44:66% v/v and pH was adjusted to 5.6 with ortho- phosphoric acid solution at a flow rate of 1.0mL/min. The eluents were monitored at 286 nm by using PDA detector. The retention times for Alfatradiol and Dexamethasone were found to be 1.786min and 3.477min respectively. The Alfatradiol and Dexamethasone followed linearity in the concentration range of 10-30 µg/mL and 10-50µg/mL respectively (r2 = 0.999). The developed method was validated for specificity, accuracy, precision and LOD & LOQ and robustness as per

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ISSN–2230-7346

Journal of Global Trends in Pharmaceutical Sciences

A REVIEW ON POTASSIUM NITRATE, CHLORHEXIDINE GLUOCONATE AND HYDROGEN PEROXIDE TOOTHPASTE FORMULATION TO TREATSENSITIVITY, BLEEDING GUMS & WHITENING OF TEETH

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ARTICLE INFO

Key Words

Aesthetics, Bleeding gums, Chlorhexidine gluconate, Hydrogen peroxide, Dentifrice, Potassium nitrate, Sensitivity, Whitening

Access this article online

Website: https://www.jgtps.com/

Quick Response Code:

ABSTRACT

Toothpasteis the paste or gel dentifrice used with a tooth-brush to clean and maintain aesthetics and health of teeth. It is used to maintain or promote oral hygiene, since last ten years there has been a booming demand for aesthetic dentistry, consequently the bleaching and whitening products have made effective augmenting cosmetic,so a routinely used product and its efficiency in whitening play a major role in aesthetics.Toothpastes are complex mixtures of abrasives, surfactants, anti-carrier agents such as fluorides, tartar control ingredients, pH buffers, humectants to prevent drying out and increase the pleasant feeling in the mouth, binders to provide consistency and shape. Tooth sensitivity is a common problem that effects many people commonly, it involves experiencing pain or discomfort to teeth from hot drinks, cold drinks or ice creams,andalso from sweets. Bleeding gums is a sign that plaque has buildup where the teeth meet the gums, a condition that can leads to gingivitis and periodontitis.Potassium nitrate in toothpaste works by calming the nerves in the teeth.They desensitize nerves in tooth pulp. Formulations containing 5% potassium nitrate (KNO3) is clinically proven to reduce dentin hypersensitivity. Potassium ions travel into exposed dentin tubules from the tooth surface to reach internal nerves.

INTRODUCTION

Toothpaste has been used since the ancient past and one of main irreplaceable components of oral health care. The design of toothpaste formulation began in china and India, during 300 to 500 BC period. Squashed bone, pulverized egg and shells were utilized as abrasive as a part of tooth cleaning. Modern toothpaste formulation was developed in the 19th century. Later onchalk and soap was incorporated to those formulations. After 1945 several formulation advancements of different detergent had begun. Sodium laurel sulphate has been used emulsifying agent. In recent years the focus has shifted towards the use of active ingredients during formulation development to prevent and or treat oral illness.The objective behind the use of tooth paste is its ability to deliver preventive and therapeutically active agents such as fluoride, metal salts and pyrophosphates. Active pharmaceutical ingredients, abrasives, humectants, detergents, binders, sweetners, preservatives, antioxidants and flavors are the most commonly used ingredients of toothpaste. There are number ofmaterialsand their combinations used in the formulation of tooth paste today.

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

A REVIEW ON NANOPARTICLES – ZINC OXIDE NANOPARTICLES CHARACTERIZATION, APPLICATIONS AND EVALUATIONS

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ARTICLE INFO

Key words:
Nanoparticles, Zinc Oxide, Synthesis, Biodegradable

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

ABSTRACT

Nanoparticles are defined as particulate dispersions or solid particles drug carrier that may or may not be biodegradable. As per International organization for standardization (ISO) and American society for testing and materials (ASTM) standards, nanoparticles sizes ranges from 1 to 100nm with one or more dimensions. Among metal nanoparticles, Zinc oxide nanoparticles are given much importance due to their utilization in gas sensors, biosensors, cosmetics, drug-delivery systems. Zinc oxide nanoparticles are synthesized by several different methods. Zinc oxide nanoparticles exhibit broad and potential applications in different fields with their specific characteristics such as surface area, shape, low toxicity, optical properties, high binding energy and large band gap. In this review paper an attempt has been made to elaborate the types, preparation methods, applications, evaluation parameters and different characterization techniques of Zinc oxide nanoparticles.

INTRODUCTION

Nanotechnology is a modern field of science which plays a dominant role in day to day life aspects. The fundamental component of nanotechnology is nanoparticles. Nanoparticles are made up of carbon, metal, metal oxides or organic matter. Numerous synthesis methods are either being developed or improved to enhance the properties and reduce the production costs. A vast development in the instrumentation has led to an improved nanoparticle characterisation and subsequent application. Recently, the scientific community has shown interest to synthesis of metal and metal oxides nanoparticles. Among these nanoparticles Zinc oxide nanoparticles exhibits most significance and wide range of applications. Zinc oxide is an inorganic compound with the molecular formula ZnO. ZnO appears as a white powder and nearly insoluble in water. Zinc oxide nanoparticles are synthesised by Means of numerous conventional approaches. Nano-sized Zinc oxide exhibits varying morphologies and shows significant antibacterial activity over a wide spectrum of bacterial species explored by a large body of researchers. In the present review, the synthesis of Zinc oxide nanoparticles using numerous approaches and the characterization of Zinc oxide nanoparticles using X-ray diffraction, scanning electron microscopy (SEM), transmission electron microscopy (TEM), UV-visible absorption spectroscopy is discussed. This paper presents a review on types of nanoparticles present. Different methods used for the preparation and application of Zinc oxide nanoparticles. Finally, general evaluation parameters and significant characterization techniques used in Zinc oxide nanoparticles are discussed.

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
ISSN 2349-7203
HUMAN

Human Journals
Research Article
September 2020 Vol.:19, Issue:2

UGC.

Development and Validation of RP-HPLC Method for the Simultaneous Estimation of Bupropion and Zonisamide in Bulk and Tablet Dosage Form

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
HUMAN

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Submission: 20 August 2020
Accepted: 26 August 2020
Published: 30 September 2020

www.ijppr.humanjournals.com

Keywords: Bupropion, Zonisamide, RP-HPLC, ICH guidelines, Validation

ABSTRACT

The present research work aims to develop and validate the RP-HPLC method for the simultaneous estimation of bupropion and Zonisamide in bulk and tablet dosage form. Chromatographic separation was achieved by using water inertsil -ODS C18 (250 x 4.6 mm, 5 µ) column with a flow rate of 1.0 ml/min. The injection volume was 20µl. The optimized mobile phase was methanol and phosphate buffer in the ratio of 80:20%v/v. UV detector wavelength monitored at 252 nm and the run time was 8 min. The retention time was found to be 3.226min for Bupropion and 4.522 min for Zonisamide. The linearity was obtained in the range of 20-80 ppm for both drugs. The developed method was validated statistically according to ICH guidelines. The proposed method was accurate, precise, reproducible, and robust and can be employed for routine quality control analysis of pharmaceutical formulations.

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International Journal of Pharmaceutical Research and Applications
Volume 6, Issue 3 May - June 2021, pp: 729-734 www.ijprajournal.com ISSN: 2249-7781

A Review on Ixora Coccinea Plant

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Date Of Submission: 01-06-2021 Date Of Acceptance: 14-06-2021

ABSTRACT: Ixora Coccinea is additionally referred to as Jungle herb, flame of the woods or Jungle flame. It belongs to the family rubiaceae; it's a typical shrub native to southern Asian nation, Asian nation and srilanka. Relying upon the medical condition the flowers, leaves, roots and also the stem area unit wants to treat varied ailments within the Indian ancient system of drugs, the written material, and additionally in varied people medicines. The fruits once totally ripe area unit wants to treat varied ailments within the Indian ancient system of drugs. The fruits once totally ripe area unit used as dietary sources. Pharmacological studies of those plant shows that it posses inhibitor, medicament, gastro protecting, hepatoprotective, antidiarrhoeal, anti-nociceptive, antimutagenic and chemo preventive effects. This review studies concerning the cultivation, ancient and pharmacologic effects of Ixora Coccinea.

KEYWORDS: Ixora Coccinea, flame of woods, Jungle herb, Ayurveda, ancient system of drugs, pharmacologic studies.

I. INTRODUCTION

Ixora Coccinea is additionally referred to as Jungle herb, flame of the woods or Jungle flame. It belongs to the family rubiaceae; it's a typical shrub native to southern Asian nation, Asian nation and srilanka. The genus name Ixora is meant to be derived from the Indo-Aryan word "ikvana" when a Malaysian spiritual being, or probably from the name "iswara" the opposite name of lord Shiva to whom the flowers area unit offered throughout worship, whereas the species name "cocaine" suggests that scarlet(reference:Manjeshwar shrinath Baliga and Poruthukaran john kurian)

Ixora coccinea is a dense, multi-branched evergreen shrub, usually 4–6 ft (1.2–1.8 m) tall, however capable of reaching up to 12 ft (3.7 m) high. It's a rounded kind, with a selection which will exceed its height. The glossy, leathery, rectangular leaves are concerning 4 in (10 cm) long, with entire margins, and area unit carried in opposite pairs or whorled on the stems. Tiny cannular, scarlet flowers in dense rounded clusters 2–5 in (5.1–12.7 cm) across area unit created most years long.

Fig: 1-IXORA COCCINEA PLANT

SCIENTIFIC CLASSIFACIATION
Kingdom : Plantae

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

DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR THE SIMULTANEOUS ESTIMATION OF ATOVAQUONE AND PROGUANIL HYDROCHLORIDE IN PHARMACEUTICAL DOSAGE FORM

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Article Received on
11 August 2020,
Revised on 01 Sept. 2020,
Accepted on 22 Sept. 2020
DOI: 10.20959/wjpps202010-17460

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ABSTRACT

A simple, reproducible and efficient reverse phase high performance liquid chromatographic method was developed for simultaneous determination of Atovaquone and Proguanil HCL in pure form and marketed combined pharmaceutical dosage forms. A column having Phenomenex Luna (C18) (250mm x 4.6mm, 5µm) in isocratic mode with mobile phase containing Methanol: Water (65:35 v/v) was used. The flow rate was 1.0 ml/min and effluent was monitored at 220 nm. The retention time (min) and linearity range (ppm) for Atovaquone and Proguanil HCL were found to be (3.202, 5.463min) and (30-70, 10-50), respectively. The proposed method has been validated for linearity, accuracy and precision, robustness and limit of detection and limit of quantification. The limit of detection (LOD) and limit of quantification (LOQ) were found to be 2.6µg/ml and 7.8µg/ml for Atovaquoneand 3.4µg/ml 10.2µg/ml for Proguanil HCL respectively. The percentage recovery of Atovaquone and Proguanil HCL was found to be 100.187% and 100.748% respectively. The developed method was found to be accurate, precise and selective for simultaneous determination of Atovaquone and Proguanil HCL in pure form and marketed combined pharmaceutical dosage forms.

KEYWORDS: Atovaquone and Proguanil HCL, RP-HPLC, Validation, Accuracy, Precision.

UGC

Development and Validation of RP-HPLC Method for the Simultaneous Estimation of Sacubitril and Valsartan in Bulk andMarketed Fixed Dosage Form

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

REVIEW ON QUALITY OF LIFE IN COVID-19 PATIENTS

opened

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Article Received on
31 May 2021,
Revised on 21 June 2021,
Accepted on 11 July 2021,
DOI: 10.20959/wjpps20218-19554

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ABSTRACT

Quality of life is defined as well being of a population with positive and the negative elements at a particular point of time. It mainly considers the person's feelings, physical health, psychological health, social relationships. Recognition is a concern for making more explicit the long-held conviction within medicine that no goal can logically be more important than optimal patient functioning and well-being. This includes the review of quality of life in covid-19 patients. It explains the different factors, domains of quality of life, different scales used to assess the quality of life in covid-19 patients. The study design, variables study, data analysis, questionnaire forms, socio-demographic characteristics are discussed. This review may help to gain knowledge of quality of life in covid 19 patients and to avoid future problems of this pandemic disease.

KEYWORDS: Quality of life, socio demographics, study design, data analysis.

INTRODUCTION

Quality of life explains the position of individual regarding the life in context of the culture and value system which they live and relationship with their expectations, goals and benefits etc. It also includes the concept of economics, sociology and political science.[1]

HISTORY

For more than a decade quality of life research center in Copenhagen, Denmark and its scientific international co-workers have pathed to try to understand quality of life with many scientific papers written by philosophers. Ancient greek philosophers were looking for meaning of life and guidelines that could have helped to achieve higher level of existence. The concept of "good life" is analyzed in Plato's and Aristotle's works but their theories are

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

PHARMACOECONOMICS - A REVIEW

open acess

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Article Received on
28 May 2021,
Revised on 18 June 2021,
Accepted on 08 July 2021
DOI: 10.20959/wjpps20218-19544

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ABSTRACT

Pharmacoeconomics is the branch of economics that applies the cost-benefit, cost-effectiveness, cost-minimization and cost-utility analyses. Comparing the economics of different pharmaceutical products or a drug therapy to the non-drug therapy or treatment. Pharmacoeconomics is defined as the description and analysis of the costs of drug therapy to the health care system and society. Pharmacoeconomic identifies, measures and compare the resources cost and clinical, economic and humanistic consequences. The research methods include cost minimization, cost-effectiveness, cost benefit, cost of illness, cost utility, cost consequences and decision analysis. It focuses on cost and benefits of drug therapy. The review article emphasize on the pharmacoeconomic needs, methods, aim and challenges.

KEYWORDS: Pharmacoeconomics, cost effectiveness, cost benefit, cost minimization, cost utility.

INTRODUCTION

Pharmacoeconomics is defined as description and analysis of costs of drug therapy to health care system and society.[1] Pharmacoeconomic is the branch of economics which particularly depend upon the costs and benefit of drug therapy.[3] The pharmacoeconomics is the new words, but the economic interest is upon the treatment and drug of health problems.[3] It applies and adopts the principle and methods of the economic health in the field of pharmaceutical policy.[7] The importance of pharmacoeconomic is to give information to health care decision worker or makers which depend on viewpoint of analysis to conduct. The research methods connected to cost-minimization, cost effectiveness, cost-benefit, cost-of illness, cost utility, cost consequences and decision analysis are included within the frame work.[7] Pharmacoeconomics promotes to continue development and study of health economics, quality

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https://doi.org/10.37896/sr8.7/009
ISSN: 0039-2049

DEVELOPMENT OF STRATEGIES FOR REDUCING MEDICATION ADMINISTRATION AND TRANSCRIPTION ERRORS IN TERTIARY CARE HOSPITAL

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ABSTRACT

The principal drawback of the present scenario in health care system is, the failure in the treatment process is mainly due to Medication Errors that lead to harm to the patient, hospitalization and even death. Our study mainly aimed to identify Medication Administration Errors and Medication Transcription Errors, and the factors responsible for causing error in the hospital setting. It is the responsibility of Health Care Professionals to enhance Patient Safety and Quality of life. So, our study mainly focusses on the role of Clinical Pharmacist in detecting, evaluating and preventing medication administration errors reaching the patient and also to know the impact of suggestions given to Health Care Staff by clinical pharmacist either helped them to prevent errors or not. Taking all these points into consideration we suggest implementation of interventions or strategies in an effort which helps Health Care Professionals to prevent Medication Administration and Medication Transcription Errors. In every hospital setting it is mandatory to introduce some professional programs which help the nurses to improve the handling and administration of intravenous infusions and other health care professionals to transcribe the prescription drugs into drug chart without any failure.

Keywords: Medication Administration Errors, Medication Transcription Errors, Clinical Pharmacist, Health Care Professionals.

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Article Received on
28 May 2021,
Revised on 18 June 2021,
Accepted on 08 July 2021
DOI: 10.20959/wjpps20218-19547

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ABSTRACT

Introduction: Medication errors are the most common medical errors which occur because of inappropriate use of medication in each of medicine prescription stages for patients. Nurses and nursing students in hospitals are people that are directly related to giving drug to patients and that they are referred to as people could build the medication errors. Nurses use 40% of their time on the average in hospital for giving drugs to their patient's and there are 20,000 forms of medicines within the world that every one of them despite their therapeutic effects has complications and their own directions which need an expertise in accuracy in handling them. **Methods:** The study was a prospective, observational study which was conducted over a period of six months October 2019 to March 2020. The necessary information was collected from in-patient case sheets, treatment charts and nursing staff. The collected data was analyzed using (NCC MERP) taxonomy and assessed the types, frequency and factors responsible for medication administration and transcription errors. **Results:** During the study period, 252 errors were identified in which Administration errors are 134(53.17%) and Transcription errors are 118(46.82%). Types of errors observed were wrong frequency (29.76%), Omission error (19.44%), wrong strength (15.07%), and improper dose (11.11%). Majority of errors belongs to Category B (43.65%) followed by Category C (25.79%) and Category D (23.80%). Contributing factors responsible for errors are frequent interruptions and distractions (25.39%), staffing (22.22%), inexperienced personnel (12.3%) and lack of availability of health care professionals (12.3%). Human factors responsible for errors are Stress (30.95%),

A.Y. 2019-20

J Young Pharm, 2020; 12(2) Suppl: s10-s15
A multifaceted peer reviewed journal in the field of Pharmacy
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Original Article

Nano Co-crystal Engineering Technique to Enhance the Solubility of Ezetimibe

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ABSTRACT

Background: Co-crystals have been highly promising for tailoring physicochemical properties of Active Pharmaceutical Ingredient (API) by coupling with co-former. **Objectives:** The objective of the present work was to prepare and characterize novel nano co-crystals of Ezetimibe by different methods in various ratios of co-formers and to optimize the formulation based on the enhancement in solubility and dissolution rate. **Methods:** Ezetimibe nano co-crystals were prepared employing oxalic acid, succinic acid and malaic acid as co-formers by solvent evaporation method and anti-solvent method. **Results:** Instrumental analysis of co-crystals (DSC, IR, SEM and XRD) was performed to characterize the novel nano co-crystals. Dissolution studies and chemical stability were assessed and compared with pure Ezetimibe. The formulation with malaic acid as co-former in the molar ratio of Ezetimibe and malaic acid (0.4:0.2) was found to be efficient than oxalic acid and succinic acid in the co-crystal dissolution profile in distilled water containing 0.5% SLS showed 18.8 folds increase in the dissolution efficiency and was found to be 96.2% within 45 min. **Conclusion:** The results demonstrate feasibility of co-crystallization method using malaic acid as co-former to enhance the solubility of poorly soluble drug Ezetimibe.

Key words: Anti-solvent, Co-formers, Malaic Acid, Oxalic acid, Solubility, Solvent evaporation, Succinic acid.

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DOI: 10.5530/jyp.2020.12s.40

INTRODUCTION

The oral route is the most preferred route of drug administration due to its convenience, good patient compliance and low medicine production costs. In order to a drug to be absorbed into the systemic circulation following oral administration, the drug must be dissolved in gastric fluids. For hydrophobic drugs, the dissolution process acts as the rate controlling step, which determines the rate and degree of absorption. Thus, one of the major challenges to development today is poor solubility, as an estimated 40% of all newly developed drugs are poorly soluble or in soluble in water.[1]

Bioavailability of poorly water soluble hydrophobic drugs (class II and class IV in biopharmaceutical classification system) is limited by solubility and dissolution rate. The dissolution rate of these drugs can be improved by decreasing particle size, decreasing crystallinity and/or increasing surface area. Several studies have been carried out to increase the rate of drugs dissolution by increasing the particle size. However, the fine drug particles have high tendency to agglomerate due to Vander Waals attraction or hydrophobicity, which both result in decrease in surface area over time.[2,3]

The enhancement of oral bioavailability of such poorly water soluble drugs remains one of the most challenging aspects of drug development. The development of nano co-crystals as a practically viable method to enhance bioavailability of poorly water soluble is to overcome the limitations of previous approaches such as salt formation, solubilization by co-solvents, particle size reduction and solid dispersion.[4]

One of the challenging tasks in the pharmaceutical industry is to discover ways of improving the physicochemical properties of active pharmaceutical ingredients (APIs). The solubility, dissolution rate, melting point, moisture sorption tendency and compressibility of APIs and/or recipients affect the bioavailability, design, processing, manufacturing and stability of the resultant dosage form.[5] Pharmaceutical co-crystals are attractive to the pharmaceutical industry because they offer multiple opportunities to modify the chemical and/or physical properties of an API without making or breaking covalent bonds.

Co-crystals may be defined as crystalline materials that consist of two or more molecular species held together by non covalent forces. In the recent years Pharmaceutical nano co crystals are highly promising in enhancing the dissolution rates and thus, improved bioavailability and efficacy of medication.[6] In pharmaceutical industry, it has been a major lucrative wherein the solid properties of pharmaceutical active agents have been modulated using complementary molecules in the form of co crystal formers (CCFs). Co-crystals containing an active pharmaceutical ingredient (API) can improve the physiochemical properties such as solubility/dissolution rate, stability and mechanical properties of an API. Nano-scaling will further advance these characteristics compared to their conventional forms because of a larger surface to volume ratio of nano sized particles, one can further improve properties of an API (e.g. dissolution rate). The enhanced dissolution rate of a nanocrystal is mainly due to the increased surface area. A slight increase in solubility owing to the curvature and the high-energy surfaces of nanosized particles will also contribute to faster dissolution. The components in a co-crystal exist in a definite stiochiometric ratio and assemble via non-covalent interactions such as hydrogen bonds, ionic bonds, - or Vander Waals interactions rather than by ion pairing. Further, co-crystals have

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The International journal of analytical and experimental modal analysis

ISSN NO:0886-9367

Development and Validation of RP-HPLC Method for the Simultaneous Estimation of Emtricatabine and Tenofovir Disoproxil Fumarate in Bulk and Marketed Fixed Dosage Form

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ABSTRACT

A rapid and precise reverse phase high performance liquid chromatographic method has been Developed for the validated of Emtricitabine and Tenofovir disoproxil fumarate, in its pure Form as well as in tablet dosage form. Chromatography was carried out on X bridge C18 (4.6×150mm) 5µ column using a mixture of Methanol: Phosphate Buffer pH3 (60:40v/v) as The mobile phase at a flow rate of 1.0ml/min, the detection was carried out at 252nm. The

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ISSN: 0975-8585

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ISSN: 0975-8585

CONCLUSION

The therapeutic outcome of the drug is significantly impacted by the route of administration. The objective of any drug delivery system is to deliver desired concentrations of drug and maintain the therapeutic drug levels at the proper site of action in the body. For topical drug delivery system skin is considered as most readily approachable organs on human body and main route of administration for skin injuries and arthritis and various skin problems namely psoriasis, eczema etc., Herbal remedies are more preferred over synthetic drugs in the belief that natural drugs offer more safety with fewer or no side effects. Hereforth, it can be concluded that preparation of topical herbal gels helps us fulfill all these objectives and hence immense research should be carried out to develop topical herbal gels using natural drugs and their combinations.

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ISSN: 0975-8585

Swelling

Gelling agents when they subjected to liquid media by utilizing the adequate extent of solvates they swell or raise the volume. This activity is called as swelling and this approach is happen by getting solvent into matrix. The gel-gel interactions are converted into gel-solvent interactions. The rate of swelling is directly proportional to number of linkages between individual molecules and strength of these linkages of gelling agent.(18)

Rheology

The gelling agents as solutions disperses as of flocculated solid are pseudo plastic that is possess Non Newtonian flow behavior, characterized with decrease in viscosity and increase in shear rate.(19)

Structure

The rigid structures of gels emerge from the inertness of network generated by interlinking gelling agent particles.(20)

Preparation Methodology: (5,9,27,15)

Gels are generally in large scale industrial formulation is carried out under room temperature. However, some of polymers required special procedure before processing. The preparation methods are described below.(21)

1. Flocculation
2. Thermal changes
3. Chemical reaction

Flocculation

In this method gelation is fabricated by adding adequate quantity of salt to produce precipitate that will give gel state but insufficient to produce complete precipitation. To overcome local high concentration of precipitation it's require to assure the rapid mixing.

Example: The solutions of polystyrene and ethyl cellulose with benzene will be gelled by hasty mixing along with appropriate quantity of non solvent like petroleum ether. The gels are produced by this method are in thixotropic behaviour. (22)

Thermal changes

The gelling effect will be formed by introducing solvated polymers to thermal changes. Most of the hydrogen forming polymers is highly soluble in hot than the cold water. If the temperature is decreases the hydration of polymers also decreases and finally gelation occurs. (23, 24) (Cooling of a concentrated hot solution of polymer will produce the gel).

Example: Agar sodium oleate, cellulose derivatives, guar gum and gelatin etc.

Chemical reaction

Chemical reaction is formulated by chemical interaction between solvent and solute.(20,6)

Example: Gel of Aluminium hydroxide can be produced by interaction between aqueous solutions of aluminium salt and sodium carbonate, the greater concentration of reactants will develop a gel structure.

ISSN: 0975-8585

iv) Based on number of phases:

a. Single phase: The twisted synthetic polymers with large organic molecules of the gel formers and which are generally bounded by vander waals forces or entangle with one another their random motion.(8)

b. Double phase: These upon standing are thixotropic forming semisolids and which upon agitation turns to liquid. Hence, named as double phased or two phase system. It exhibits three dimensional structures all through the gel and is comprised of smaller particles in the gel structure and is not stable always.(9)

Depending upon application gels are categorized as described below.

- Lubricating gels
- Medicated gels
- Miscellaneous gels

Lubricating gels: These are the gel preparations intended for lubrication of diagnostic equipment namely Cytoscopes, Rectal thermometers, surgical gloves, catheters and fingerstalls etc. It is mandatory to maintain sterility of these gels as they are also used for insertion into sterile region of body like urinary bladder etc. They are usually water soluble, thin and transparent. (10,11)

Medicated gels: These are primarily used on skin and mucus membrane due to its local anesthetic, antiseptic and spermicidal. For example phenyl mercuric nitrate gel is employed as spermicidal contraceptive.

Miscellaneous gels: These gels mainly serve the following purposes –

a. Patch testing: To detect sensitivity these gels as vehicles for allergens are usually applied on the skin.

b. Electro-cardiography: These gels are generally made up of sodium chloride, pumice powder and glycerin and are primarily meant for application on the electrode in a way to diminish the electric resistance between electrode and patient's skin.(12-14)

Characteristics of Gels

The gels should withhold the following characteristics:

- ✓ The gelling agents used in formulations that should be inert, safe and should not interact with active ingredient and other excipients.
- ✓ The gels reserves appropriate anti-microbial activity towards microbial infections.(15)
- ✓ Gelling agents are one of the ingredient for formulation of gels, when introduce shear forces to squeeze or for topical application it will generate solid like nature during shored condition that can be easily breakable.
- ✓ The topical gels should not be viscid.
- ✓ The gels administered for ophthalmic that should be sterile.(16)

Ageing

Colloidal systems traditionally produce slow vigorous aggregation. This phenomenon is known as ageing. In the formulation of gels, ageing emerge the continuous generation of denser network of gelling agents.

Syneresis

Numerous/Innumerable gels are with stand and emit, when they are frequently contract spontaneously with some fluid medium. This is referred as syneresis. The degree of syneresis increases as the concentration of gelling agent is decreases. The phenomenon of syneresis indicates that the original gel was thermodynamically unstable.(17)

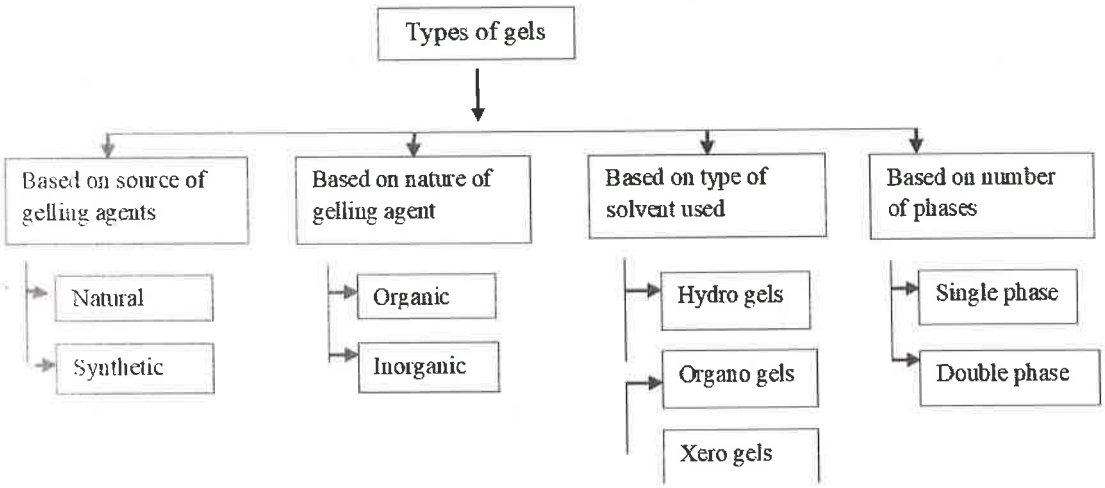
ISSN: 0975-8585

INTRODUCTION

Herbal medicines are even now the backbone of developing countries about 75-80% of the world's population, for primary health care because of better compatibility with human body and lesser side effects. Herbal plants are which comprises medicinal properties in its part to treat injuries, disease or illnesses and ailments or to promote health. It is a drug or preparation made from a plant or plants and used for any to such purpose. Herbal medicines are the oldest form of health care. (1). Topical drug administration is a localized drug delivery system anywhere in the body through ophthalmic, rectal, vaginal and skin as topical routes. Skin is one of the most readily accessible organs on human body for topical administration and is main route of topical drug delivery system (2). Topically applied dermal and transdermal delivery systems could replace needles required to administer many of the new biologics-based drugs and vaccines, in addition to other significant advantages such as avoiding first-pass hepatic metabolism, gastric degradation and frequent dosing. The topical drug delivery system is generally used where the others system of drug administration fails or it is mainly used in pain management, contraception, and urinary incontinence. Over the last decades the treatment of illness has been accomplished by administrating drugs to human body via various routes namely oral, sublingual, rectal, parental, topical, inhalation etc.(3)

Types of **Gels**

Classification of gels based on various parameters.



i) Based on source of gelling agents:

a. Natural: These are gelling agents which are obtained from natural sources and employed for the preparation of gels. Ex: Starch, Pectin, Gelatin and Tragacanth etc,.(5,6)

b. Synthetic: These are obtained from synthetic sources. Ex: Methyl cellulose, Hypromellose (HPMC) and Carbomer etc.,

ii) Based on nature of gelling agents:

a. Organic: The gels with gelling agents which are organic in nature for example –polyvinyl alcohols.

b. Inorganic: It includes gelling agents which are inorganic in nature such as – Bentonite, Veegum (magnesium aluminium silicate).

iii) Based on solvents used:

a. Organogels: These gels are prepared by incorporating organic solvents as their continuous phase. Ex- Metallic stearate dispersion in oils and olag aerosol gel.

b. Hydrogels: These are the gels which utilizes water as continuous liquid phase in preparation. Ex- Poloxamer gel, gelatin, Mennonite magma, cellulose derivatives.(7)

c. Xero gels: These gels contain solvent in low concentration and are prepared by freeze drying or solvent evaporation. They can be subjected to reconstitution by swelling on addition of fresh fluid. Ex- Dry cellulose, Tragacanth ribbons and acacia.

ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

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A Perspective Overview On Topical Herbal Gels.

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ABSTRACT

Herbal formulations have been used to alleviate many chronic diseases since antiquity, ascribing to their diverse pharmacological activity shown by various parts of plants. These days there are many herbal dosage forms available in the form of tablets, capsules, ointments, syrups, gels, creams, etc.,. Numerous semisolid dosage forms are also used for various dermatological problems like burns, acne, warts, psoriasis and some bacterial and fungal infections. Topical herbal gels are transparent or translucent semisolid dosage forms which consist of one or more herbs in defined quantities to produce specific therapeutic effect. These gels are applied to skin, rectus, vagina etc., In this modern century, herbal products are gaining huge popularity by leaps and bounds worldwide as synthetic drugs have constraint of adverse effects. There by, it is pre requisite to develop more herbal formulations with enhanced product quality and shelf life to congregate the necessity and demand globally. Hence, this review is centered to elucidate about detailed characteristics, preparation methodologies and evaluation parameters of herbal gels which might enlighten researchers to utilize this knowledge for developing herbal gel dosage forms.

Keywords: Herbal products, Topical herbal gel, Shelf life, Dermatological problems.

https://doi.org/10.33887/rjpbcs/2020.11.6.14

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SP-21

CURRENT MODERN DAY TRENDS OF "PRE CLINICALTRIALS"

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ABSTRACT :
Investigation Initiated Studies (IIS) is the need of the hour to compliance with the present trends in pharmacological research. IIS includes broad spectrum of studies, clinical trials of new drugs. It is beneficial for the progressive growth of fundamentals of drug efficacy, toxicity and pharmacokinetics data of drugs to anticipate the safety profile of the products. As per the guidelines of ICMR, at every organizational level the assessment of the quality of the generated data should be ensured. Auditing , monitoring, safety of the intervention and the quality of the data generated should be established by every institution as per the guidelines of Indian Council Of Medical Research (ICMR) . The Ethics Committee (EC) can effectively use its tools of monitoring and audit to affirm and ensure the ICMR guidelines. Thus we can infer that in modern times the current trends in Pharmacological research will make the conduct of the academic research far more arduous for the researchers to enhance the fulfillment of the rules laid by EC unlike earlier times, where only a small number of research institutes were indulged in clinical trials.[1,5]

Keywords: Investigation Initiated Studies (IIS), ICMR, clinical trials.

1.INTRODUCTION:

Pre – clinical tests are performed on animal subjects in order to assess if the expected and hoped treatment really works and whether it is safe to test on human beings. It helps to determine the effective dose, the toxic dose, pharmacological action etc., There are numerous rampantly spreading diseases. The methodology of finding a new cure for it is both expensive and time consuming, without any assurance of success it may cost about billions of dollars to investigate about them. In the pre clinical studies on an average Scientists starts with 10,000 companies and it requires about 7 years of time to investigate about them. Once the research proceeds to clinical trial stage, it takes about 6 more years of time. At the end of all the research done, if the new drug developed has unwanted cell toxicity characteristics along with the desired therapeutic effect then it has to be abandoned. Thereby there is a desperate need for the development of the modern and innovative trends such that unwanted toxicity is anticipated at much earlier stage in drug development process, so that it would effectively safe time, energy , money spent on the research , scientists and the institutions .[2,3,4]

2.DISCUSSIONS:

In the present trends researchers use good laboratory practices (GLP) for preclinical laboratory studies. These set of regulations assure the proper execution of all the basic requirements like Quality Assurance Program, Personnel and Organization, Facilities (both for test systems and reference), Apparatus and reagents, Standard Operating Procedures (SOP), Performance of study, reporting of results while performing the pre-clinical trials. The supervision of quality assurance system is employed throughout the studies to ensure the safety of the FDA regulated products[6]

Plug and Play upstream Development:
By the optimization of in-silico codon, we can establish stable pools. After choosing the appropriate clone we acquire good quality material, thus highly stable cell line is produced, a MASTER CELL BANK can be established and the documentation is made ready for IND filing . These sort of advanced techniques helps to

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WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF impact Factor 8.084
Volume 8, Issue 13, 1172-1188. Research Article ISSN 2277– 7105

DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF CEFTOLOZANE AND TAZOBACTAM IN INJECTION

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Article Received on
22 Oct. 2019,
Revised on 12 Nov. 2019,
Accepted on 02 Dec. 2019,
DOI: 10.20959/wjpr201913-16270

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ABSTRACT

A simple, selective, linear, precise and accurate reverse-phase high-performance liquid chromatography technique was urbanized and validated for the concurrent determination of Ceftolozane and Tazobactam in powder for injection. The chromatographic separation was achieved on Altima C18 4.6×150mm, 5.0 µm column by means of a mobile phase consisting a mixture of Methanol: Water in a proportion of 65:35v/v at a flow rate of 1ml/min at room temperature and detection was carried out at 285nm. The clear chromatography peaks were identified with retention times of 2.09min for Ceftolozane and 6.07 min for Tazobactam. The proposed technique was validated according to ICH guidelines with respect to specificity, linearity, accuracy, precision, LOD, LOQ and robustness. The linearity was observed in the concentration range of 10-40µg/ml for Ceftolozane and 5-25µg /ml for Tazobactam. A linear regression coefficient for both drugs was 0.999. The percentage recovery of Ceftolozane and Tazobactam was 100.9% and 99.6%. The %RSD for repeatability and intermediate precision was less than 2%. LOD was 0.8µg/ml and 0.9µg/ml and LOQ was 2.5µg/ml and 2.9µg/ml for Ceftolozane and Tazobactam respectively. The results of validation parameters were met ICH requirements. Hence, the projected method can be used for the estimation of Ceftolozane and Tazobactam in powder for injection during regular and quality-control analysis.

KEYWORDS: Ceftolozane, Tazobactam, Simultaneous estimation, RP-HPLC, Injection.

E-ISSN: 0975-8232; P-ISSN: 2320-5148

IJPSR (2019), Volume 10, Issue 12 (Research Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 06 January 2019; received in revised form, 06 November 2019; accepted, 13 November 2019; published 01 December 2019

ISOLATION AND CHEMICAL CHARACTERIZATION OF POTENTIAL BIOACTIVE COMPOUNDS FROM *CASSIA UNIFLORA*

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Keywords:

Cassia uniflora, Bioactive compounds, Spectral analysis, Flavonoid

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ABSTRACT: Objective: The present study was designed for Isolation of phytoconstituents from pharmacologically potent extracts of leaves of *Cassia uniflora* based on *in-vitro* pharmacological screening and their subsequent characterization. **Methods:** Crude extracts of leaves, stems, and fruits of *cassia uniflora* were prepared using various solvents such as water, methanol and hydro alcohol. These extracts were screened for *in-vitro* pharmacological activities like antioxidant, anti-inflammatory, and anti-diabetic activities. These active extracts were subjected to column chromatography by means of different mobile phases followed by TLC. The isolated compounds were subjected to IR, ^{1}H NMR, ^{13}C NMR, and LC-MS spectral analysis for chemical characterization. **Results:** The methanol extract of leaf of *Cassia uniflora* was found to be potent when compared with other extracts. This extract was subjected to column chromatography to get fractions and eluted fractions were run in TLC mobile phase with different solvent ratios. The fractions with similar R_f values to standard were united and crystallized. The spectral analysis confirmed that the isolated compounds were found to be Methyl inositol, Luteolin, pentacosane, and Triacontan-1-ol. **Conclusion:** various extracts from different parts of the plant *of Cassia uniflora* were prepared. Methyl inositol, Luteolin, pentacosane, and Triacontan-1-ol were isolated from the methanol extract of leaves and characterized.

INTRODUCTION: The high cost of contemporary medicines (mostly imported) and their unavailability in remote areas, and most prominently, the severe side effects of certain drugs, have resulted in a considerable return to traditional medicine. Since huge portions of pharmaceutical drugs are derived from medicinal plants, the demand for these raw materials has been progressively increasing. The evaluation of the effectiveness of the plant has been recommended by the World Health Organization (1980) in conditions where there is a lack of safe synthetic drugs. The chemicals obtained from the medicinal plants act as, imminent sources of new therapeutic agents, precursors for the synthesis of helpful drugs, and used as therapeutic purposes, Such as artemisinin for the cure of multidrug-resistant malaria, silymarin for hepatic protection; Vincristine and Vinblastine for various types of cancers.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.10(12).5347-61

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

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.10(12).5347-61

Int. J. Pharm. Sci. Rev. Res., 56(1), May - June 2019; Article No. 06, Pages: 30-37 ISSN 0976 – 044X

Research Article

A New Validated RP-HPLC Method for Simultaneous Estimation of Lumacaftor and Ivacaftor in Pharmaceutical Dosage Form

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Received: 10-03-2019; **Revised:** 22-04-2019; **Accepted:** 05-05-2019.

ABSTRACT

A simple, selective, linear, precise and accurate reverse phase high performance liquid chromatography method was developed and validated for the simultaneous estimation of Lumacaftor and Ivacaftor in tablet dosage form. The chromatographic separation was achieved on Symmetry C18 4.6×150mm, 5µ column using a mobile phase consisting a mixture of Methanol: Water in the ratio of 65:35 v/v at a flow rate of 1ml/min at an ambient temperature and detection was carried out at 270 nm. The clear chromatography peaks were identified with retention times of 2.460 min for lumacaftor and 4.312 min for ivacaftor. The proposed technique was validated according ICH guidelines in respect to specificity, linearity, accuracy, precision, LOD, LOQ and robustness. The linearity was observed in the concentration range of 45-225 µg/ml for lumacaftor and 10-50µg /ml for ivacaftor. Linear regression coefficient for both drugs was 0.999. The percentage recovery of lumacaftor and ivacaftor was in between 98-102%.The %RSD for repeatability and intermediate precision was less than 2%. LOD was 0.83 and 1.3 and LOQ was 2.5 and 3.95 for lumacaftor and ivacaftor respectively. The results of validation parameters were met ICH requirements. Hence, the proposed method can be used for the determination of lumacaftor and ivacaftor in various pharmaceutical dosage forms during regular and quality-control analysis.

Keywords: Lumacaftor, Ivacaftor, Simultaneous estimation, RP-HPLC, tablets.

INTRODUCTION

Cystic fibrosis (CF) is a hereditary disease affects the endocrine, gastrointestinal, reproductive, and respiratory systems. It causes the assemblage of abnormally thick mucus, leading to the obstruction. CF is caused by any one of several defects in the cystic fibrosis transmembrane conductance regulator (CFTR) protein, such as F508del mutation, G551D mutation that causes the disease. [1] This life-restriction disease requires multiple daily medications to extend life and get a better quality of life. Many conventional regimens including pancreatic enzyme supplements, multivitamins, mucolytics, antibiotics, *bronchodilators,* and *anti-*inflammatory agents have been used for the treatment of CF. Lumacaftor (CFTR corrector) and Ivacaftor (Potentiator) are new drugs used in combination (brand name **Orkambi)** for the treatment of cystic fibrosis. Lumacaftor (LMF) is an aromatic amide, is a chemically 3-[6-[[1-(2, 2-difluoro-1, 3-benzodioxol-5-yl) cyclopropane carbonyl] amino]-3-methylpyridin-2-yl] benzoic acid, Figure 1 with the molecular formula of $C_{24}H_{18}F_2N_2O_5$ and molecular weight is 452.414. It is a white to off-white powder that is practically insoluble in water (0.02 mg/mL). Lumacaftor acts as a chaperone during protein folding and increases the number of cystic fibrosis transmembrane conductance regulator proteins which are trafficked to the cell surface by targeting the defective F508del CFTR gene. [2] Ivacaftor (ICF) is an aromatic amide, chemically it is a N-(2,4-di tert-butyl-5-hydroxyphenyl)-4-oxo-1H-quinoline-3-carboxamide, Figure 2 with a molecular formula of $C_{24}H_{28}N_2O_3$ and molecular weight is 392.499. Ivacaftor is a white to off-white powder that is virtually insoluble in water (<0.05 mg/mL). Ivacaftor is the first drug that treats the original cause rather than the symptoms of the disease. Ivacaftor is a potentiator of the CFTR protein a chloride channel present at the surface of epithelial cells in multiple organs, it increases chloride transport by potentiating the channel-open probability (or gating) of the G551D-CFTR protein. [3,4] Lumacaftor and Ivacaftor fixed-dose combination oral tablets are developed by Vertex Pharmaceuticals and both was approved by the FDA in 2015. [5] These drugs, when given in a fixed dose combination product rather than individual entities, has shown to get potential therapy in a condition of cystic fibrosis by correcting the defective protein. [6,7] Number of drugs are introducing into the market yearly. There is a time lag between the date of the prologue of a drug into the market and the date of its enclosure in pharmacopeias. Hence, standards and analytical methods either for the individual or combination of drugs may not be official in the pharmacopeias. Some analytical procedures are not accessible in the literature due to patent regulations. Analytical methods for the drugs in formulations are not available owing to the interference caused by the excipients. Therefore, it becomes essential to build up a newer analytical procedure for such drugs.

Literature survey reveals many analytical methods have been published for simultaneous estimation of Lumacaftor and Ivacaftor in bulk, pharmaceutical dosage forms and in biological samples. These methods are UV Spectrophotometric techniques, HPLC methods, UPLC method, stability indicating methods, and LC-MS/MS methods. [8-17] The objective of our study is that High-

UGC, SCI, 10

An Elsevier Indexed Journal ISSN-2230-7346

Journal of Global Trends in Pharmaceutical Sciences

PREGNANCY BLUES - TREATING ANEMIA WITH FOLIC ACID LOZENGES REVIEW

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ARTICLE INFO

Key Words

Anemia, Folate, Methylfolate, Lozenges, Pregnancy, RBC

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

ABSTRACT

Folic acid also known as folate is an essential vitamin. It is converted to folate in our body. Folate is the natural form of the vitamin, found in whole foods. Methylfolate is the most bioavailable form of vitamin B9. Folic acid helps in producing new cells and keeps them healthy. Folic acid when formulated as lozenges is very convenient for administration and its used to prevent neural tube defects which develops in early pregnancy, sufficient intake of this vitamin even before pregnancy have protective benefits and reduces the risks. It can prevent the pregnancy blues like miscarriage, preterm delivery and maternal anemia. Its recommended to take folate for three months prior to pregnancy, continue through pregnancy and also post partum. A growing baby absorbs folic acid from its mother. Folate deficiency anemia is tested by complete blood count (CBC) to measure the number and appearance of RBC. Lack of folate makes RBC to look large and immature. Each type of anemia is caused by something different, each ranges from mild to severe. RBC plays a central role in this condition, with all forms of anemia tiredness or fatigue is the most common symptom because of low RBC. Shortness of breath, dizziness, headache, coldness in hands and feet, pale or yellowish skin are the signs along with irregular heartbeat. Low RBC causes heart to work harder to move oxygen rich blood through the body. So treating this condition with folic acid lozenges is the most easy, economical and safe to the patient

INTRODUCTION

Anemia is a medical condition where the RBC count is less than the normal, the blood do not have sufficient healthy red blood cells. It results from lack of red blood cells or dysfunction RBC in the body leading to reduced flow of oxygen to the organs in the body or tissues. The RBC in the body is low and it is measured according to the amount of hemoglobin, the protein present in RBC carries the oxygen from the lungs to the body's tissue. In women suffering from anemia the hemoglobin is less than12.0g/100 ml. According to National heart, lung & blood institute anemia is the most common blood disorder in women and children.The different types of Anemias include:

1. Anemia due to vitamin B12 deficiency
2. Anemia due to folate (Folic acid deficiency)
3. Anemia due to iron deficiency
4. Anemia of chronic disease
5. Hemolytic Anemia
6. Idiopathic aplastic Anemia
7. Megaloblastic Anemia
8. Pernicious Anemia
9. Sickle cell Anemia
10. Thalassemia
11. Aplastic or Hypoplastic Anemia
12. Sideroblastic Anemia-Acquired and Hereditary
13. Myelodysplastic syndrome
14. Autoimmune Hemolytic Anemia
15. Congenital dyserythropoietic Anemia (CDA)

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An Elsevier Indexed Journal ISSN-2230-7346

Journal of Global Trends in Pharmaceutical Sciences

A REVIEW ON CORONAVIRUS – THE PANDEMIC CAUSING GLOBAL CRISIS

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ARTICLE INFO

Key Words

COVID – 19, pandemic, Quarantine.

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

ABSTRACT

The word COVID - 19 is abbreviated as CO – Corona, VI – Virus, D – Disease and 19 indicates the year it emerged. The occurrence of coronavirus disease had been confirmed in around 210 countries and territories. The virus had infected 9,360,758 people worldwide. The most severely affected countries include USA, Brazil, U.K, Russia, Spain and India is inching towards the most affected country. Telangana confirms 9,553 confirmed cases till June 24-2020. A pandemic is an epidemic of an infectious disease which spreads across large regions and countries affecting many people. The 2019- 2020 Covid –19 pandemic is expected to have negative effect on the global economy, for years to come with a drop in GDP accompained by increase in unemployment around the world. The basic strategies in the control of an outbreak are containment and mitigation. Another strategy called as suppression strategy includes stringent population – wide social distancing, isolation of cases and quarantine can be considered.

INTRODUCTION

Coronavirus belongs to the family Coronaviridae. Club-shaped glycoprotein spikes in the envelope give the viruses a crown like appearance. Coronaviridae is generally considered to contain two genera, Coronavirus and Torovirus, which differ in nucleocapsid morphology, the former being helical and the latter being tubular. Coronaviruses constitute the subfamily Orthocoronavirinae, in the family Coronaviridae, order Nidovirales, and realm Riboviria.

STRUCTURE:

Coronaviruses are large, roughly spherical, particles with bulbous surface projections. The average diameter of the virus particles is around 125 nm (.125 µm). The diameter of the envelope is 85 nm

And the spikes are 20 nm long. The viral envelope consists of a lipid bilayer, in which the membrane (M), envelope (E) and spike(S) structural proteins are anchored. The ratio of E: S: M in the lipid bilayer is approximately 1:20:300. On average a coronavirus particle has 74 surface spikes. The coronavirus surface spikes are homotrimers of the S protein, which is composed of an S1and S2 subunit. The homotrimeric S protein is a class I fusion protein which mediates the receptor binding and membrane fusion between the virus and host cell. The S1 subunit forms the head of the spike and has the receptor binding domain (RBD). The S2 subunit forms the stem which anchors the spike in the viral envelope and on protease activation enables fusion. The E and M protein are important in forming the viral envelope and maintaining its structural shape.

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An Elsevier Indexed Journal ISSN-2230-7346

Journal of Global Trends in Pharmaceutical Sciences

PREGNANCY BLUES - TREATING ANEMIA WITH FOLIC ACID LOZENGES REVIEW

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ABSTRACT

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ORIGINAL RESEARCH PAPER

Volume-8 | Issue-7 | July - 2019 | PRINT ISSN No. 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A DETAILED REVIEW ON LIPID BASED CARRIER DRUG DELIVERY SYSTEM: LIPOSPHERES

Pharmacy

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ABSTRACT

Lipospheres are lipid-based water dispersible solid particles of particle size between 0.01 and 100 µm in diameter composed of a solid hydrophobic lipid core (triglycerides), stabilized by a layer of Phospholipid molecules embedded in their surface. Lipospheres delivery system is a suitable carrier system for the delivery of both hydrophobic and hydrophilic drugs. Much of research is now focused on using lipids as novel carriers for drug moieties. Lipid based drug delivery systems like solid lipid nanoparticles, lipospheres (LS) are being developed as substitutes for "polymer based delivery systems" due to the increasing toxicity related concerns of monomers after intracellular processing of polymers and attractive benefits offered by lipids as carriers. Lipospheres are new type of drug delivery system developed mainly for parenteral system. As most of the recent drugs discovered (nearly 40-45 %) are lipophilic in nature having poor water solubility and less bioavailability. This article explains about formulation of lipospheres, factors influencing the quality attribute of lipospheres, mechanisms behind drug loading, evaluation of lipospheres and challenges in the development of lipospheres are discussed in detail.

KEYWORDS

Lipospheres, Phospholipid, hydrophobic, hydrophilic drugs, polymers, Encapsulation.

INTRODUCTION:

The first approach of using lipid microparticles was described by Eldem *et al.* The liposphere drug delivery system is an aqueous micro dispersion of solid water insoluble spherical micro particles of a particle size between 0.2 and 200 µm. Lipospheres were firstly reported by Domb and Maniar as scattering of strong circular particles of molecule size between 0.2-500 µm in breadth. Recently, advances in pharmaceutical research is focused on new delivery systems utilizing new devices to achieve modification of delivery time, targeting, as well as improve the *in-vivo* solubility and hence bioavailability of poorly soluble drugs. The particulate drug carriers that have been investigated for sustaining the therapeutic activity are based on the synthetic polymers or natural macromolecules. The drawback of these particulate systems, being the degradation of the polymer, organic solvent residues present in the delivery system that could result in severe acceptability and toxicity problems. To resolve these issues, lipid microspheres, often called lipospheres, have been proposed as a new type of fat-based encapsulation system for drug delivery of bioactive compounds. Lipospheres are lipid based water dispersible solid particles bearing particle size between 0.01 and 100 µm in diameter, composed of a solid hydrophobic lipid core containing active drug moiety dissolved or dispersed in a solid fat matrix, which is stabilized by a layer of phospholipid molecules as external coat.

LIPOSPHERES:

Lipospheres represents a type of fat based encapsulated system developed for parenteral, topical delivery of bioactive compounds. Lipospheres are lipid-based water dispersible solid particles of particle size between 0.01 and 100 µm in diameter composed of a solid hydrophobic lipid core, stabilized by a layer of phospholipid molecules embedded in their surface.

Many existing drug candidates have poor solubility in biological fluids, which results in low and highly variable bioavailability and a high food dependency after oral administration. Lipospheres are single unit system with respect to their uniform drug dispersion, maintain the uniform absorption of drug at gastrointestinal tract and more advantages than multiple unit drug delivery systems like Nanoparticles microparticles, microemulsions, and liposomes. The amount of drug encapsulated can vary up to 95% for lipophilic as well as for hydrophilic drugs and because they are made from physiological or physiologically related materials, they are well tolerated in living systems.

Comparison of Lipospheres and Liposomes

Table 1: Comparison of Lipospheres and Liposomes

	Lipospheres	Liposomes
Components	Soybean oil, Lipid. Water	Phospholipid, Water
Lipid membrane	Monolayer single membrane	Mono- or multi-layer double membrane
Emulsion form	O/W	W/O/W
Incorporable drugs	Compounds soluble in soybean oil and retainable in lipids.	Water soluble compounds and compounds retainable in lipids.
Particle diameter	200 – 300 nm	Various sizes
Safety in vivo	Safe Clinically used as intravenous nutrition in 100 ml doses	Liposomes made of some lipids are toxic
Stability	Stable for 24 months at room temperature. Lipo preparation are stored at 4°C	Rather unstable

CHARACTERIZATION OF LIPOSPHERES:

Morphology:

- Lipospheres are characterized in the terms of morphology by various microscopic techniques such as optical and electron microscopy.
- Lipospheres are prepared by melt dispersion method, it shows unimodal shape with average particle size between 5-15µm with less than 2% of particles greater than 100µm.
- Polymeric Lipospheres consisting of PLA and lecithin shows very board particle distribution from 2-100µm.

Structure:

- Lipospheres are lipid-based water dispersible solid particles, composed of a solid hydrophobic lipid core, and stabilized by a layer of Phospholipid molecules embedded in their surface.
- Phospholipid content on the surface of lipospheres is determined by 31P-NMR, before and after complexation of manganese (Mn2+) or proseodimium (Pr+3) ion with tri- nitrobenzene sulfonic acid labeling using liposphere formulations containing phosphatidyl ethanolamine.

Entrapment efficiency:

- Loading capacity of drug in lipid carriers depends on the type of lipid matrix, solubility of drug in melted lipid, miscibility of drug melt and lipid melt, chemical and physical structure of solid lipid matrix and the polymorphic state of the lipid material.

Stability:

- Numerous research works has been done and they explain the dealing with protein delivery through Lipospheres.
- Preservation of the integrity of protein can be maintained by avoiding exposure to higher temperatures using low melt lipid carriers.
- Stability of proteins in terms of physical, chemical and conformational features is an important prerequisite to establish the utility of the procedures adopted for encapsulation. The extent

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Development and Validation of an Analytical Method for the Estimation of Netupitant and Palonosetron using RP-HPLC

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ABSTRACT:

A Rapid and Precise Reverse Phase High Performance Liquid Chromatographic method has been developed for the validated of Palonosetron and Netupitant, in its pure form as well as in tablet dosage form. Chromatography was carried out on X-Terra C18 (4.6 x 150mm, 5µm) column using a mixture of Methanol: Buffer pH 4.5: Acetonitrile (65:15:20) as the mobile phase at a flow rate of 1.0 ml/min, the detection was carried out at 212nm. The retention time of the Palonosetron and Netupitant was 2.090, 5.289 ±0.02min respectively. The method produce linear responses in the concentration range of 5-25µg/ml of Palonosetron and 50-250µg/ml of Netupitant. The method precision for the determination of assay was below 2.0 %RSD. The method is useful in the quality control of bulk and pharmaceutical formulations.

Keywords: Palonosetron, Netupitant, RP-HPLC, validation.

1. INTRODUCTION

Palonosetron,(5S)-3-[(3S)-1-azabicyclo[2.2.2]octan-3-yl]-3-azatricyclo[7.3.1.0^{5},^{13}]trideca 1(12),9(13),10-trien-2-one 5-HT3 antagonist used in the prevention and treatment of chemotherapy-induced nausea and vomiting (CINV). It is the most effective of the 5-HT3 antagonists in controlling delayed CINV nausea and vomiting that appear more than 24 hours after the first dose of a course of chemotherapy and is the only drug of its class approved for this use by the U.S. Food and Drug Administration. The structure of Palonosetron was shown in Fig. 1.

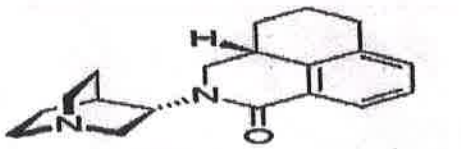

Fig. 1: Chemical Structure of Palonosetron

Netupitant is an antiemetic drug. In the United States, the combination drug netupitant/palonosetron (trade name Akynzeo) is approved by the Food and Drug Administration for prevention of acute and delayed chemotherapy-induced nausea and vomiting, including highly emetogenic chemotherapy such as with cisplatin. In Europe, it is approved by the European Medicines Agency for the same indication

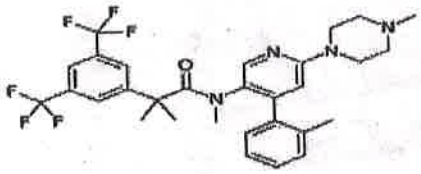

Fig.2 Chemical Structure of Netupitant

The literature survey revealed that there are few RP-HPLC [1-5], UV6 and LC-MS7 methods are available for the estimation of Palonosetron. However, stability indicating UPLC method was not available. Hence, present work focused on the development and validation of simple, rapid, robust and economic stability indicating UPLC method. To the best of our knowledge, the anticipated method is the first UPLC method to allow estimation of Palonosetron in tablet dosage form.

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IJPSR (2020), Volume 11, Issue 1 (Research Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 15 April 2019; received in revised form, 29 July 2019; accepted, 17 August 2019; published 01 January 2020

EFFECT OF POLYHERBAL COMBINATIONS AND ESSENTIAL OILS AGAINST BIOFILM OF *STREPTOCOCCUS MUTANS*

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Keywords:

Streptococcus mutans, Antiadherence activity, Polyherbal extracts, Plate count method, Essential oils

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ABSTRACT: Background: Herbal extracts have been used in dental products for many years owing to their anti-adherence effect on *Streptococcus mutans* (*S. mutans*) in the biofilm formation. Dental caries are developed by the colonization of oral bacteria on the surface of teeth and adherence is the first step in the colonization process. **Objective:** The objective of the present study was to explore the anti-biofilm effect of the various combinations of herbal extracts and essential oils against *S. mutans* which play a central role in causing dental caries. **Methods:** Hydroalcoholic extracts of *Terminalia chebula* (*T. chebula*), *Psidium guajava* (*P. guajava*), *Azadirachta indica* (*A. indica*) and *Pongamia pinnata* (*P. pinnata*) were prepared separately and dried. Various combinations of herbal extracts, as well as essential oils Syzygium aromaticum (clove) and Mentha piperita (Peppermint oil), were tested for anti-biofilm potential on the glass surface. The number of adhering bacteria (CFU/ml) was determined by the plate count method. **Results:** It was found that all extract combinations and essential oils have shown anti-biofilm activity. The 2:2:1:1 of extracts and 2:2 ratio of essential oils has shown less bacterial count compared to all other tested ratios. Furthermore the herbal extract ratio of 2:2:1:1 has shown significant ($P<0.01$) anti-biofilm activity when compared to standard chlorhexidine mouthwash. **Conclusion:** These findings suggest that the active constituents present in the combined extracts could synergize the anti-biofilm activity owing to the reinforcement effect of constituents present in the combined mixture.

INTRODUCTION: The human mouth with its diverse nature and environmental change are well known for its unrestricted growth and formation of natural biofilms comprising a heterogenous microbial population among which vast variety of organisms are bacteria.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.11(1).264-67

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

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.11(1).264-67

Among the microbes *Streptococcus mutans* (*S. mutans*) have been implicated as a primary causative organism of dental caries [1]. Dental caries and gingivitis are the most prevalent oral infectious diseases of humans and are due to the accumulation of the dental plaque (a microbial biofilm) to the tooth surface and at the gingivitis margin respectively [2]. Strains of *S. mutans* adhere by hydrophobic bonds to enamel surface and ferment dietary carbohydrates, notably sucrose [3].

Sucrose metabolism promotes the firm adherence and cellular aggregation (biofilm) of bacteria to the tooth surface using glucan produced by the

OPEN ACCESS
Saudi Journal of Biomedical Research
Abbreviated Key Title: Saudi J Biomed Res
ISSN 2518-3214 (Print) | ISSN 2518-3222 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: http://scholarsmepub.com/sjbr/

Original Research Article

Development and In-Vitro Anticancer Evaluation of Dual Loaded Nanoparticles on Human Glioblastoma Multiforme Cell line T98G

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DOI:10.21276/sjbr.2019.4.3.2 | Received: 01.03.2019 | Accepted: 10.03.2019 | Published: 30.03.2019

Abstract

Cancer treatment suffers with the failure of chemotherapeutic agents because of multi drug resistance. Investigation of new molecules involves huge expenditure and time. Present investigation aims at the dual loading of anticancer agent Imatinib Mesylate along with Piperine on to bovine serum albumin nanoparticles in order to overcome multi drug resistance and to achieve the maximum therapeutic effect. Desolvation method with the addition of acetone is used to prepare the nanoparticles. Drugs and polymer are subjected to differential scanning calorimetry. Nanoparticles are evaluated for encapsulation efficiency, particle size, zeta potential and drug release studies. In-vitro anticancer activity of dual loaded nanoparticles against Human Glioblastoma Multiforme (GBM) cell line T98G is determined. Results indicated the compatibility in DSC, an encapsulation efficiency of 52.456%-88.254%, particle size of 208.3nm -497.3nm, zetapotential of -16.5mV to -63.2mV and drug release of 86.256% to 94.56% in 24H. In in-vitro anticancer activity % of cell death is found to be 72.257% to 79.658%. Results suggest increased anticancer activity with the nanoparticles dual loaded with Imatinib Mesylate and Piperine.

Keywords: Piperine, Imatinib mesylate, anticancer activity, bovine serum albumin and desolvation method.

INTRODUCTION

Even with the advents in cancer research, multi drug resistance is still a big challenge for cancer chemotherapy. This resistance may be because of multiple mechanisms like, decreased uptake of drug, increased drug efflux, DNA repair mechanisms and many others [1]. This ultimately results in the failure of chemotherapeutic agents. The cancer drug resistance is multiplex phenomenon and more difficult to overcome. Combination therapy which can show synergy or an additive effect with reduced drug resistance, along with cancer drug may provide a new strategy in drug resistant cancers [2]. Imatinib mesylate (IMB) is a selective tyrosine kinase inhibitor approved for the treatment of chronic myelogenous leukemia and gastrointestinal stromal tumors. Several clinical studies suggested the use of IMB in the treatment of patients with malignant glioma [3]. IMB is a substrate for multi drug resistance proteins. An increased expression of P-glycol protein (PGP) plays an important role in multi drug resistance to IMB in treating cancer [4]. Piperine (PIP) being natural antioxidant can act as anticancer agent by detoxification of enzymes, suppression of cell proliferation and also by inhibition of cancer cell proliferation [5]. Literature also supports PIP, a substrate for PGP can prevent the efflux and can be an interesting novel modulator of multidrug resistance [6]. Present investigation aimed at dual loading of the PIP and IMB on to Bovine serum albumin (BSA) nanoparticles (NPs) in order to evaluate their anticancer activity on Human glioblastoma multiforme (GBM) cell line T98G.

MATERIALS AND METHODS

Materials

Imatinib Mesylate is a kind gift sample from MSN laboratories, Hyderabad. Piperine and Bovine serum albumin are from Sigma Aldrich, Mumbai. All the other chemicals and reagents used are of analytical grade.

Preparation of dual loaded NPs

BSA dual loaded NPs were prepared by desolvation method with the addition of acetone as the desolvating agent. 1% BSA solution was prepared in double distilled water. pH of the solution was adjusted by using 0.1M NaOH. 0.5g of (IMB) and (PIP) in 1:1 ratio was added to acetone. Acetone was added

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Meeting Time Zone (UTC/GMT +10 hours)

01:00-01:10	Join the meeting (A/V Check)
01:10-01:30	Opening Remarks and Introduction
	Invited Speakers
01:30-01:50	Corona Virus, Ethno-phyto Indications, and Australian Indigenous Potential **Michael G King**, Sunshine Specialist Centre, Australia
01:50-02:10	**Chinese Medicine for Neuro Disorders** **Weijian Bei**, Guangdong Pharmaceutical University, China
02:10-02:30	**Quality Control of TCM Herbs and Herbal Preparations in Taiwan** **Yuan Shiun Chang**, China Medical University, Taiwan
02:30-02:50	**Ayurveda Drugs and Formulations Used in General Practice** **Shripathi Acharya**, Muniyal Institute of Ayurveda Medical Sciences, India
02:50-03:10	**Screening of Some Antidiabetic Herbal Medicine and A Preliminary Exploratory Trial with One of Them** **Begum Rokeya**, Bangladesh University of Health Sciences, Bangladesh
03:10-03:20	Break
03:20-03:40	**Standardization and Validation of Indian Medicinal Plants: A Step Forward** **Ekta Menghani**, JECRC University, India
03:40-04:00	**Documentation of 'Plant Drugs' Dispensed via Local Weekly Shanties of Madurai City, India** **Tagadur Sureshchandra Suma**, The University of Trans-Disciplinary Health Sciences and Technology, India
04:00-04:20	**Traditionally Used Two Orchid Species and Their Phytochemical Analysis with Efficacy as Anti-Inflammatory and Anti-Cancer Agents** **Mohammed Kamrul Huda**, University of Chittagong, Bangladesh
04:20-04:40	**Novel Herbal Sources for Wound Healing and Skin Ailments** **Mujeera Fathima**, University of Madras, India
04:40-05:00	**Plant-Derived Polyphenols as an Alternative Antiviral Agent in Traditional Medicine** **Mary Saral Antoneyraj**, Vellore Institute of Technology, India
05:00-05:30	Break
05:30-05:50	**Synergestic Potential of Phytomedicines: A Present and Future Hope** **Kiranmai Mandava**, Osmania University, India
05:50-06:10	**Effects of Synthesized Curcumin Derivative (MS65) on Interleukin-6 and its Signalling Pathways in Histamine-Induced Keratinocytes Cell Line** **Syahida Ahmad**, Universiti Putra Malaysia, Malaysia
06:10-06:30	**Honey and Nigella sativa as Home Remedy- To Prevent Sore Throat (Gate of Covid-19 Epidemic)** **Khaled Saeed Aser**, King Abdulaziz University, Saudi Arabia
06:30-06:50	**Antioxidant Properties, Catechin Profile and Hypolipidemic - Activity of *Morinda citrifolia* Leaf Water Extract** **Zamzahaila MOHD ZIN**, Universiti Malaysia Terengganu, Malaysia
	Young Researchers
06:50-07:10	**Chemical Composition and Aphrodisiac Potentials of Aqueous and Hydroalcoholic Extracts of *Corynaea crassa* Hook .f.** **Alexandra Jenny López Barrera**, Guayaquil University, Ecuador
07:10-07:30	**Adulticidal Activity of Moroccan *Rosmarinus officinalis* and *Mentha pulegium* Essential Oils Against the Mosquito Vector, *Culex pipiens*** **Ramzi Amal**, Sidi Mohamed Ben Abdellah University, Morocco

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UGC, ICI, Scopus

Current Drug Delivery, 2018, *15*, 1245-1260

RESEARCH ARTICLE

Improvement of Anti-Hyperlipidemic Activity and Oral Bioavailability of Fluvastatin *Via* Solid Self-Microemulsifying Systems and Comparative with Liquisolid Formulation

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Abstract: ***Background*:** FR&D scientists continuously try to increase the *in vivo* performance of low soluble and bioavailable drugs. Solid SMEDDS and liquisolid formulations are relatively simple to develop and fall within the novel drug delivery approaches. Here, a comparison is made to know relative superiority.

***Objective*:** The study aimed to conduct comparative pharmacokinetic (PK) and pharmacodynamic (PD) studies of developed Fluvastatin (FLU) solid SMEDDS (SSMED) and liquisolid formulation (LS) for their relative *in vivo* efficacy.

***Method*:** FLU liquid SMEDDS were optimized by central composite design (CCD). Components, oil, surfactant and co-surfactant were selected as variables; particle size, self-emulsifying time and % drug release in 15min were selected as responses. L-SMEDDS with positive charge inducer were adsorbed on to porous carriers and characterized. Liquisolid formulations were prepared with Avicel PH-102 and Neusilin US2 as carriers.

***Results*:** Optimized L-SMEDDS contained 24.92 mg of oil, 45.18 mg of surfactant and 34.28 mg of co-surfactant. SSMEDs containing Syloid XDP (SSMED-XDP) as carrier was selected based on flow properties and liquid retention potential. The average particle size of SSMED-XDP was 154.30±1.10 nm, PDI was 0.311±0.03 and ZP was +19.57±1.34 mV after dilution. The drug release from SSMED-XDP and LS formulations was higher than FLU powder. The bioavailability of SSMEDs was increased by 3.00 fold and that of LS by 1.49 fold more than FLU-suspension. SSMEDs showed 12 h, while LS and suspension showed only 6 h lipid-lowering effect.

***Conclusion*:** The development of solid SMEDDS resulted in superior performance in both PK and PD effects over the LS formulation.

ARTICLE HISTORY

Received: September 23, 2017
Revised: July 08, 2018
Accepted: July 14, 2018

DOI:
10.2174/1567201815666180723115141

Keywords: Fluvastatin, solid SMEDDS, liquisolid formulations, central composite design, positive charge inducer, pharmacokinetics, pharmacodynamics.

1. INTRODUCTION

Oral route is the major route of drug delivery for treatment of diseases. Nearly, 40% of new drugs exhibit poor aqueous solubility, which leads to poor oral bioavailability (BA), high intra and inter-subject variability and lack of dose proportionality [1]. To reduce these difficulties, various formulation approaches were developed involving the use of surfactants, co-surfactants, lipids/oils, permeation enhancers, co-solvents, cyclodextrins and techniques like micronization, salt formation, nanoparticles, liquisolid formulations and solid dispersions [2]. Currently, much focus is given to lipid-based drug delivery systems which improve the oral BA of BCS class II drugs by lymphatic transport. The absorption of drug from these delivery systems depends on issues like, *i.e.* particle size, emulsification properties and rate of dispersion of drug [3, 4]. Formulation strategies were developed for improving the solubility and BA of many drugs by incorporating into lipid [5], solid dispersions [6], self-emulsifying formulations [7, 8], emulsions [9] and liposomes [10] with particular importance on self-emulsifying drug delivery systems (SEDDS/SMEDDS/SNEDDS).

SMEDDS are isotropic mixtures of oils, surfactants and co-surfactants / co-solvents [11-13]. When these SMEDDS are diluted and mixed with aqueous solutions such as GI fluids, these result in o/w type emulsion containing fine oil

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VELOPMENT AND VALIDATION OF A STABILITY INDICATING RP-UPLC METHOD R THE SIMULTANEOUS QUANTIFICATION OF SOFOSBUVIR AND VELPATASVIR INISHED DOSAGE FORM

UGC, Scopus,

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RTICLE INFO
ticle history
ceived 25/06/2018
ailable online
/07/2018

eywords
P-UPLC,
ofosbuvir,
elpatasvir.

ABSTRACT
A simple, rapid, accurate, precise and economical reverse phase Ultra performance liquid chromatographic method was developed for simultaneous quantification of two anti-viral drugs, viz., Sofosbuvir and Velpatasvir. The separation of both the drugs was achieved on Endeavorsil C 18 column (2.1 × 50 mm, 2.5 µm particle size) as a mobile phase with phosphate buffer (at pH 3): Acetonitrile (50:50 v/v). The flow rate was 0.3 ml/min and detection was done at 240 nm based on isobestic point. The retention time of Sofosbuvir and for Velpatasvir was 2.7 mins and 1.7 mins respectively. The proposed method was validated as per ICH guidelines. The linearity of the method was evaluated at a range of 10 to 50µg/ml and 40 to 200µg/ml for sofosbuvir and Velpatasvir respectively. The Correlation Coefficient of Sofosbuvir and Velpatasvir were 0.999 each. Precision studies were carried out and % RSD of peak areas of Sofosbuvir and Velpatasvir was about 0.6 and 1.6 respectively. The percentage recoveries of both the drugs Sofosbuvir and Velpatasvir from the tablet formulation were 99.79% and 99.95% respectively. Results obtained for LOQ, LOD and Robustness were well within the acceptance criteria. Validation results indicated that the method is linear, accurate, precise, and robust. The simple mobile phase composition makes this method cost effective, rapid, and non-tedious and can also be successfully adopted for simultaneous estimation of both drugs in commercial products.

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Please cite this article in press as P.Sunil Kumar Chaitanya et al. Development and Validation of A Stability Indicating RP-UPLC Method for the Simultaneous Quantification of Sofosbuvir and Velpatasvir in Finished Dosage Form. Indo American Journal of Pharmaceutical Research.2018:8(06).

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Open Access Journal

Indian Journal of Medical Research and Pharmaceutical Sciences

April 2018;5(4) ISSN: ISSN: 2349-5340

DOI: 10.5281/zenodo.1214978 Impact Factor: 4.054

EVALUATION OF IN-VITRO ANTI-ARTHRITIC AND ANTI-ANGIOGENIC ACTIVITY OF COMBINATION OF CURCUMIN AND DICLOFENAC SODIUM

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Keywords:
anti-angiogenic, anti-arthritic, curcumin, diclofenac, protein denaturation.

Abstract

Osteoarthritis is a degenerative bone disorder characterized by cartilage destruction and bone remodelling. Multiple risk factors like age, sex, trauma, obesity and genetic predisposing factors are linked with osteoarthritis. Inflammation and angiogenesis are the main characteristic features of osteoarthritic pathophysiology. The present research was aimed to evaluate the *in vitro* anti-arthritic and anti angiogenic activity of curcumin, diclofenac sodium and their combination. Anti arthritic activity was evaluated by protein denaturation using bovine serum albumin. Denaturation was induced by incubating the drugs with bovine serum albumin under experimental conditions and compared with the control. The protein denaturation was quantified by measuring their absorbance at 660nm. Percentage of Inhibition and IC50 were calculated. Anti-angiogenic effect was evaluated using Chick Chorion Allantoic Membrane (CAM) assay. Drugs were loaded on to the agar gel and aspectically inserted into CAM. Angiogenesis was evaluated by counting the number of blood vessels under microscope. The length, diameter of primary, secondary and tertiary blood vessel and CAM area of different groups were measured by using Image J software. The results demonstrates that diclofenac sodium and curcumin when given in combination induced more effective anti-arthritic and anti-angiogenic effect than the individual drugs. The results of this study highlighted the synergistic potency of diclofenac sodium and curcumin combination in attenuating arthritis and angiogenesis which can serve as a novel therapeutic strategy in treatment of osteoarthritis

Introduction

Osteoarthritis (OA) is a degenerative disorder characterized by cartilage degeneration, inflammation, remodelling of adjacent bone leading to intense joint pain accompanied by limitation in mobility and reduced quality of life. OA is also known as 'wear and tear' arthritis. Genetics, sex, trauma, age and obesity are the major risk factors associated with OA. Articular cartilage provides surface for the movement of synovial joints, is often affected by OA. It is composed of hyaline cartilage and proteoglycans and type II collagen rich Extra Cellular Matrix (ECM). Articular cartilage is usually avascular in nature, but found to undergo extensive vascularisation during OA due to hypoxic conditions induced by multiple factors including oxidative stress and mechanical strain. Being a chronic inflammatory disorder, several biochemical changes and simultaneous destruction of cartilage leads to synovitis, characterized by alterated chondrocyte function, enhanced angiogenesis and decreased bone turnover. Recruitment of activated macrophages and lymphocytes into the synovial capsule leads to release of several pro inflammatory

INTERNATIONAL RESEARCH JOURNAL OF PHARMACY
www.irjponline.com
ISSN 2230 – 8407

Research Article

ROLE OF CURCUMIN IN THE PREVENTION OF OSTEOARTHRITIS

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Article Received on: 05/06/18 Approved for publication: 22/07/18

DOI: 10.7897/2230-8407.098167

ABSTRACT

Osteoarthritis is a chronic degenerative disorder characterized by loss of cartilage and its underlying bone as well as the formation of osteophytes. Obesity serves as one of the major risk factors for osteoarthritis. The present study was aimed to investigate the role of curcumin in preventing obesity which in turn prevents osteoarthritis. Female rats were divided into 4 groups each containing 6 animals. Group I was considered as a control in which animals were fed with a normal/standard diet. Group II animals were fed with high-fat diet (Monosodium glutamate 4mg/g). Group III animals were fed with normal/standard diet along with curcumin (200mg/Kg) and group IV animals were fed with high-fat diet (monosodium glutamate 4mg/g) along with curcumin (200mg/Kg) for 28 days. Parameters like body weight, serum High-density lipids (HDL), low-density lipids (LDL), very low-density lipids (VLDL), triglycerides and cholesterol were estimated. The data of our study shows that the animals which were fed with curcumin have less percentage of weight gain when compared to the animals which were fed with high-fat diet. Serum HDL was found to be higher in group II animals when compared to group I and higher in group IV when compared to group III. Other parameters like serum LDL, VLDL, cholesterol, triglycerides were higher in animals fed with high-fat diet group III when compared to all other groups. It demonstrates that curcumin, when included in diet, has a role in preventing obesity and thereby reduces the risk of osteoarthritis.

Keywords: Cholesterol, curcumin, obesity, osteoarthritis, the percentage of weight gain.

INTRODUCTION

Osteoarthritis is a pro-inflammatory degenerative disorder characterized by cartilage destruction, osteophytes formation, and bone remodeling. Multiple risk factors like age, sex, trauma, obesity and genetic predisposing factors are linked to osteoarthritis. Obesity, one of the risk factors for osteoarthritis is one of the major concerns today worldwide. According to the estimation of WHO 2.3 billion people are overweight and 700 billion are obese in the world in 2015. Overweight and obesity put people at a high risk of comorbidities like diabetes II, osteoarthritis, cancer, cardiovascular diseases increasing morbidity and mortality[1, 2].

Obese people are more prone to get affected by Osteoarthritis. The link between obesity and osteoarthritis is because of certain metabolic factors. These factors are termed as adipokines which are leptin, adiponectin, resistin, visfatin. These factors mediate lipid and glucose metabolism, insulin sensitivity, other physiological functions like reproductive functions, regulation of blood pressure, bone formation and angiogenesis.

Adipose tissue is considered as an endocrine gland which releases adipokines and cytokines which in turn are capable of promoting low-grade inflammation. Obesity is also related to altered lipid metabolism leading to low serum high-density lipid levels, high serum free fatty acids, triglycerides and oxidized low-density lipids.

Curcumin also called as a golden herb is an active chemical constituent of the rhizome *Curcuma longa*. Extensive research has been conducted on the anti-inflammatory, antioxidant and anti-cancer properties of curcumin. The present study is to investigate the role of curcumin in preventing overweight or obesity in rats in rats thereby helpful in preventing osteoarthritis.

MATERIALS AND METHODS

24 female Wistar rats weighing around 180-250 g were used for this study. The animals were accommodated in standard conditions of ventilation and temperature (25±2° C), humidity (60-70%) and light/dark condition (12/12). They were housed in pathogen-free conditions.

The animal procedures were conducted according to CPCSEA guidelines. Approval for animal studies was obtained from an animal ethical committee of TRR College of pharmacy with ethical clearance number: 2/IAEC/TRRCP/2016.
Female rats (n=24) were divided into four groups each group containing 6 animals. Group I was considered as control animals receiving standard chow or normal diet. Group II was fed with high-fat diet i.e. monosodium glutamate (4mg/g), group III animals were fed with standard diet along with curcumin (200mg/Kg) and group IV animals were fed with monosodium glutamate (4mg/g) and curcumin (200mg/Kg).

WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.421
Volume 7, Issue 4, 1031-1042 Research Article ISSN 2278 – 4357

KINETICS & STABILITY STUDIES OF CONTROLLED POROSITY OSMOTIC PUMP TABLET OF ATENOLOL

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Article Received on
29 January 2018,
Revised on 19 Feb. 2018,
Accepted on 11 March 2018,
DOI: 10.20959/wjpps20184-11280

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ABSTRACT

The objective of the present study was to determine the curve fitting analysis and stability of controlled porosity osmotic pump tablet of Atenolol. The linearity of all the kinetic models was estimated. The optimized formulation follows zero order kinetics and the R^2 for zero order was found to be 0.999 which is considered to be the best fit model. The drug release data was obtained, quantitatively correlated and interpreted by these kinetic mathematical models which are important for optimization of the formulations. These models helps to measure significant physical parameters such as drug diffusion coefficient and model fitting on experimental data. The optimized formulation was subjected to accelerated stability studies as per ICH guidelines. The temperature was maintained at 40 ± 2°C and relative humidity of 75 ± 5%. It was observed that no significant change in the drug release by dissolution during stability testing. This testing helps in selecting the best formulation from a series of formulations.

KEYWORDS: Atenolol, Curve fitting, Optimization, Stability, Zero order.

INTRODUCTION

The drug release mechanisms and kinetics are the two important characteristics of a delivery system in describing the drug dissolution profile. A number of mathematical models have been developed to analyze drug release. The model that best fits the release data is selected based on the correlation coefficient (r) value in these models. The model that has high "r" value is considered as the best fit of the release data. The various Mathematical Models are:

CODEN [USA]: IAJPBB ISSN: 2349-7750

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PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.1218255

Available online at: http://www.iajps.com Review Article

A REVIEW ON OSMOTIC DRUG DELIVERY SYSTEM IN TREATING HYPERTENSION BY ATENOLOL

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Abstract:

Hypertension results from increased peripheral vascular smooth muscle tone which leads to increased arteriolar resistance and reduced capacitance of the venous system. Elevated BP is an extremely common disorder and many of the individuals have no symptoms. Chronic hypertension either systolic or diastolic can lead to congestive heart failure, myocardial infarction, renal damage and cerebro vascular accidents. The beta blockers are used individually or in a combination therapy to treat hypertension. The development of oral osmotic systems has a strong and good market potential. Atenolol is a cardio selective beta-1 blocking agent which is used to reduce systolic and diastolic B.P and it is widely used to treat hypertension, introduced in the year 1976. It reduces heart rate and cardiac output when resting and during exercise. The osmotic drug delivery system utilises the principle of osmosis and drug release is aimed to release by zero order kinetics, to prolong the release of the drug for longer duration of time, providing the treatment in controlled manner by reducing the multiple dosing of drug.

Keywords: *Atenolol, Beta -1 blocking agent, Diastolic, Hypertension, Systolic, Osmotic, Zero order.*

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QR code

*Please cite this article in press Ayesha Sultana and D. Varun., **A Review on Osmotic Drug Delivery System in Treating Hypertension by Atenolol,** Indo Am. J. P. Sci, 2018; 05(04).*

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UGC, SCI,

International Journal of Medical Research and Pharmaceutical Sciences
Volume 5 (Issue 3): March 2018
DOI- 10.5281/zenodo.1209210
ISSN: 2394-9414
Impact Factor- 4.174

A REVIEW ON CONTROLLED POROSITY OSMOTIC PUMP DRUG DELIVERY SYSTEM & TREATING HYPERTENSION WITH BETA BLOCKERS

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Keywords: *Beta blockers, Colligative property, Cardiac output, Hypertension, Osmosis.*

Abstract

A significant milestone in oral NDDS is osmotic drug delivery system. Osmotic system releases a drug at a predetermined zero order delivery rate based on osmosis. The osmotic pressure is a colligative property of a solution in which the magnitude of osmotic pressure of the solution is independent on the number of discrete entities of solute present in the solution. The release rate depends on solubility, molecular weight and activity coefficient of the solute i.e osmogens. Elevated BP is an extremely common disorder affecting millions of people world wide. In most cases rise in B.P is due to increase in total peripheral resistance while cardiac output and heart rate are not high. The beta blockers are used individually or a combination therapy to treat hypertension. The development of oral osmotic systems has a strong and good market potential and it is clear from the marketed products and number of patents granted in the last few years. Beta blockers continue to be first choice drugs recommended by JNC VI & WHO-ISH. Hypertension is termed as 'Silent killer' as its symptoms are invisible many times, long term hypertension causes atheroscelerosis, strokes, aneurysm, retinopathy in eyes and amputation of the parts. At this time focus was on developing zero order delivery system. Zero order kinetics would be superior as they maintain steady drug concentration in blood in treating hypertension effectively.

Introduction

The new technologies have revolutionalized the delivery of medication and provide many benefits, one of them is controlled drug delivery system it used in the long term therapy for treatment of chronic conditions like hypertension and heart diseases. Conventional formulations have many limitations, control release formulations are preferred to maintain uniform dosing, reduce dose and increase safety margins for high potency drugs. Hypertension is a chronic disease in which the blood pressure in the arteries is increased. It is expressed by two measurements i.e. systolic and diastolic pressures which are maximum and minimum pressures respectively. Sustained hypertension over time is a major risk factor for heart diseases, strokes and chronic kidney disease. Hypertension is caused when BP is above 180 systolic or above 110 diastolic. It is also a common cause of cardiovascular disorder and is generally associated with abnormal lipid and altered glucose metabolism thus managing of cardiovascular disease in particular becomes important to improve health of the patients.

As per American heart association (AHA) following ranges of blood pressure (BP) in (mm Hg):

i. Normal BP is below 120 systolic and below 80 diastolic.
ii. Pre hypertension is 120-139 systolic or 80-89 diastolic.
iii. Stage 1 high BP (hypertension) is 140-159 systolic or 90-99 diastolic.
iv. Stage 2 high BP (hypertension) is 160 or higher systolic or 100 or higher diastolic.

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An Elsevier Indexed Journal ISSN-2230-7346

Journal of Global Trends in Pharmaceutical Sciences

UGC, SCI

CONTROLLED POROSITY OSMOTIC PUMP TABLET OF ATENOLOL - CONSTRUCTION OF 2^2 FACTORIAL DESIGN, CALCULATING INTERACTION OF FACTORS & PREDICTION BY MATHEMATICAL MODEL AND ANALYZING BY SOFTWARE

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ARTICLE INFO

Key Words

Atenolol, Design Expert, Factorial Design, Osmotic agent, Pore former

ABSTRACT

The objective of present investigation is to construct and evaluate the formulations of controlled porosity osmotic pump tablet of Atenolol by applying 2^2 factorial design. A selected two levels two factors experimental design was developed and evaluated to find out the significance of combined effects of the factors on percentage drug release to obtain the optimized combination to achieve the desired controlled release dosage form. The factorial design calculations were done by hand and the drug release is predicted by using mathematical equation. The cube and contour plots were plotted. The curvature lines indicated interaction, which was calculated and predicted using mathematical models for both the factors. This was further analysed and confirmed by using Stat- Ease Design Expert version 11. The effects of two factors i.e osmotic agent and pore former on drug release were established. The construction of a factorial design involves the selection of parameters and the choice of responses. It was concluded that effect of pore former and osmotic agent in the formulation had significant effect on drug release. The optimized formulation OF4 with high concentration of both these factors showed 97% drug release and they had significant effect on each other which was confirmed by manual calculation and also by software.

INTRODUCTION:

Controlled drug delivery systems is designed to achieve better selectivity and longer duration of action and to decrease dose frequency, it shows customized delivery profiles. Conventional formulations have many limitations so control release formulation are preferred to maintain uniform dosing and increase safety margins for high potency drugs. Controlled porosity osmotic pump is based on the principle of

WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.074
Volume 7, Issue 07, 956-964. Research Article ISSN 2277–7105

IN VIVO STUDIES & SEM OF CONTROLLED POROSITY OSMOTIC PUMP (CPOP) TABLET OF ATENOLOL

UGC, SCI

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Article Received on
03 Feb. 2018,
Revised on 24 Feb. 2018,
Accepted on 16 March 2018
DOI: 10.20959/wjpr20187-11566

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ABSTRACT

The objective of the present research was to explain in detail about in – vivo studies, to determine the pharmacokinetic parameters which were estimated by comparing the marketed Atenolol tablets (Texanolol-AM) with the optimized CPOP tablet of Atenolol in rabbits and by analysing in UV Spectrophotometer. The C_{max}, t_{max}, AUC, AUMC and MRT were estimated. The animal testing is considered to be a major element of in – vivo research. This study helps in observing the overall effects of an experiment. The bioavailability study is performed to characterize the plasma concentration versus time profile. CPOP works on the principle of osmosis releasing drug at zero order kinetics so better control over drugs. In vivo performance is possible releasing the drug after an initial lag. The core tablet consists drug and osmogen in optimum quantity with other excipients. The surface morphology of coating membrane of the optimized formulation was examined by using Scanning Electron Microscopy (SEM) before and after dissolution, it was observed microporous pores are formed after dissolution.

KEYWORDS: Atenolol, Bioavailability, In vivo, Pharmacokinetic, SEM, Texanolol-AM,

INTRODUCTION

A key goal for developing oral controlled dosage form is good understanding of in - vivo studies. The pharmacological responses can be related directly to the plasma levels thus bioavailability is defined as the rate and extent of absorption of unchanged drug from its

INDO AMERICAN JOURNAL OF PHARMACEUTICAL RESEARCH

IN VITRO ANTIOXIDANT POTENCY STUDIES OF HYDRO ALCOHOLIC LEAF EXTRACT OF CASSIA UNIFLORA

UGC, Scopus [1]

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ARTICLE INFO

Article history
Received 24/12/2017
Available online
31/01/2018

Keywords
Antioxidant,
DPPH, ABST,
Superoxide Ion,
Ascorbic Acid,
Gallic Acid.

ABSTRACT

To study the antioxidant potency of hydro alcoholic extract of Cassia uniflora. Hydro alcoholic leaf extracts of the plants was studied for its Free radical scavenging activity against DPPH, ABST and Superoxide ion. Hydro alcoholic crude extracts of leaves of Cassia uniflora at concentrations of 10, 25, and 50µg/ml were studied against DPPH, ABST and Superoxide ion to know their antioxidant potential. Cassia uniflora leaf hydro alcoholic extract possessed an IC50 value 26.32 µg/ml in DPPH radical scavenging assay on compare to standard Vitamin C (3.59µg/ml), in ABST radical scavenging assay 8.76 µg/ml and standard vitamin C (2.32 µg/ml) and in Super oxide ion scavenging recorded as 45.84 µg/ml and for standard gallic acid was found to 0.61 µg/ml. The crude extracts showing better activity against DPPH ABST and Superoxide ion. Hence, can be recommended for potential usage as an antioxidant agent in pharmaceutical and nutraceutical industries.

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Please cite this article in press as Dr. Pratap Kumar Patra et al. In Vitro Antioxidant Potency Studies of Hydro Alcoholic Leaf Extract of Cassia Uniflora. Indo American Journal of Pharmaceutical Research.2018:8(01).

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International Journal of Pharmacy and Pharmaceutical Sciences

ISSN- 0975-1491 Vol 10, Issue 4, 2018

Original Article

PREVENTION OF PEPTIC ULCERS BY CURCUMIN IN CHEMICALLY INDUCED OSTEOARTHRITIS

Scopus, SCI

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Received: 06 Feb 2017 Revised and Accepted: 24 Feb 2018

ABSTRACT

Objective: The present study was carried out to investigate the role of curcumin in osteoarthritis when it is used as an adjuvant to diclofenac sodium.

Methods: Osteoarthritis (OA) was induced by administering nalidixic acid 400 mg/kg. Animals (Female rats) were divided into 5 groups each containing 6 animals. Group I was considered as control, group II in which the animals were induced with osteoarthritis with nalidixic acid and were given no treatment. Group III in which osteoarthritis induced animals were treated with diclofenac sodium by the oral route. Group IV osteoarthritis induced animals were treated with the combination of diclofenac sodium and curcumin and group V animals were pre-treated with curcumin and then induced with osteoarthritis. Parameters like ulcer area, ulcer index, free acidity, total acidity, the volume of gastric juice were estimated. Histopathological studies were also carried out.

Results: The data of our study shows that nalidixic acid has not shown much effect on the gastric parameters in group II animals. The ulcer index, free acidity, total acidity and gastric juice volume were increased significantly ($p<0.001$) in group III and decreased in group IV animals ($p<0.05$) when compared to group I control animals. Group V animals pretreated with curcumin have shown fewer incidences of gastric ulcers and other ulcerative parameters non significantly. Histopathology also suggests a low incidence of ulcers in group IV and group V.

Conclusion: It demonstrates that curcumin when used along with the conventional NSAIDs as an adjuvant therapy, has a role in treating osteoarthritis effectively.

Keywords: Osteoarthritis, Gastric ulceration, Nonsteroidal anti-inflammatory drugs, Curcumin

DOI: http://dx.doi.org/10.22159/ijpps.2018v10i4.24327

INTRODUCTION

Osteoarthritis (OA) is a pro-inflammatory degenerative disorder affecting millions of individuals in whole over the world [1]. It is the most common type of arthritis. Soreness and stiffness in joints, Heberden nodes [2] and pain are the common symptoms experienced in Osteoarthritis. Alleviating pain is the treatment goal in osteoarthritis treatment. Nonsteroidal anti-inflammatory drugs (NSAIDs) like diclofenac sodium, naproxen, indomethacin, and ibuprofen are conventionally used to reduce the pain.

Although these drugs help in reducing the pain they cause many adverse effects of which gastric ulceration is important which is one of the reasons for the increased mortality and morbidity. Curcumin is an active constituent available in the rhizome of *Curcuma longa* (Turmeric) which belongs to the family Zingiberaceae. Curcumin is thought to possess anti-inflammatory, antioxidant, anti-fungal, antiviral properties. It also suppresses the tumor formation and blood vessel formation.

Quinolone antibiotics are the drugs which act by inhibiting DNA gyrase and topoisomerase enzyme in bacteria. In addition to this activity, it degenerates articular cartilage due to their affinity towards the cartilage and bone. Blisters like lesions are formed on the cartilage followed by its degeneration after 24 h of its administration. This is evidenced by the appearance of nodules [3].

The present study was aimed to investigate the effect of curcumin when used with the standard drug in the treatment of Osteoarthritis and also its role in the prevention of gastric ulceration when animals are pretreated with it. Parameters like ulcer area, ulcer index, free acidity, total acidity, the volume of gastric juice were studied. Histopathological study of the stomach was also carried out to determine the effect of curcumin.

MATERIALS AND METHODS

Animals

24 female Wistar rats weighing around 180-250 g were used for this study. The animals were accommodated in standard conditions of ventilation and temperature (25±2° C), humidity (60-70%) and light/dark condition (12/12). They were housed in pathogen-free conditions.

The animal procedures were conducted according to CPCSEA guidelines. Approval for animal studies was obtained from an animal ethical committee of TRR College of pharmacy with ethical clearance number: 2/IAEC/TRRCP/2016.

Chemicals

Curcumin, nalidixic acid, dimethyl Sulfoxide were purchased from Hychem Laboratories, Hyderabad.

Nalidixic acid was administered at a single dose of 400 mg/Kg subcutaneously.

Diclofenac sodium was administered orally at a dose of 13 mg/Kg for 21days. Curcumin was given orally at a dose of 200 mg/Kg for 21 d.

Experimental design

The animals were allowed for stabilization or acclimatization for one week. Then they were grouped below 5 groups each containing 6 animals.

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UGC, 6.01.2018

ISSN 2231-5640 (Print)
2231-5659 (Online)
DOI: 10.5958/2231-5659.2018.00021.8

Vol. 08| Issue-03|
July-September 2018

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www.anvpublication.org

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Research in Pharmaceutical Sciences
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RESEARCH ARTICLE:

Formulation Development and *In vitro* Evaluation of Transdermal Patches of Tramadol HCl

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ABSTRACT:
In the present research work an attempt was made to prepare and evaluate the transdermal patches of Tramadol HCl, a centrally acting opiod analgesic drug. Formulations were made by using different ratios of rate controlling polymers like Eudragit RL100, hydroxyl propyl methyl cellulose 6 cps and ethyl cellulose. Poly ethylene glycol 400 is used as plasticizer and Tween 80 as penetration enhancer. The patches were prepared by solvent evaporation technique using liquid paraffin as lubricant. The study examines the influence of polymers ratio on physicochemical properties and drug release potential of transdermal films. In the pre formulation studies, solubility, partition coefficient and melting point were determined to assess its application for transdermal delivery. The FTIR studies confirmed that there is no incompatibility present between drug and excipients. The patches were evaluated for their appearance, weight uniformity, and thickness uniformity, drug content uniformity, folding endurance, invitro diffusion and stability studies. Based on the evaluation studies F10 formulation was optimised. The drug release was extended for 12 hrs showing drug release of 94.19%. The release kinetics data for optimised formulation has revealed that the patch is best fit in to higuchi model with fickian type of diffusion. The optimised formulation was subjected to accelerated stability studies for 6 months and the results found to be stable with respect to drug content, drug release as well as physical changes.

KEYWORDS: Tramadol HCl, Eudragit RL100,, hydroxyl propyl methyl cellulose 6 cps,ethyl cellulose,solvent evaporation techniquePoly ethylene glycol 400, liquid paraffin.

INTRODUCTION:
At present, the most common form of delivery of drugs is the oral route. While it has an advantage of easy administration, it also has significant drawbacks namely poor bioavailability due to hepatic metabolism and the tendency to produce rapid blood level spikes, leading to a need for high and/or frequent dosing, which can be cost prohibitive and inconvenient [1].

To overcome these difficulties there is a need for the development of new drug delivery system; which will improve the therapeutic efficacy and safety of drugs by more precise (i.e site specific), spatial and temporal placement within the body thereby reducing both the size and number of doses.[2]New drug delivery systems are also essential for the delivery of novel, genetically engineered pharmaceuticals (i.e. peptides, proteins) to their site of action, without incurring significant immunogenicity or biological inactivation.[22] One of the methods most often utilized has been transdermal delivery- meaning transport of therapeutic substances through the skin for systemic effect. Closely related is

Received on 20.06.2018 Modified on 25.07.2018
Accepted on 21.08.2018
Asian J. Res. Pharm. Sci. 2018; 8(3):123-129.
DOI: 10.5958/2231-5659.2018.00021.8

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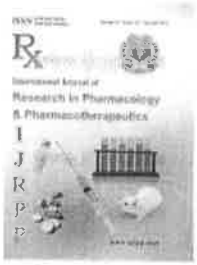

ISSN Print: 2278-2648 IJRPP |Vol.6 | Issue 1 | Jan - Mar - 2017
ISSN Online: 2278-2656 Journal Home page: www.ijrpp.com

Research article Open Access

Design formulation and evaluation of gastroretentive floating tablets of stavudine

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ABSTRACT

The purpose of the present research work was to design, formulate and evaluate the floating tablets of Stavudine, a gastro retentive drug delivery system. Direct compression was used to prepare the tablets using HPMC K4M, HPMC K15M and Carbopol 974(p) as polymers. Formulations were prepared by varying the amount of polymers. The compatibility of drug with the polymers is identified by using FTIR studies. Gastric floating of Stavudine tablets results from effervescence produced by the reaction between sodium bicarbonate and hydrochloric acid in stomach. Twelve formulations of floating tablets were prepared using direct compression technique with polymer such as carbopol974 (p), HPMC grades, Xanthium gum, Guar gum, chitosan in different ratios. The evaluation results revealed that all formulations comply with the specification of official pharmacopoeias and/or standard reference with respect to general appearance, content uniformity, hardness, friability and buoyancy. Out of all the formulation developed, formulation F8 containing of Carbopol showed in vitro drug release of 97.8% up to desired time period of i.e., 24 hours. Thus it is summarized; carbopol grades can be used in formulation of gastro retentive floating drug delivery system. The compatibility of drug with polymers is identified by FT-IR studies. The results obtained showed that the drug is compatible with all the polymers used. The prepared tablets (F1-F12) were evaluated for both pre-compression and post-compression parameters. The results obtained showed that the drug is compatible with all the polymers used.

Keywords: Stavudine, HPMC K4M, HPMC K15M, Carbopol 974.

INTRODUCTION

Oral drug delivery is the most widely utilized route of administration among all the routes that have been explored for systemic delivery of drugs via pharmaceutical products of different dosage form. Oral route is considered most natural, uncomplicated, convenient and safe due to its ease of administration, patient acceptance and cost-effective manufacturing process [1].

Oral delivery continues to be the most popular route of administration due to its versatility, ease of administration and probably most importantly patient compliance [2,3]. Oral controlled release drug delivery have recently been of increasing interest in pharmaceutical field to achieve improved therapeutic

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Asian Journal of Research in Pharmaceutical Science
Year : 2018, Volume : 8, Issue : 3
First page : (123) Last page : (129)
Print ISSN : 2231-5640. Online ISSN : 2231-5659.
Article DOI : 10.5958/2231-5659.2018.00021.8 (http://dx.doi.org/10.5958/2231-5659.2018.00021.8)

Formulation Development and *In vitro* Evaluation of Transdermal Patches of Tramadol HCl

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Online published on 24 October, 2018.

Abstract

In the present research work an attempt was made to prepare and evaluate the transdermal patches of Tramadol HCl, a centrally acting opiod analgesic drug. Formulations were made by using different ratios of rate controlling polymers like Eudragit RL100, hydroxyl propyl methyl cellulose 6 cps and ethyl cellulose. Poly ethylene glycol 400 is used as plasticizer and Tween 80 as penetration enhancer. The patches were prepared by solvent evaporation technique using liquid paraffin as lubricant. The study examines the influence of polymers ratio on physicochemical properties and drug release potential of transdermal films. In the pre formulation studies, solubility, partition coefficient and melting point were determined to assess its application for transdermal delivery. The FTIR studies confirmed that there is no incompatibility present between drug and excipients. The patches were evaluated for their appearance, weight uniformity, and thickness uniformity, drug content uniformity, folding endurance, invitro diffusion and stability studies. Based on the evaluation studies F10 formulation was optimised. The drug release was extended for 12 hrs showing drug release of 94.19%. The release kinetics data for optimised formulation has revealed that the patch is best fit in to higuchi model with fickian type of diffusion. The optimised formulation was subjected to accelerated stability studies for 6 months and the results found to be stable with respect to drug content, drug release as well as physical changes.

Top

Keywords

Tramadol HCl, Eudragit RL100, , hydroxyl propyl methyl cellulose 6 cps, ethyl cellulose, solvent evaporation techniquePoly ethylene glycol 400, liquid paraffin.

Top

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Volume 14, March 2017, Pages 59-64

Prevention of Adriamycin induced cardiotoxicity in rats — A comparative study with subacute angiotensin-converting enzyme inhibitor and nonselective beta blocker therapy

Ajay Godwin Potnuri [a, 1], Sundar Kumar Kondru [b, 1], Pavan Kumar Samudrala [c, 1], Lingesh Allakonda [d] [1]

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https://doi.org/10.1016/j.ijcme.2017.01.001

Abstract

Back ground

Cardiotoxicity confines the usage of Adriamycin in clinical practice as it can develop cardiac impediments up to 10 years after the termination of therapy. Even though, no specific therapeutic strategies are available for treating adriamycin-induced cardiotoxicity, beta-adrenergic blockers (βB) and angiotensin-converting enzyme (ACE) inhibitors are known to prevent its progression into failure. In this scenario, we attempted to compare the pharmacological outcome of sub-acute βB and ACE inhibitor treatments in preventing adriamycin-induced cardiotoxicity by analysing the differences between them.

Methods

Rats received a single bolus dose of adriamycin (10 mg/kg) on day one and treated with either Carvedilol (10 mg/kg) (CAR) or Captopril (50 mg/kg) (CAP) once daily for 28 days. Cardiac morphology, systolic and diastolic functions were evaluated by 2D trans-thoracic

International Journal of Pharma Research and Health Sciences (IJPRHS)

(An open access, Indexed, Peer- Review Online Pharmaceutical and Health Research Journal)

Abbreviated Key Title: Int J Pharma Res Health Sci

Language: English

ISSN:2348-6465

Frequency: Bimonthly

Editor In Chief: Dr Satyabrata Bhanja

Abstracted and Indexed: Chemical abstract services (CASSI), NLM (NC GENAMICS, Google scholar, Electronic Journals Library, Scientific Indexing J Gate, Ulrichs Periodical.

DOI Prefix: 10.21276/ijprhs

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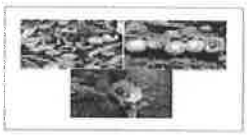
Current Issue: Volume-9, Issue-5, 2021.



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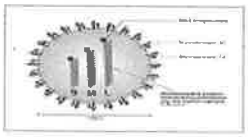

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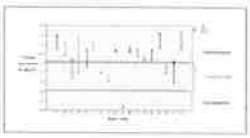

Analysis of Low Dose Platelet Aggregation P High-Risk Pregnancy

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WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
(An ISO 9001:2015 Certified International Journal)
An International Peer Reviewed Journal for Pharmaceutical and Medical Research and Technolo
World Journal of Pharmacy and Pharmaceutical Sciences (WJPPS) has indexed with various repute

Abstract

CONTROLLED POROSITY OSMOTIC PUMP (CPOP) -THE MOST SYSTEM REVIEW.

Ayesha Sultana* and D. Varun

ABSTRACT

Controlled drug delivery system has evolved over the last six decades, the se development of zero order release systems. The CPOP is extension of Elem controlled plasma drug delivery avoiding fluctuations in drug concentrati compliance. Osmotic systems release drugs at constant rate which is reliable after dissolution is released from the core by hydrostatic pressure and diffusi formers in membrane. The hydrostatic pressure is created either by osmotic ag is imbibed across the semi permeable membrane, the membrane after form solutes. This delivery system gained wider acceptance as the drug released i GIT and spatial controlled pattern over long period of time by osmosis ma important for treatment of various chronic diseases.

Keywords: Controlled drug delivery, Hydrostatic Pressure, Osmotic agent, Osr

[Full Text Article]

A.Y. 2016-17

ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 05, pp.31920-31925, May, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

PROBIOTICS AS A POTENTIAL ADJUVANT THERAPY FOR THE TREATMENT OF COLORECTAL CANCER

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ARTICLE INFO

Article History:
Received 07th February, 2016
Received in revised form
21st March, 2016
Accepted 25th April, 2016
Published online 31st May, 2016

Key words:

Colorectal cancer,
Probiotics,
5-Fluorouracil,
Oxaliplatin,
Biomarkers.

ABSTRACT

Colorectal cancer (CRC), also known as colon cancer or bowel cancer is a cancer resultingfrom uncontrolled cell proliferation or growth in the colon or rectum or in the appendix. 5-fluorouracil (5-FU) and Oxaliplatin are most frequently prescribed drugs for treatment of CRC. But many side effects like mucositis, diarrhea, nausea; vomiting, neurotoxicity, hand foot syndrome, tinnitus, and myelosuppression, anaphylactic reactionsetc are the problems with chemotherapy. Probiotics are bacterial cultures comprising of potentially beneficial bacteria or yeast, administered in adequate amounts confer a health benefit on the host. Lactic acid bacteria (LAB) are the most common microbes used. Prebiotics are non-digestible fibre compounds that act as substrate for the probiotics and stimulates the growth of useful bacteria oflarge intestine and probiotics. The ingestion of probiotics, prebiotics or combinations of both (synbiotics) represents a novel new therapeutic option. Probiotics and prebiotics act to alter the intestinal microflora by increasing concentrations of beneficial bacteria such as *Lactobacillus* and *Bifidobacteria*, and reducing the levels of pathogenic micro-organisms. This strategy has the potential to inhibit the development and progression of neoplasia via mechanisms including: decreased intestinal inflammation, enhanced immune function and anti-tumorigenic activity, binding to potential food carcinogens including toxins found in meat products, and a reduction in bacterial enzymes which hydrolyzeprecarcinogenic compounds, such as beta-glucuronidase. The present review is an attempt to explore the role of combination of probiotics with the drugs to observe the efficiency profile of the drugs in the management of CRC.

Citation: Nasreen Sulthana and Vijay K. Chidrawar. 2016. "Probiotics as a potential adjuvant therapy for the treatment of colorectal cancer", *International Journal of Current Research*, 8, (05), 31920-31925.

INTRODUCTION

Cancer can be defined as a disease in which a group of abnormal cells grow uncontrollably by disregarding the normal rules of cell division. Normal cells are constantly subjected to signals that dictate whether the cell should divide, differentiate onto another cell or die. Cancer cells develop a degree of autonomy from these signals, resulting in uncontrolled growth and proliferation. If this proliferation is allowed to continue and spread, it can be fatal. In fact, almost 90% of cancer-related deaths are due to tumor spreading- a process called metastasis Colorectal cancer (CRC), commonly known as colon cancer or bowel cancer, is a cancerfrom uncontrolled cell growth in the colon or rectum (parts of the large intestine), or in the appendix.

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CRC results from the cumulative effects of sequential genetic alterations in proto-oncogenes, tumor suppressor genes and DNA repair genes. In sporadic (non hereditary) CRC, these alterations are acquired, and are likely to be caused by exogenous and endogenous carcinogens. In contrast, in cancer syndromes such as familial adenomatous polyposis (FAP) and hereditary non-polyposis CRC (HNPCC), critical genetic alterations that predispose to malignancy are inherited. For example, in FAP, a germ line mutation in the APC gene (Groden *et al.*, 1991) which occurs in every cell predisposes to adenomatous polyps, while in HNPCC, mutations in DNA repair genes result in a more rapid accumulation of genetic alterations which increases the risk of polyp formation (Oving & Clevers, 2002). There are three main approaches to treat established cancer i.e. surgical excision, irradiation and chemotherapy (Rose and Harris, 2012). The relative value of each of these approaches depends on the type of tumor and the stage of its development.

ejpmr, 2016,3(10), 207-212.

SJIF Impact Factor 3.628

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 3294-3211

EJPMR

SCREENING OF DAMASK ROSE ESSENTIAL OIL IN WISTAR ALBINO RATS FOR ANTIULCER ACTIVITY

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Article Received on 27/07/2016 **Article Revised on 17/08/2016** **Article Accepted on 07/09/2016**

ABSTRACT

Introduction: Gastric ulcer is one of the most prevalent gastrointestinal disorders, which affects approximately 5-10% of population in their life time. In recent years; abundant work has been carried out on herbal medicine to clarify their potential efficacy in gastric ulcer prevention or management. **Objectives**: The present study was carried out to investigate antiulcer activity of *Rosa damascena mill* belonging to family Rosaceae in the albino rats. **Methods**: Pyloric ligation and alcohol induced ulceration methods were used. Ranitidine (20mg/kg) was used as the standard drug. Rose oil was preliminary subjected to the acute oral toxicity study according to OECD guidelines no: 423 based on which, two dose levels i.e. 250 and 500 mg/kg were selected for the further study. In pylorus ligation induced ulcer model, various parameters were studied viz. gastric volume, total acidity, free acidity and ulcer index. Ulcer index and percentage inhibition of ulceration were determined by alcohol induced ulcer model. **Results**: Rose oil at 500mg/kg shown 68.36% inhibition in alcohol induced ulcer model and 56.5 % in pyloric ligation induced ulcer model. **Conclusions** In conclusion, rose oil tested in this investigation deserves further attention due to its importance in prevention and treatment of gastric ulcers. Further molecular level studies are to be done for knowing its exact mechanism of action.

KEYWORDS: *Rosa damascene*, Ulceration, Ligation, Phytochemicals.

INTRODUCTION

Peptic ulcer therapy has undergone many studies over past few years and a number of synthetic drugs are now available for treatment. Reports on clinical evaluation of these drugs show that there are incidences of relapses and several adverse effects and danger of drug interaction during therapy.[1,2] The development of new antiulcer drug from medicinal plants is an attractive proposition because diverse chemical compounds have been isolated from different medicinal plants with antiulcer activity[3] and have been shown to produce promising results in the treatment of gastric ulcers.[4] The bioactive molecules (generally alkaloids, glycosides, essential oils etc.) are isolated/extracted from crude drugs may be used directly as therapeutic agents or as starting materials for the synthesis of useful drugs or serve as a model for pharmacologically active compounds in the period of drugs in synthesis.[5]

An extensive literature survey reveals no pharmacological validation of antiulcer activity of this plant. This made us to screen this plant for antiulcer activity in a scientific manner. Therefore based on the above facts, the present study has been under taken with the main objective of evaluating the extract of plant flower for antiulcer activity using Albino Wistar Strain Rats as experimental animal model.

MATERIALS AND METHODS

DRUGS AND REAGENTS

The chemicals used in the present study were analytical grade Ethanol (90%), Anesthetic ether, Sodium hydroxide, Phenaphthelien indicator, Topers' reagent, Spirit, Ranitidine, Povidone powder from.

EXPERIMENTAL ANIMALS

Albino Wistar strain rats (either sex) weighing 100-150gms were used. The animals were maintained in well-ventilated room temperature with 12/12 natural day-night cycle, in polypropylene cages. They were fed balanced rodent pellet diet obtained from Mahaveera enterprises, Ghatkesar and tap water throughout the experimental period. The animals were housed for one week prior to the experiments to acclimatize to laboratory conditions.

Grouping

The animals were randomly distributed into four different groups with six animals in each group. The experimental protocol was approved by the Institutional Animal Ethics Committee (IAEC).

ACUTE TOXICITY STUDIES

The procedure was followed by using OECD guidelines-423 (Acute Toxic Class Method).

International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

Inexpensive Happy Hormone "Dopamine"-A Safe Antiangiogenic Drug & Enhancing Dopamine Levels By Mucuna Pruriens

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Abstract: ***The research reveals that Dopamine blocks the formation of blood vessels in tumors by inhibiting the action of vascular endothelial factor and prevents the side effects associated with currently used chemotherapeutic agents. The aim of this work is to show the role of Dopamine as safe anti angiogenic agent, treating and enhancing Dopamine naturally by the tablets prepared from the powdered seed extracts of Mucuna pruriens by Wet granulation method. The tablets prepared were evaluated for pre and post compression parameters and they were within permissibe limits as per the standards. Experiments were carried out in mice and were divided into four groups. Group A-Control group, Group B-Disease induced (tumor) but no treatment, Group C-Disease induced and treatment by Standard I.V dose of Dopamine, Group D-Disease induced ,it is treated with test dose of tablets of Mucuna pruriens. The tumors were induced by Benzopyrene, formation of tumors were confirmed by checking the parameters of electrolyte levels, haematology values and liver function test .The mice treated with standard dose exhibited weight gain because of retention of urine which leads to accumulation of Uric acid. Swelling and Pain is also observed at the site of injection. Mice treated with test dose showed no side effects, as Mucuna pruriens contains L-Dopa which readily crosses Blood Brain Barrier enhances Dopamine levels naturally, significantly in very economical and easy approach. The In –vitro release of formulation(F3) showed 92% drug release.***

Keywords: Benzopyrene , Dopamine, Vascular Endothelial Factor, Mucuna pruriens

1. Introduction

Dopamine controls the Brain rewards and in this research it is used to treat Cancer. Brain has 100 billion neurons and only 20,000 carry dopamine in 4 major tracts .The VTA(Ventral tegmental area) contains large number of Dopamine neurons in brain. Dopamine boosters Mucuna pruriens (MP) enhances dopamine levels. Dopamine is monoamine acting as neurohumoral transmitters at the post – ganglionic sympathetic nerve endings and certain regions within the brain. This is present in highest concentration in the terminal axonal processes of specific neurons where they are synthesized and stored in vesicles within the varicose axon terminals. This naturally occurring precursor of noradrenaline acts on dopaminergic and other adrenergic receptors. Currently two classes of postsynaptic dopamine receptors have been described: D1-like (D1 and D5) and D2-like (D2,D3,D4). Presynaptic receptors or autoreceptors for Dopamine are present in the brain. Dopamine is also alpha and beta adrenergic receptor agonist. Mainly D1 receptors helps in dilatation of blood vessels. Dopamine is most abundant in corpus striatum a part of the extrapyramidal motor sytem concerned with the co-ordination of movement, and high concentrations also occur in certain parts of frontal Cortex, limbic system and hypothalamus, it is the best food sources of the amino acid L-dopa, also called Levodopa , L-dopa is a direct precursor to dopamine, a powerful neurotransmitter in your brain .Dopamine doesn't cross the blood brain barrier so it cannot be taken or administered directly for therapeutic results. Dopamine boosters Mucuna pruriens (MP) naturally contains 5% of L-Dopa it enhances Dopamine levels and the Psycological stress, depression associated with cancers can also be treated. It also nourishes tissues and fluids of body. The Mucuna pruriens seeds contain 20%proteins, 59%carbohydrates, 10% fiber, 7% crude lipids, tetra hydro iso quinoline alkaloid, beta-carboline, D-chiro inositol and psychoactive substances.

2. Objective

The objective of this research is to treat cancer in very economical and easy approach. Dopamine prevents the formation of blood vessels in tumors and helps in the treatment. It also restores healthy neuron synapses and minimizes the toxicities associated with chemotherapeutic agents.

3. Mechanism of Action- Dopamine

It inhibits vascular endothelial growth factor (VEGF) or vascular permeability Factor (VPF).VEF'S create new blood vessels including in tumors , dopamine prevents the formation of blood vessels in tumors and helps in treatment of cancers.

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IJC Metabolic & Endocrine 14 (2017) 59–64

Contents lists available at ScienceDirect

IJC Metabolic & Endocrine

journal homepage: http://www.journals.elsevier.com/ijc-metabolic-and-endocrine

Prevention of Adriamycin induced cardiotoxicity in rats — A comparative study with subacute angiotensin-converting enzyme inhibitor and nonselective beta blocker therapy

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ARTICLE INFO

Article history:
Received 4 August 2016
Received in revised form 26 December 2016
Accepted 3 January 2017
Available online 11 January 2017

Keywords:
Adriamycin
Cardiotoxicity
Captopril
Carvedilol

ABSTRACT

Back ground: Cardiotoxicity confines the usage of Adriamycin in clinical practice as it can develop cardiac impediments up to 10 years after the termination of therapy. Even though, no specific therapeutic strategies are available for treating adriamycin-induced cardiotoxicity, beta-adrenergic blockers (βB) and angiotensin-converting enzyme (ACE) inhibitors are known to prevent its progression into failure. In this scenario, we attempted to compare the pharmacological outcome of sub-acute βB and ACE inhibitor treatments in preventing adriamycin-induced cardiotoxicity by analysing the differences between them.
Methods: Rats received a single bolus dose of adriamycin (10 mg/kg) on day one and treated with either Carvedilol (10 mg/kg) (CAR) or Captopril (50 mg/kg) (CAP) once daily for 28 days. Cardiac morphology, systolic and diastolic functions were evaluated by 2D trans-thoracic echocardiography. Cardiac Troponin and Ck MB levels were measured to analyse the myocyte damage. Myocardial lipid peroxidation, IL1β levels and caspase 3 activity were evaluated as the markers of oxidative stress, inflammation and apoptosis respectively.
Results: Both treatments had reduced the adriamycin induced cardiotoxicity. Whereas CAP treatment showed a better reduction of inflammation, superior preservation of posterior wall architecture and enhanced improvement in relative wall thickness when compared to CAR. Oxidative stress, caspase 3 activity and markers of myocyte damage were better recovered with CAR treatment while other parameters were found to be identically attenuated.
Conclusion: The present study found an identical therapeutic outcome from ACE inhibition and β blockade with a better attenuation of inflammation and structural preservation with ACE inhibition and superior antioxidant and antiapoptotic effect with βB treatment.

1. Introduction

Adriamycin (ADR) is an anthracycline based antineoplastic agent which is used in the treatment of leukaemia, lymphomas, carcinomas and soft tissue sarcomas either alone or in combination with other chemotherapy regimens [1]. The cytotoxic effects of ADR are mediated by DNA intercalation and inhibition of the progression of the topoisomerase II, thereby relaxing the DNA supercoils preventing the transcription [2]. Common adverse effects of ADR include myelosuppression, oral mucositis, oesophagitis, hand-foot syndrome and liver dysfunction. The potent and life threatening adverse effect of ADR is cardiomyopathy induced heart failure with a rate of incidence about 4% with a dose of 500–550 mg/m^2, 18% with a dose is 551–600 mg/m^2 and 36% with a dose more than 600 mg/m^2 [3].

The mechanisms of ADR induced cardiomyopathy are not fully understood, but evidences indicate the involvement of oxidative stress and cardiac inflammation leading to apoptosis mediated structural deformation and its transition into failure [4,5]. Free radical generation by ADR in mitochondrial dependent and independent manner induces oxidative stress in the myocardium [6–8]. Treatment with various antioxidants has shown a promising recovery from the ADR induced cardiotoxicity in pre-clinical models [9,10] . But the clinical studies on utility of antioxidants in ADR cardiotoxicity, showed an inconsistent results due to multiple issues like bioavailability of the antioxidant, timing of therapy, type and degree of malignancy and other combinational

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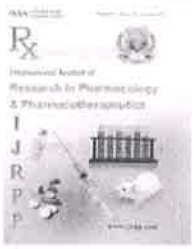
http://dx.doi.org/10.1016/j.ijcme.2017.01.001

International Journal of Research in Pharmacology & Pharmacotherapeutics



ISSN Print: 2278-2648 IJRPP |Vol.6 | Issue 1 | Jan - Mar - 2017
ISSN Online: 2278-2656 Journal Home page: www.ijrpp.com

Research article Open Access

Design formulation and evaluation of gastroretentive floating tablets of stavudine

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ABSTRACT

The purpose of the present research work was to design, formulate and evaluate the floating tablets of Stavudine, a gastro retentive drug delivery system. Direct compression was used to prepare the tablets using HPMC K4M, HPMC K15M and Carbopol 974(p) as polymers. Formulations were prepared by varying the amount of polymers. The compatibility of drug with the polymers is identified by using FTIR studies. Gastric floating of Stavudine tablets results from effervescence produced by the reaction between sodium bicarbonate and hydrochloric acid in stomach. Twelve formulations of floating tablets were prepared using direct compression technique with polymer such as carbopol974 (p), HPMC grades, Xanthium gum, Guar gum, chitosan in different ratios. The evaluation results revealed that all formulations comply with the specification of official pharmacopoeias and/or standard reference with respect to general appearance, content uniformity, hardness, friability and buoyancy. Out of all the formulation developed, formulation F8 containing of Carbopol showed in vitro drug release of 97.8% up to desired time period of i.e., 24 hours. Thus it is summarized; carbopol grades can be used in formulation of gastro retentive floating drug delivery system. The compatibility of drug with polymers is identified by FT-IR studies. The results obtained showed that the drug is compatible with all the polymers used. The prepared tablets (F1-F12) were evaluated for both pre-compression and post-compression parameters. The results obtained showed that the drug is compatible with all the polymers used.

Keywords: Stavudine, HPMC K4M, HPMC K15M, Carbopol 974.

INTRODUCTION

Oral drug delivery is the most widely utilized route of administration among all the routes that have been explored for systemic delivery of drugs via pharmaceutical products of different dosage form. Oral route is considered most natural, uncomplicated, convenient and safe due to its ease of administration, patient acceptance and cost-effective manufacturing process [1].

Oral delivery continues to be the most popular route of administration due to its versatility, ease of administration and probably most importantly patient compliance [2,3]. Oral controlled release drug delivery have recently been of increasing interest in pharmaceutical field to achieve improved therapeutic