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Journal of PharmaResearch
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JPR INFO
Journal of Pharma Research

Vol. 6, Issue 11, 2017 ISSN: 2319-5622 USA CODEN: JPROK3

Research Article

STABITY INDICATING DISSOLUTION METHOD DEVELOPMENT FOR ESTIMATION OF PARACETAMOL AND CHLORZOXAZONE IN COMBINE DOSAGE FORM

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Received on: 13-11-2017; Revised and Accepted on: 24-11-2017

ABSTRACT

The aim of this work was to develop dissolution test method for Paracetamol and Chlorzoxazone in combination tablet. The dissolution established conditions were 900 mL of 0.1M HCl pH 1.0 as dissolution medium, using a paddle apparatus at a stirring rate of 50 rpm. The assay was performed by spectrophotometry for the better conditions stirring speed of 50 rpm, is used .Ahead of results it can be concluded that the method developed consists in an efficient alternative for assay of dissolution for tablets. The method was validated to meet requirements for a global regulatory filing which includes linearity, precision, accuracy robustness and ruggedness. In addition, filter suitability and drug stability in medium were demonstrated.

KEYWORDS: *Dissolution study of Paracetamol and Chlorzoxazone, In vitro release, Spectrophotometry, Q-Analysis Method, Validation.*

INTRODUCTION

Paracetamol (PCM) chemically is 4-hydroxyacetanilide[1]. Paracetamol acts by complex and includes the effects of both the peripheral (COX inhibition) and central (COX serotonergic descending neuronal pathway, L-arginine/NO Pathway, cannabinoid system) antinociception processes and redox mechanism [2]. Paracetamol is well tolerated drug and produces few side effects from the gastrointestinal tract. Chemical structure of PCM is given fig .1.

Chlorzoxazone Chemically is 2(3H)-Benzoxazolone,5-chloro-5-chloro-2 benzoxazolinone[3].

Chlorzoxazone acts by inhibiting multi synaptic reflexes involved in producing and maintaining skeletal muscle spasm of varied aetiology.It acts on the spinal cord by depressing reflexes. CHN a synthetic compound, inhibits antigen-induced bronco spasms.CHN inhibits degranulation of mast cells. Subsequently preventing the release of histamine and slow-reacting substance of anaphylaxis(SRS-A), mediators of type-1 allergic reactions. CHZ also may reduce the release of inflammatory leukotrienes[4]. CHZ is given fig.2.

Literature survey revealed that various analytical technique such as spectrophotometric technique [5-8]. Several method based on separation technique including HPLC[9-11], have been reported. The method was validated as per the International Conference on Harmonization (ICH) guidelines [12,13].

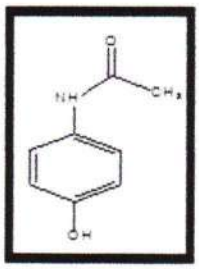

Fig. 1: chemical structure of Paracetamol

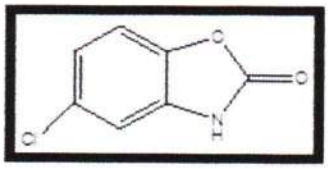

Fig. 2: chemical structure of Chlorzoxazone

MATERIALS AND METHODS

Materials:

Paracetamol was received as a gift samples from Glenmark Pharmaceuticals Ltd. (Goa, India) and Chlorzoxazone was received as a gift samples from Flemingo Pharmaceuticals Nanded, India.

Instrumentation:

Dissolution test was performed in a ELECTROLAB (VK7025) Model(TDT-06L)[14]dissolution apparatus, multi-bath (n=6), in accordance to USP Pharmacopoeia generalmethod. The medium were vacuum degassed under in house vacuum and weremaintained at 37.0 ± 0.5°C by using a thermostatic bath. A double-beam UV-Visiblespectrophotometer (Model:UV 1800,Shimadzu] with a fixed slit width (2 nm)using1.0 cm quartz cell was used for all absorbance measurements. Elico pH analyzer(Model: Elico 11610) was used to determine the pH of all solutions.

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JOURNAL OF PHARMACEUTICAL SCIENCE AND BIOSCIENTIFIC RESEARCH (JPSBR)

(An International Peer Reviewed Pharmaceutical Journal that Encourages Innovation and Creativities)

Area Under Curve Spectrophotometric Method for Determination of Finasteride in Pharmaceutical Formulation

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Article history:

Received 14 July 2017
Revised 16 November 2017
Accepted 17 November 2017
Available online 01 Dec 2017

Citation:

Gaikwad S. S., KhanH. N., Zameeruddin M., Bharkad V. B. Area Under Curve Spectrophotometric Method for Determination of Finasteride in Pharmaceutical Formulation **J Pharm Sci Bioscientific Res.** 2017. 7(5):310-313

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ABSTRACT:

A simple, accurate and precise Area Under Curve spectrophotometric method was developed for determination of Finasteride in pharmaceutical dosage form. This method involves the calculation of integrated value of absorbance with respect to the wave-length between two selected wavelengths. The area selected between 210-220 nm for the determination of Finasteride. The drug follows Beer-Lambert's law over the concentration range of 2-10 µg/ml for Finasteride. The % estimation of the drug 99.546% representing the accuracy of the method. The recovery of Finasteride found near to 99.68. The validation of the proposed method was carried out for its accuracy, precision, limit of detection and limit of quantitation according to ICH guidelines. The proposed methods can be successfully applied in routine work for the determination of Finasteride in its pharmaceutical dosage form.

KEY WORDS: Spectroscopy, Area under curve,Methanol, Dimethyl Sulfoxide (DMSO), Finasteride, validation.

INTRODUCTION:

Finasteridechemically is 17β-(N-tert-butylcarbamoyl)-4-aza-5α-androst-1-en-3-one (Figure. 1).It is white in colour and crystalline powder. The molecular weight of Finasteride is 372.6g/ml and molecular formula is $C_{23}H_{36}N_2O_2$.[1]. It is competitive inhibitor of enzyme 5α-reductase which converts testosterone responsible for androgen action in tissues including prostate gland and hair follicles. Finasteride is antiandrogenicdrug and also found effectively in male baldness. It is effective orally,metabolized in liver and excreted in urine faeces.[2]Literature survey revealed UV ,HPLC and UPLC analytical methods for its estimation.[3-17] The validation of the proposedmethod was carried out by ICH guidelines.[18]

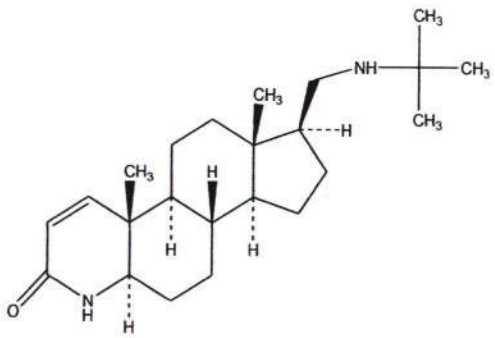

Figure 1: Chemical structure of Finasteride

MATERIAL AND METHODS:

Chemical:

A standard sample ofFinasteride was obtained as gift from Cipla Ltd. Mumbai, Maharashtra. FINAST 5mg tablet was

World Inventia Publishers

Journal of PharmaResearch

http://www.jprinfo.com/

Vol. 6, Issue 11, 2017 ISSN: 2319-5622 USA CODEN: JPROK3

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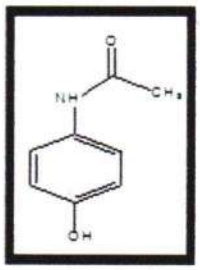

Fig. 1: chemical structure of Paracetamol

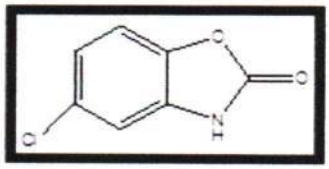

Fig. 2: chemical structure of Chlorzoxazone

MATERIALS AND METHODS

Materials:

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WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES

SJIF Impact Factor 6.647

Volume 6, Issue 10, 900-905 Research Article ISSN 2278 – 4357

DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF METHYLDOPA AND HYDROCHLOROTHIAZIDE IN BULK FORM

Khan Hajera*[1], Mangulkar Ankita[2], Khan Sana[2], Mohammad Zameeruddin[2], Bharkad Vishvanath[2]

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Article Received on
01 August 2017,

Revised on 21 August 2017,
Accepted on 11 Sep. 2017,

DOI: 10.20959/wjpps201710-10227

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ABSTRACT

Present work concerns with development of high performance liquid chromatographic (HPLC) method development for simultaneous determination of Methyldopa and Hydrochlorothiazide in combined dosage form. Chromatographic separation was achieved isocratically on C18 Column Zorbax Eclipse XDB(4.6×250mm×5µ) utilizing Mobile phases consists of Methanol: Water (30:70 v/v) with flow rate of 1ml/min, with detection of 267nm. The Retention Time for Methyldoa & Hydrochlorothiazide was found to be 2.420min and 3.220 min respectively. The developed method was validated in terms of recovery, precision, Ruggedness, Robustness, linearity. This study aimed at developing and validating an HPLC method.

KEYWORDS: Methyldopa, Hydrochlorothiazide, RP- HPLC, Validation.

INTRODUCTION

Methyldopa (MD) (Fig.1) is 3-(3, 4dihydrophenyl)-2-Methyl-L-alanine sequihydrate is Chemical name of methyldopa.[1] It is White to yellowish white, Fine powder which may contain friable lumps it is slightly soluble in water, very slightly soluble in Ethanol (95%), practically insoluble in chloroform and in ether. It is freely soluble in dilute hydrochloric acid.[2]

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INTERNATIONAL JOURNAL OF PHARMACY AND ANALYTICAL RESEARCH

ISSN:2320-2831

IJPAR |Vol.6 | Issue 3 | July - Sep -2017
Journal Home page: www.ijpar.com

Research article Open Access

Development and validation of RP-HPLC method for simultaneous estimation of paracetamol and chlorzoxazone in bulk form

Hajera N. Khan*, Mahajan Swarali, Chopde Asha, Mohammad Zameeruddin, Vishvanath B. Bharkad.

Department of Quality Assurance, Indira college of Pharmacy, Vishnupuri, Nanded, Maharashtra, India.
***Corresponding Author: Hajera N. Khan**

ABSTRACT

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SJIF Impact Factor 6.647

Volume 6, Issue 9, 1537-1549 Research Article ISSN 2278 – 4357

DEVELOPMENT AND EVALUATION OF ORAL MEDICATED JELLY OF ONDANSETRON HYDROCHLORIDE

Jadhav S. B.[1]*, Bharkad V. B.[1], Shinde M. K.[1], Kadam V. S.[1] and Katkam P.[2]

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Article Received on
11 July 2017,
Revised on 31 July 2017,
Accepted on 21 August 2017
DOI: 10.20959/wjpps20179-10082

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ABSTRACT

The aim of present investigation was to formulate and evaluate the oral medicated jelly containing Ondansetron HCl for the treatment of nausea and vomiting. Jellies are semisolid to thick viscous fluids which is easily taken by patients of advanced age, patients with disability in ingestion of food and drink in other word those having difficulty in mastication and swallowing. The benefit of these prepared medicated jellies are increased bioavailability by passing first pass metabolism, easily taken without water and accepted by paediatrics easily. Jellies are prepared by heating and congealing method by dispersing gelling agents in water and evaluated for their physicochemical parameters like appearance, stickiness, pH, viscosity, spreadability, stability studies, drug release and content uniformity. All batches (F1-F12) of medicated jelly showed acceptable and comparable appearance, pH, viscosity, spreadability, stability studies, drug release and content uniformity. The viscosity range was found to be 619007 to 710077cps. The drug content of F1 to F12 formulations was found to be in the range of 95.21 to 103.76%. F8 batch prepared with xanthan gum shows 101.04%. drug release.

KEYWORDS: Oral medicated jelly, Heating and Congealing, Ondansetron HCl, Gelling agents, Nausea and Vomiting.

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Scan QR code to view this publication on your mobile device

www.als-journal.com/ ISSN 2310-5380/ February 2017

als Short Communication
Advancements in Life Sciences – International Quarterly Journal of Biological Sciences

ARTICLE INFO

Date Received: 29/09/2016;
Date Revised: 12/02/2017;
Date Published Online: 25/02/2017;

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How to Cite:
Ahmed MM, Fatima F, Ansari MJ, Shdefat RA, Anwer MK, Jamil S, Ahmed MO, Saeed Y, Noor M, Katakam P, Aleemuddin M, Farheen A (2017). Bacterial contamination of Saudi Arabian paper currency: A report from Al-Kharj. Adv. Life Sci. 4(2): 27-32.

Keywords:
Currency, Microbial contaminations, Cross-sectional study, Al-Kharj *spinachristi, Garcinia kola*

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Bacterial contamination of Saudi Arabian paper currency: A report from Al-Kharj

Mohammad Muqtader Ahmed*[,1], Farhat Fatima[1], Mohammad Javed Ansari[1], Ramadan Al-Shdefat[1], Mohammad Khalid Anwer[1], Shahid Jamil[1], Mutasim Osman Ahmed[1], Yonus Saeed[1], Mohammed Noor[1], Prakash Katakam[2], Aleemuddin M[3], Ayesha Farheen[4]

Abstract

Background: Currency is a public support tool for exchange of commodity and services. It's prevalent practice for acquiring bread to broast and bath to bed has connected all human being together irrespective of race and occupation. Currency notes along with their denomination values also carry pathogens if contaminated and will act as an agent for infection transference. Therefore the objective of this cross-sectional study was to assess the load microbial pathogens of paper currency collected in selected public places of Al-Kharj, Saudi Arabia.

Methods: Currency notes under study were assessed through microbiological culture, microscopic and biochemical visualization techniques.

Results: The results from this cross-sectional study suggested that lower the currency denominations higher was the microbial contaminations, frequency percentage was lower with higher isolations. Small eateries were the biggest source of contaminated currency from the ten selected centres. Percentage microorganism occurrence for *Bacillus* sp., *Staphylococcus* sp., *Klebsiella* sp. *and E. coli was* 56.84%, 25.03%, 13.40% and 04.71% respectively in all currency notes under study.

Conclusions: The outcomes of this study revealed that currency notes can be a source for microbe transmission causing infectious diseases represent public health hazards to the community and individuals.

IJOPILS. FEB 2017; 5(3):34-57

International Journal of Pharmacy and Integrated Life Sciences
"Where improvisation meets innovation"
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RESEARCH ARTICLE ISSN: 2320 - 0782 V5-(I3) PG(34-57)

Study the enzyme inhibitory potentialities of a phytocomposite for Type 2 diabetes by *in silico* GRIP docking

Baishakhi De[1], Rajeev K Singla[2], Koushik Bhandari[1], Prakash Katakam[3], Shanta K Adiki[4], Analava Mitra[1*]

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ABSTRACT

This study reports the identification and characterization of pharmacologically active compounds present in a polyherbal product phytocomposite (PHC) prepared from the leaf powders of *Ficus benghalensis* (Banyan), *Syzigium cumini* (Jamun) and *Ocimum sanctum* (Tulsi) and explore the binding affinities of the compounds in PHC in inhibiting α-amylase and Dipeptidyl Peptidase 4 by *in silico* GRIP docking studies using V Life MDS software. These enzymes are found to play a role in the pathogenesis of Type 2 diabetes. MALDI-ToF spectra of the PHC showed compounds in the molecular range of 137-537g/mol. HPLC quantitation showed 0.22% w/w of lupeol, 1.24% w/w of rutin, 0.14% w/w of eugenol and 0.25% w/w of ursolic acid. Rutin showed highest negative dock score for inhibiting DPP4 and Eugenol in inhibiting α amylase. Lupeol, rutin, eugenol and ursolic acid all exhibit antidiabetic and antioxidant effect and their cumulative effect accounted for synergistic antidiabetic effect of PHC.

Article received on: 12/01/2017 Article accepted on: 27/02/2017

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Original Article

Comparative *in-vivo* Evaluation of Anti-Cancer Drugs Loaded Nanospheres

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ABSTRACT

Objectives: objective of present research was to formulate and evaluate nanospheres of selected anticancer drugs, viz., Capecitabine (CPN), Tamoxifen (TAM) and Doxorubicin (DXO). The adverse effects associated with anticancer drugs which include are bone-marrow depression, cardio toxicity, diarrhoea, nausea and vomiting, stomatitis and dermatitis. **Materials and Methods:** Drug loaded nanospheres of polycaprolactone-chitosan in various drug: polymer ratios, cross linked with Tripolyphosphate were prepared by double emulsion solvent evaporation and solvent diffusion methods. Male white New Zeeland Rabbits(weighing about 2500 gm) were selected as the animalmodel. The rabbits selected for the study had no medicationfor two weeks prior to the study. **Results and Discussion:** The parameters like AUC(0-24) of DXO nanospheres 2362.0 ng.h/mL, whereas DXO pure drug was 1956.5 ng.h/mL. AUC (0-24) of TAM nanospheres 5646.00 ng.h/mL. Whereas TAM unadulterated medication was 4786.30ng.h/mL. AUC (0-24) of CPN nanospheres 4927.40 ng.h/mL. Whereas CPN pure drug was 4027.5ng.h/mL. **Conclusion:** *In vivo* results showed a significant increase in the bioavailability of drugs from DXO6, CPN6 and TAM6 nanospheres when compared to those of the standard drugs. This enhanced bioavailability could be helpful in reducing the dose of DXO, CPN and TAM and also reduce their toxicities. This enhanced bioavailability could be helpful in reducing the dose and also reduce the toxicities of the selected drugs.

Key words: Doxorubicin, Tamoxifen, Capecitabine, Nanospheres, *in vivo* studies.

INTRODUCTION

Tamoxifen (TAM) is a nonsteroidal specialist that ties to estrogen receptors (ER), propose a conformational change in the receptor. The outcome is a blockage or change in the indication of estrogen qualities.[1] TAM is utilized to treat a breast tumor that has reach out to different parts of the body, to treat breast growth in specific patients after surgery and radiation treatment. Doxorubicin (DXO) has antimitotic and cytotoxic activity through a numeral of future components of activity. DXO shapes edifices with DNA by intercalation between base sets, and it restrains topoisomerase II movement by settling the DNA-topoisomerase II complex. DXO is an anthracycline sort of chemotherapy that is utilized alone or with different medications to treat a few distinct sorts of breast tumor.[2] Capecitabine (CPN) is a prodrug that is specifically tumor-initiated to its cytotoxic moiety[3] fluorouracil, by thymidine phosphorylase.[4] CPN is utilized alone or with different medicines/drugs to take care of positive sorts of malignancy like colon, rectum.[5] The adverse effects associated with anticancer drugs which include are bone-marrow depression, cardio toxicity, diarrhoea, nausea and vomiting, stomatitis and dermatitis.[6] Therefore the objective of the present study was to evaluate the bioavailability studies of these drugs in order to eliminate its adverse effects.

Nanoparticles take an interest to a great degree basic obligation in tumor study. Because of a massively minimal size of nanoparticles they are basically and included

Submission Date: 17-04-2017;
Revision Date: 18-06-2017;
Accepted Date: 13-07-2017

DOI: 10.5530/ijper.51.4s.88

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www.ijper.org

Journal of Pharmacreations

PharmaCreations

Pharmacreations | Vol.4 | Issue 3 | July- Sep- 2017
Journal Home page: www.pharmacreations.com

Research article Open Access

Influence of guar gum, tragacanth and HPMC E-5 on fluconazole release from lozenzes

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ABSTRACT

Topical application of drug prevents several drug interactions and lozenge is a better delivery system as the effective concentration of drug can be maintained in the oral cavity for a more prolonged period of time. The aim of study was to develop and evaluate fluconazole lozenges for topical therapy of oropharyngeal candidiasis. The current investigation was designed to improve patient compliance and its efficacy by delivering anti-fungal drug in the form of lozenges. Fluconazole is having poor flowing property it was decided to go for wet granulation in order to increase its ability to flow. For the formulation of compressed tablets lozenges guar gum, tragacanth and HPMC E-5 was used as drug release polymer. Other excipients used were gelatin 6% solution (as binder), sucrose (taste masking agent), methyl paraben (as preservative) and Magnesium stearate (lubricating agent). Among all the formulations F8 showed 98.33 % drug release at 35 min, thickness 4.0±0.1mm, hardness 3.3±0.3 kg/cm3, Friability 0.72±0.26%. F8 batch showed better drug release than other batches, hence F8 was the optimized batch from all formulations.

Keywords: Fluconazole lozenges, Guar gum, Tragacanth, HPMC E 5.

INRODUCTION

Oral drug delivery is the most preferred and simplest means as the oral route provides a maximum active surface area of all drug delivery system for administration of various drugs. The oral route of drug administration has been widely used for both conventional as well as novel drug delivery. The lozenges are solid medicated, flavored and sweetened base dosage forms intended to be sucked and hold in the mouth or pharynx to treat local irritation, mouth or pharynx infection. [1]

Lozenges should dissolve slowly in mouth and possess some degree of smoothness, with their shape being without corners. Lozenges may be formulated with various shapes, like flat, circular, octagonal, biconvex or bacilli, meaning short rods or cylinders. Lozenges are placed in oral cavity. Since the sublingual lozenges may be impractical due to their size, buccal lozenges are formulated and have been

Journal of Pharmacreations

PharmaCreations

Pharmacreations | Vol.4 | Issue 3 | July- Sep- 2017
Journal Home page: www.pharmacreations.com

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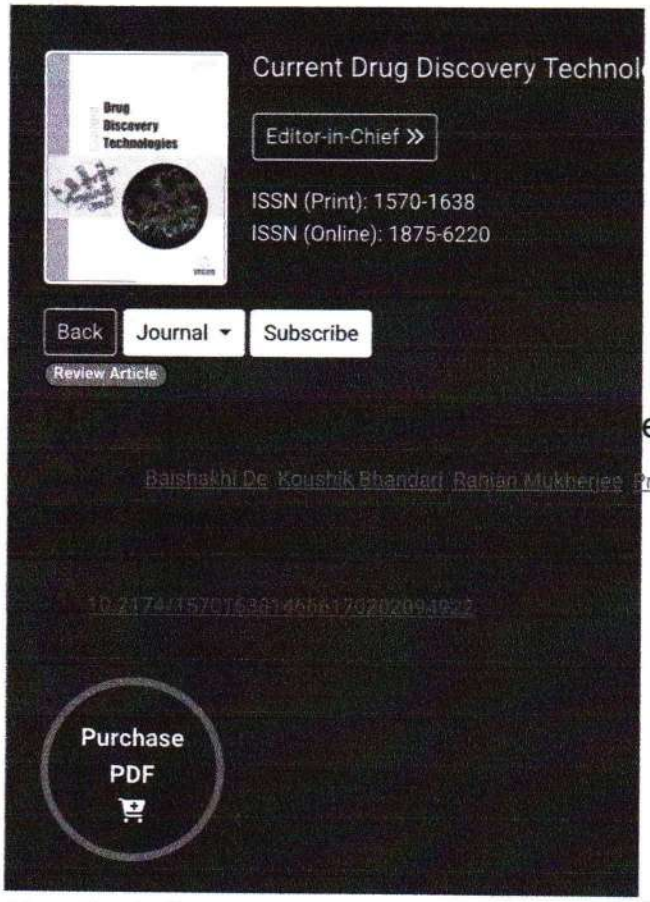

endly, Bio-Waiver Tool for Drug Research

Baishakhi De, Koushik Bhandari, Ranjan Mukherjee, Prakash Katakam, Shanta K. Adiki, Rohit Gundamaraju and Analava Mitra*

Pages: 14

Abstract

Current Drug Discovery Technol

Editor-in-Chief »

ISSN (Print): 1570-1638
ISSN (Online): 1875-6220

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Review Article

PBPK Modeling - A Predictive, Eco-Friendly, Bio-Waiver Tool for Drug Research

Author(s): Subhankar De, Koushik Bhandari, Ranjan Mukherjee, Prakash Katakam, Shanta K. Adiki, Rohit Gundamaraju and Analava Mitra*

Volume 14, Issue 3, 2017

Page: [142 - 155]

DOI: 10.2174/1570163814666170202094922

Price: $65

Pages: 14

Abstract

Available online on www.ijddt.com
International Journal of Drug Delivery Technology 2017; 7(1); 1-12
doi: 10.25258/ijddt.v7i1.8911

ISSN: 0975 4415

Research Article

Development of An Antidiabetic Phytocomposite Loaded Phytoceutical Formulation, Its Quality Control and Pharmacokinetic Studies and Establishing *In Vitro- In Vivo* Correlation

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Received: 11th Dec, 2016; Revised: 15th Jan, 2017; Accepted: 18th Jan, 2017; Available Online: 1st March, 2017

ABSTRACT

This study reports the development of solid oral phytoceutical formulations with Phytocomposite (PHC), an antidiabetic poly herbal preparation as the active core material. Spherical, monolithic PHC microspheres of size range (10 -100 µm) were obtained with Hausner ratio, Carr's index and angle of repose of 1.141± 0.010, 12.418±0.769 and 25.17±0.96 respectively. Encapsulation efficiency amongst different batches (F1-F5) ranged from 96.8- 100.7, with 99% release profile up to 12h. Conventional and sustained release tablets were prepared by direct compression and compatibility amongst polymers and the PHC checked by FTIR studies. Natural polymers viz. gum kondagogu, gum karaya, *Aegle marmelos* gum were used as release retardant. Optimized batch of conventional tablets (F6) showed 99.8 % release in 35 min and optimized batch of PHC-SR tablets (F12) showed 99.9% release at 12th hr, both followed zero order kinetics and non-Fickian diffusion. These optimized formulations were subjected to stability studies and the similarity factors (f2) of the conventional and SR tablets were 88.75 and 66.76 respectively. Pharmacokinetic parameters of three formulations in rat plasma were analyzed by PK Solver 2.0. *In vitro-in vivo* correlation (IVIVC) of three different formulations showed Level A correlation in all cases.

Keywords: phytocomposite, microspheres, conventional, sustained release, phytoceutical, Level A correlation.

INTRODUCTION

Considering the multiple etiology of Type 2 diabetes, therapeutic strategies in treating Type 2 diabetes have undergone a radical change and focuses on multi dimensional aspects viz. hormonal effects, oxidative stress, cell signaling defects, hyper or hypo activities of enzymes etc[1,2]. Enzymes like alpha amylase, alpha glucosidase, aldose reductase, dipeptidyl peptidase 4 are considered to play a role in the pathogenesis of Type 2 diabetes[2]. Currently there has been a great resurgence of interest in phytomedicine in the treatment of chronic ailments. Pharmacologically active molecules from natural sources inhibiting such enzymes can serve as effective therapeutic entities in the management of Type 2 DM. Indian subcontinent is bestowed with natural phytomedicinal hub with several pharmacologically active phytochemicals that can serve as Natural enzyme inhibitors (NEIs) as well as active pharmaceutical ingredients (API) which can be implemented in the control of this chronic disease[2].

Combination therapy with poly herbals or phytoceuticals has gained popularity in terms of providing multiple and synergistic health benefits[1]. Oleanolic acid is found to provide a synergistic effect with first line antidiabetic metformin[3]. Sesame oil forms a synergistic antidiabetic combination with glibenclamide[4]. Research works of Mitra et al. have shown that Fenugreek-tulsi composite or composite prepared from the Tulsi leaves (*Ocimum sanctum*), Amla (*Emblica officinalis*), Bitter Gourd (*Momordica charantia*), Gurmur leaves (*Gymnema sylvestre*) and Jamun (*Syzygium cumini*) fruit and its seed help in controlling the blood gluco-lipid profile of Type 2 diabetics and is accepted by the indigenous or tribal populace of Bengal as surveyed in Binpur and Jhargram area of rural Bengal[5-7].

Ficus benghalensis (Indian Banyan tree, family *Moraceae*), *Syzigium cumini* (Jamun or Black pulm, family *Myrtaceae*) and *Ocimum sanctum* (Holy Basil or Tulsi, family *Lamiaceae*) have documented anti-diabetic potentials. A poly herbal product, named as phytocomposite (PHC), prepared from the leaf powders of Banyan, Jamun and Tulsi in varying weight ratios is found to show synergistic antioxidant and anti-diabetic actions in various *in vitro* enzyme inhibitory assays that are found to play a role in the pathogenesis of Type 2 diabetes[2].

Despite immense potentialities of the phytomedicines, the preparation and delivery pattern being traditional (either as whole extracts or individual herbs) problem arises due to patient noncompliance owing to organoleptic issues,

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ISSN 2349-7203

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

HUMAN

Human Journals
Research Article
September 2018 Vol.:13, Issue:2

Development and Validation of RP-HPLC Method for the Estimation of Gemigliptin

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
HUMAN

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Submission: 20 August 2018
Accepted: 27 August 2018
Published: 30 September 2018

Keywords: Gemigliptin, RP-HPLC, Validation.

ABSTRACT

The RP-HPLC method has been developed for the estimation of Gemigliptin. The quantification was carried out C_{18} bonded phase i.e. Zorbax Eclipse XDB-C_{18} (4.6×250mm×5µ) with particle size 5 µm in an isocratic mode with a mobile phase consisting of Methanol: Water (20:80 % v/v). The detection was carried out using a UV detector at 233 nm. The solutions of Gemigliptin was chromatographed at a constant flow rate of 1 ml/min & the retention time of the drug was found to be 2.3 min. The linearity range of Gemigliptin was found to be from 1- 35 µg/ml. linear regression coefficient was 0.999. As per ICH guideline, the method was validated for recovery, Precision, ruggedness and linearity.

HUMAN JOURNALS
www.ijppr.humanjournals.com

CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

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

DEVELOPMENT AND VALIDATION OF SPECTROPHOTOMETRIC METHOD FOR SIMULTANEOUS ESTIMATION OF CIPROFLOXANCINE, TINIDAZOLE AND DICYCLOMINE HCL

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Abstract:

A Simple, accurate and precise UV Spectrophotometric method has been developed for the simultaneous estimation of Ciprofloxacin, Tinidazole and Dicyclomine Hcl in tablet. The method is based upon formation of simultaneous equation of these drugs and detections were carried out at wavelength of maximum absorbance of drugs: viz, 271nm, 317nm and 212nm for Ciprofloxacin,Tinidazole & Dicyclomine Hcl respectively. The linearity was found to be in the concentration range of 2-10 µg/ml for Ciprofloxacin,2-20 µg/ml for Tinidazole and 100-600 µg/ml for Dicyclomine Hcl respectively. The results of tablet analysis were found to be 99.98% for Ciprofloxacin and 100.05% for Tinidazole, 99.92% for Dicyclomine Hcl.The proposed methods can be effectively applied for the routine analysis of Ciprofloxacin, Tinidazol and Dicyclomine Hcl in bulk and combined dosage form.

Keywords: *UV Spectrophotometric method, Ciprofloxacin, Tinidazole, Dicyclomine Hcl, Simultaneous equation method.*

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*Please cite this article in press Hajera Khan et al., **Development and Validation of Spectrophotometric Method for Simultaneous Estimation of Ciprofloxancine, Tinidazole and Dicyclomine Hcl.**, Indo Am. J. P. Sci, 2018; 05(08).*

Principal
Indira College of Pharmacy
Vishnupuri, Nanded-06.

CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

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Abstract:

A Simple, accurate and precise UV Spectrophotometric method has been developed for the simultaneous estimation of Ciprofloxacin, Tinidazole and Dicyclomine Hcl in tablet. The method is based upon formation of simultaneous equation of these drugs and detections were carried out at wavelength of maximum absorbance of drugs; viz, 271nm, 317nm and 212nm for Ciprofloxacin,Tinidazole & Dicyclomine Hcl respectively. The linearity was found to be in the concentration range of 2-10 µg/ml for Ciprofloxacin,2-20 µg/ml for Tinidazole and 100-600 µg/ml for Dicyclomine Hcl respectively. The results of tablet analysis were found to be 99.98% for Ciprofloxacin and 100.05% for Tinidazole, 99.92% for Dicyclomine Hcl.The proposed methods can be effectively applied for the routine analysis of Ciprofloxacin, Tinidazol and Dicyclomine Hcl in bulk and combined dosage form.

Keywords: *UV Spectrophotometric method, Ciprofloxacin, Tinidazole, Dicyclomine Hcl, Simultaneous equation method.*

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QR code

*Please cite this article in press Hajera Khan et al., **Development and Validation of Spectrophotometric Method for Simultaneous Estimation of Ciprofloxancine, Tinidazole and Dicyclomine Hcl.**, Indo Am. J. P. Sci, 2018; 05(08).*

CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

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

DEVELOPMENT AND VALIDATION OF SPECTROPHOTOMETRIC METHOD FOR SIMULTANEOUS ESTIMATION OF CIPROFLOXANCINE, TINIDAZOLE AND DICYCLOMINE HCL

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Indira College of Pharmacy
Vishnupuri, Nanded-06.

WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES

SJIF Impact Factor 6.647

Volume 7, Issue 2, 1025-1033 Research Article ISSN 2278 – 4357

INVESTIGATION OF ORANGE PEEL ETHANOLIC EXTRACT AS AN ANTICATARACT AGENT

Amol S. Kulkarni[1], Vikram V. Nimbalkar[2], Mohammad Zameeruddin[3], Hajera N. Khan[4], Sandhya S. Bundel[5]* and Sandip T. Thoke[6]

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Article Received on
04 December 2017,
Revised on 25 Dec. 2017,
Accepted on 15 Jan. 2018
DOI: 10.20959/wjpps20182-10925

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ABSTRACT

The lens lies behind the iris and the pupil. It works much like a camera lens. It focuses light onto the retina at the back of the eye where an image is recorded. The lens also adjusts the eye's focus, letting us see things clearly both up close and far away. The lens is made of mostly water and protein. The protein is arranged in a precise way that keeps the lens clear and let's light pass through it. But as we age, some of the protein and clump together and start to cloud a small area of the lens. This is a cataract. Over time, the cataract may grow larger and cloud more of the lens, making it harder to see a leading cause of blindness and poor vision is a major public health problem worldwide. Diabetes and hyperglycemia have long been recognized as risk factor for cataract. The present study evaluated the in vitro Anticataract activities of orange peel Ethanolic Extract has rich source of flavonoids, show magnificent a Antioxidant activity against glucose-induced cataract genesis using goat lenses. using isolated goat lenses are incubated in artificial aqueous humor and divided into four experimental groups. The orange peel Ethanolic Extract at a dose of 500µg/ml is incubated simultaneously with glucose (55 mM) and glucose (5. 5mM) for a period of 72 h. ascorbic acid (20 µg/ml) is used as the standard drug. At the end of the incubation lense opacity is measured by photographic evaluation. The orange peel Extract shows significant inhibition of cataractogenesis of eye lenses at conc. 500 p.p.m. The present study suggested that the ethanol extract of orange peel possesses Anticataract activity.

WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES

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WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES

SJIF Impact Factor 7.421

Volume 7, Issue 9, 337-346 Review Article ISSN 2278 – 4357

EMULGEL: AN OVERVIEW

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Article Received on
24 June 2018,

Revised on 14 July 2018,
Accepted on 04 August 2018

DOI: 10.20959/wjpps20189-12212

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ABSTRACT

Emulgel is used to treat aches and pains caused by colds, headaches, muscle aches, backaches, arthritis and other conditions and injuries. The patient adherence to topical formulations is significant in relation to chronic skin diseases, like fungal infections, acne, psoriasis. Emulgel is one of the recent technology in NDDS used topically having characteristics of dual control release i.e. emulsion as well as gel. Emulgels have emerged as one of the most interesting topical delivery systems as it has dual release control system i.e. gel and emulsion. When gel and emulsion are used in combined form, the dosage form are referred as Emulgel.

KEYWORDS: Emulgel, Gelling agents, Topical drug delivery, Skin diseases.

INTRODUCTION[1,2,8]

Topical drug administration is simplest and easiest route of localized drug delivery anywhere in the body by routes as ophthalmic, rectal, vaginal and skin. These are applied as wide spectrum of preparations in case of both cosmetic and dermatological, to the healthy diseased skin. The formulations are available in different forms like from solid through semisolid to liquid. Drugs are administered topically for their action at the site of application or for systemic effects Drug absorption is enhanced through the skin if the drug substance is in solution, if it has a favorable lipid/water partition coefficient and if it is a non electrolyte. Mostly, pharmaceutical preparations applied to the skin are expected to serve some local action and are formulated to provide prolonged local contact with minimal systemic drug absorption. Drugs applied to the skin for their local action include antiseptics, antifungal agent, skin emollients and protectants. Topical drug administration is a localized drug delivery system anywhere in the body through ophthalmic, rectal, vaginal and skin as topical

INTERNATIONAL JOURNAL OF PHARMACY AND ANALYTICAL RESEARCH

ISSN:2320-2831

IJPAR |Vol.7 | Issue 4 | Oct - Dec - 2018
Journal Home page: www.ijpar.com

Research article Open Access

Retrospective study on antibiotic use in different clinical departments of hospital in Nalut, Libya

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ABSTRACT

A retrospective Study on Antibiotic Use in Different Clinical Departments of Hospital in Nalut, Libya during a period of five months (1/1/2013to 30/5/2013). Data were collected retrospectively from inpatients medical files (600 patient's medical file), prescriptions for outpatients (400 prescriptions studied) and the total number of prescription was 1000. The data then was evaluated by Microsoft Excel software for analysis and descriptive statistics. The World Health Organization (WHO) indicators (utilization in defined daily doses (DDD): DDD/1000 inh/day) were used and the ATC/ DDD method was implemented. The three most frequently used antibiotics for inpatients were cefotaxime, ceftriaxone and metronidazole with 25.57%, 16.54% and 15.34% of the total prescribed antibiotics respectively, and for outpatients they were amoxiclav (26.23%), amoxicillin and azithromycin (12.41%) and ciprofloxacin (11.48%). After calculating the consumption of antibiotics in DDD, the highest consumed antibiotic in DDDs (g) was clarithromycin 10.67 g and 0.119 g in terms of DDD/1000inh/day, while consumption of amoxiclav was the lowest consumption 0.011 g and 0.00012 DDD/1000 in h/day. About 98% of patients given antibiotics without culture sensitivity tests (c/s). Only 2% of the patients undergone the test during the treatment. In conclusion, this study we identified that the DDD for antibiotic consumption data for five months and the clarithromycin was the most consumption over those months and we find out the most prescribed antibiotics and the most of the wards use it. In addition to the demographic data, this also helps physicians to have a more precise idea about prescriptive patterns prevalent in the Libyan community.

Keywords: Drug utilization research, Inpatient, Defined daily dose, Anatomical therapeutic chemical (ATC), Libya

INTRODUCTION

The dawn of antibiotics, which are one of the most booming drug groups used in medicine, dramatically improved the prognoses of patients with microbial infections. Unfortunately, following quite a few years of hopefulness, the over the top and unpredictable utilization of these antiinfection agents in both human and veterinary practices has prompted the development and spread of resistant organisms that imperil their viability, joined by undesirable symptoms and unwanted adverse effects [1].

In spite of the effectiveness of antimicrobials in the treatment of various bacterial diseases, usually they are utilized improperly worldwide [2]. This

Biological Trace Element Research
https://doi.org/10.1007/s12011-018-1541-5

Enhancement in Iron Absorption on Intake of Chemometrically Optimized Ratio of Probiotic Strain *Lactobacillus plantarum* 299v with Iron Supplement Pearl Millet

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Received: 5 August 2018 / Accepted: 2 October 2018

Abstract
This research article aims to establish the intake ratio of probiotic *Lactobacillus plantarum* 299v with iron supplement pearl millet by central composite design of response surface methodology so as to enhance iron absorption. In anemic rat models, the food intake pattern, body weight, hemoglobin content, and hematocrit values were found to be significantly increased on treatment with pearl millet:probiotic; however, incorporation of probiotics at lower dose (0.5 g) was significantly ($p < 0.05$) effective in enhancing iron absorption, and further increment in probiotic doses (1.0 g) did not produce significant increase in hemoglobin and hematocrit values as evidenced by the experimental findings.

Keywords Probiotic · Iron absorption · Pearl millet · Anemia · Central composite design

Introduction

Iron, an essential micronutrient, is a redox metal that switches between the ferrous and ferric, the two oxidation states. It plays a very vital role in different physiological processes, viz., oxidative metabolism, oxygen transport, and cellular proliferation and participates in cell signaling processes [1]. Among the two major dietary irons, non-heme iron can be obtained both from plant and animal sources, and heme iron from the animal source. Non-heme iron is less well absorbed than the heme iron. Iron balance in the body is regulated by absorption, and there is not definitive mechanism for iron excretion; and if proper iron supplementation is not provided, the daily iron needs of the body are met by the breakdown of the circulating red blood cells [2]. The body losses iron either through the skin, urinary tract, respiratory airways, intestine, or menstrual blood loss. Anemia, mostly nutritional anemia with far reaching consequences, is a matter of public health concern [1]. Dietary iron fortification is an effective method for iron compensation [3]. Components like proteins, calcium, and plant secondary metabolites (polyphenols and the phytates) inhibit the iron absorption, whereas ascorbic acid promotes iron absorption.

Polyphenols, phenolic compounds, and tannins are widely distributed in food items like tea, coffee, blueberry, raspberries, apples, and walnuts. All polyphenols can inhibit non-heme iron absorption to a variable extent, and iron absorption inhibiting capacities of tea polyphenolics and catechins like epigallocatechin-3-gallate often range high from 60 to 90%. Phytates that are found in soy proteins, fibers, lentils, peas, cereals, walnuts, almonds, and seasame have the capacity to decrease non-heme iron bioavailability by 50 to 65%. Animal proteins from milk and egg also reduce iron absorption. Calcium affects negatively on both heme and non-heme iron bioavailability [2]. Literature mining reports the effect of probiotic mix on heme and non-heme iron bioavailability in humans; probiotic *Lactobacillus plantarum* 299v (Lp299v) increases non-heme iron absorption [4–6]. However, still scientific evidence is lacking to establish the causal relationship between Lp299v consumption and increase in absorption of non-heme iron [7]. This research article aims to establish the probiotic Lp299v to pearl millet (rich source of iron supplement) combination intake ratio by chemometric tools and study the potentiality of the combination ratio in enhancement of iron absorption in an evidence-based manner.

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Published online: 07 October 2018

INTERNATIONAL JOURNAL OF PHARMACY AND ANALYTICAL RESEARCH

ISSN:2320-2831

IJPAR |Vol.7 | Issue 2 | Apr - Jun -2018
Journal Home page: www.ijpar.com

Research article Open Access

Comparative evaluation of antioxidant, hypoglycemic and hypolipidemic potentials of Black tea from three major tea growing zones of India

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ABSTRACT

Tea is a very popular commercial crop and India is the world's largest consumer of tea in the world and the second largest producer of tea. Black tea is mostly preferred in Indian context and its multifaceted health benefits are being largely explored. This research article made a comparative study of antioxidant, hypoglycemic and hypolipidemic effect of Assam, Darjeeling and Nilgiri varieties of black tea. Research results have shown that Assam variety of tea has the highest antioxidant, hypoglycemic and hypolipidemic potentials followed by Nilgiri and Darjeeling variety.

INTRODUCTION

Tea is a very popular commercial crop, a worldwide popular beverage and being a source of several pharmacologically active molecules has currently attracted research limelight owing to its multifaceted pharmacologic actions. India is the world's largest consumer of tea in the world and the second largest producer of tea. As per historical records, the prevalence of tea drinking in India is since 750 BC [1]. Since 1947, India has approximately 563,980 hectares of land under tea cultivation and the largest tea cultivating states include Assam (304,400 hectares), West Bengal (140,440 hectares), Tamil Nadu (69,620 hectares) and Kerala (35,010 hectares). The versatile health aspects of tea are already being extensively studied [2, 3]. This research article focuses to study the antioxidant, hypoglycemic and hypolipidemic potentials of three different varieties of black tea (Darjeeling tea, Assam tea and Nilgiri tea) grown in three different states of India.

MATERIALS AND METHODS

Research material

Black tea of Darjeeling variety (DBT); Black tea of Assam variety (ABT); Black tea of Nilgiri variety (NBT)

INTERNATIONAL JOURNAL OF PHARMACY AND ANALYTICAL RESEARCH

ISSN:2320-2831

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INTERNATIONAL JOURNAL OF PHARMACY AND ANALYTICAL RESEARCH

ISSN:2320-2831

IJPAR |Vol.8 | Issue 1 | Jan – Mar - 2019
Journal Home page: www.ijpar.com

Research article Open Access

Development and validation of UV spectroscopic method for simultaneou estimation of dapagliflozin and saxagliptin in synthetic mixture

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ABSTRACT

Aim

Simple, precise and accurate UV-Spectrophotometric Simultaneous Equation method for estimation of Dapagliflozin and Saxagliptin were developed and validated as per ICH guidelines.

Experimental and Results

The objective of the work is to develop UV spectroscopic method for simultaneous estimation of Dapagliflozin (DAPA) and Saxagliptin (SAXA). This Method involve solving of simultaneous equations based on measurement of absorbance at two wavelengths 223 nm and 212 nm. Both the drugs obey the Beer's law in the concentration ranges 4-24 µg mL and 5-50 µg mL respectively. Results of the methods were validated statistically. Novel, simple, sensitive, rapid, accurate and economical Spectrophotometric methods have been developed for simultaneous estimation of Dapagliflozin and Saxagliptin .The method can be used to estimate the amount of Dapagliflozin and Saxagliptin in mixture containing Dapagliflozin and Saxagliptin.

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INTERNATIONAL JOURNAL OF PHARMACY AND ANALYTICAL RESEARCH

ISSN:2320-2831

IJPAR |Vol.7 | Issue 4 | Oct - Dec - 2018
Journal Home page: www.ijpar.com

Research article Open Access

Retrospective study on antibiotic use in different clinical departments of hospital in Nalut, Libya

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ABSTRACT

A retrospective Study on Antibiotic Use in Different Clinical Departments of Hospital in Nalut, Libya during a period of five months (1/1/2013to 30/5/2013). Data were collected retrospectively from inpatients medical files (600 patient's medical file), prescriptions for outpatients (400 prescriptions studied) and the total number of prescription was 1000. The data then was evaluated by Microsoft Excel software for analysis and descriptive statistics. The World Health Organization (WHO) indicators (utilization in defined daily doses (DDD); DDD/1000 inh/day) were used and the ATC/ DDD method was implemented. The three most frequently used antibiotics for inpatients were cefotaxime, ceftriaxone and metronidazole with 25.57%, 16.54% and 15.34% of the total prescribed antibiotics respectively, and for outpatients they were amoxiclav (26.23%), amoxicillin and azithromycin (12.41%) and ciprofloxacin (11.48%). After calculating the consumption of antibiotics in DDD, the highest consumed antibiotic in DDDs (g) was clarithromycin 10.67 g and 0.119 g in terms of DDD/1000inh/day, while consumption of amoxiclav was the lowest consumption 0.011 g and 0.00012 DDD/1000 in h/day. About 98% of patients given antibiotics without culture sensitivity tests (c/s). Only 2% of the patients undergone the test during the treatment. In conclusion, this study we identified that the DDD for antibiotic consumption data for five months and the clarithromycin was the most consumption over those months and we find out the most prescribed antibiotics and the most of the wards use it. In addition to the demographic data, this also helps physicians to have a more precise idea about prescriptive patterns prevalent in the Libyan community.

Keywords: Drug utilization research, Inpatient, Defined daily dose, Anatomical therapeutic chemical (ATC), Libya

INTRODUCTION

The dawn of antibiotics, which are one of the most booming drug groups used in medicine, dramatically improved the prognoses of patients with microbial infections. Unfortunately, following quite a few years of hopefulness, the over the top and unpredictable utilization of these antiinfection agents in both human and veterinary practices has prompted the development and spread of resistant organisms that imperil their viability, joined by undesirable symptoms and unwanted adverse effects [1].

In spite of the effectiveness of antimicrobials in the treatment of various bacterial diseases, usually they are utilized improperly worldwide [2]. This

HPLC-UV method for simultaneous determination of sparfloxacin and dexamethasone sodium phosphate in eye drops

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Abstract: A simple, sensitive liquid chromatographic method was developed and validated for the simultaneous estimation of sparfloxacin and dexamethasone sodium phosphate in bulk and pharmaceutical formulations. Optimum separation was achieved in less than 10 min using a C_{18} column (250 mmx4.6 mm i.d, 5µ particle size) by isocratic elution. The mobile phase consisting of a mixture of mixed phosphate buffer (pH 6.8) and acetonitrile (50:50, v/v) was used. Column effluents were monitored at 224nm at a flow rate of 1ml/min. Retention times of sparfloxacin and dexamethasone sodium phosphate were 3.01 and 6.47 min respectively. The linearity of sparfloxacin and dexamethasone sodium phosphate was in the range of 3-18µg/ml and 1-6µg/ml respectively. Developed method was economical because, the time taken and amount of solvent consumed for each analysis was less. The method was validated and was applied to the simultaneous determination of sparfloxacin and dexamethasone sodium phosphate in bulk and pharmaceutical formulations.

Keywords: Simultaneous determination, HPLC, isocratic elution, validation.

INTRODUCTION

Sparfloxacin (SFN) is a third generation fluoroquinolone antibiotic used in bacterial infections. It is chemically (cis) - 5-amino-1-cyclopropyl-7-[(3, 5-dimethyl piperazin-1-yl] –6, 8-difluoro- 1, 4-dihydro 4-oxo-quinoline- 3-carboxylic acid (Merk index, 2001). Dexamethasone sodium phosphate (DSP) is a highly selective glucocorticoid which is widely used in ocular inflammatory diseases. Its chemical name is 9- fluoro-11b, 17, 21-trihydroxy-16α- methylpregna-1, 4- diene-3, 20-dione 21-(dihydrogen phosphate) disodium salt (The Indian Pharmacopeia commission, 2007). Dexamethasone in combination with sparfloxacin is used in several anti-infective eye preparations to treat acute and sub acute conjunctivitis, keratitis and corneal ulcers caused by susceptible strains of the following aerobic gram positive and negative bacteria such as *S. aureus, S. epidermidis, S. pneumonia* and *Haemophilus influenza* (Vyas *et al.*, 2002).

In the literature, methods were described for the individual estimation of fluoroquinolones and dexamethasone in aqueous samples and biological fluids by liquid chromatography (Chen *et al.*, 2008; Hyung *et al.*, 1995) liquid chromatography-fluorescence detection (Joana *et al.*, 2011). A few methods were also given for the simultaneous determination of Dexamethasone and sparfloxacin with other drugs such as Chloremphenicol (Iqbal *et al.*, 2006), ciprofloxacin (Rele and Warkar, 2010) ofloxacin (Tang *et al.*, 2002) and some H_2 receptor antagonists (Najma *et al.*, 2011). But simultaneous determination of SFN and DSP has not been reported in the literature. So an attempt was made to develop a HPLC method for the estimation of these drugs available as eye drops.

The purpose of the present study was to develop a simple, sensitive and economical HPLC method for determination of SFN and DSP in bulk and pharmaceutical formulations simultaneously. The developed method has been validated (The United States Pharmacopeia Convention, 1995; Validation of Analytical Procedures Q2 B, 2003) to determine its suitability for its intended use by parameters such as specificity, linearity, limit of detection and quantification, precision, accuracy by recovery studies and system suitability. The validated method was applied to the commercially available pharmaceutical formulations containing both the drugs.

MATERIALS AND METHODS

Materials

DSP and SFN were obtained as gift samples from Ajanta Pharmaceuticals Ltd., Mumbai. HPLC grade acetonitrile was purchased from SD fine chemicals, India. Triple distilled water was used during the study. The pharmaceutical formulations containing 3mg/ml of SFN and 1mg/ml DSP was purchased from local market.

Instrumentation

A high performance liquid chromatograph (Shimadzu-10 AT VP) equipped with two pumps (Model-10AT VP) and Shimadzu UV-Visible detector (SPD-10AT VP), ultrasonic bath (Spincotech Pvt. Ltd., India).

Chromatographic conditions

For chromatographic analysis, a Chromosil C_{18} column (250 mmx4.6 mm i.d, 5µ particle size) was used.

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Formulation and Evaluation of Maltose-Leucine-Tetanus Toxoid Dry Powder Inhalation for Pulmonary Delivery

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Abstract: Tetanus toxoid vaccination is primarily used for tetanus prevention. The conventional vaccine for tetanus toxoid is characterised by the limitations of pain, sterility issues, and cold storage. Hence, a pulmonary administered tetanus toxoid (TT) vaccine was fabricated to overcome the limitations of conventional intramuscular vaccines. The goal of this study was to make a dry powder of tetanus toxoid that could be inhaled using maltose and leucine as a vaccine carrier. Additionally, TT dry powder inhalation (DPI) was intended to confer antigenicity and stability. Maltose, leucine and tetanus toxoid were homogenised and centrifuged to obtain the particles of Maltose-leucine-tetanus toxoid (MLTT). Particle size analysis, FTIR, encapsulation efficiency, flocculation, in vitro vaccine release tests, and flow characteristics were all performed on the produced particles. MLTT powder combination remained stable during the process and after storage. FTIR analysis, showed no chemical interactions. The homogenization method produced a powder with the geometrical particle size of the DPI formulation, in the range between 95.6 ± 5.7 nm and 1081.1 ± 10.8 nm which was believed to be appropriate for inhalation. Whereas -27 ± 0.6 mV and 0.496 ± 0.013 were found to be the zeta potential and polydispersity index, respectively. The formation of flocculation of tetanus toxoid with antitoxin as at 20 min confirms the antigenicity of the same. TT was released immediately with 83.2 ± 4.9% within 2 h following the diffusion mechanism. The findings revealed the powder blend's potential as a dry powder inhalation for delivering TT.

Keywords: *Tetanus toxoid, Maltose, Leucine, Dry powder inhalation, Pulmonary administration, Mucosal vaccine.*

1 INTRODUCTION

Tetanus is a life-threatening illness that causes convulsions (seizures) and severe muscle spasms, which can lead to spinal fractures. Tetanus causes death in 30% to 40% of the cases. Tetanus vaccine is recommended for infants aged between 6 and 8 weeks of age and older, as well as for children and adults during minor cuts and surgeries. Additionally, a series of three to four shots is prescribed during maternal care to protect the mother and the neonate. Owing to the short term immunity induced by TT vaccine, immunization for every 10 years is recommended. As can be seen, the implementation of vaccination programmes has been shown to be effective in disease control [2]. Despite the advantages of intramuscular tetanus toxoid vaccination, it has drawbacks such as sterility, discomfort, cold chain storage, and mucosal immunity induction. Mucosal linings are exposed to a wide range of microorganisms and are equipped with innate immune components to prevent microbial penetration [4-9]. Mucosal vaccinations, which are known for their non-invasive approach, are available on the market. Oral, nasal, sublingual, vaginal, and pulmonary vaccine administration routes have all been examined and reported for conferring mucosal and systemic immunity [10-13]. Local mucosal immune responses are becoming more widely recognised as it is important for disease prevention [14]. Vaccines delivered by mucosal ports induced greater mucosal immune response, but vaccines administered via injection are observed to be poor inducers of mucosal immunity and thus less effective against infection invading at mucosal surfaces. [14]. Nonetheless, antigen injection has played a large role in clinical vaccination development, and the

IJPSR (2019), Volume 10, Issue 3 **(Research Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 01 July 2018; received in revised form, 08 September 2018; accepted, 15 September 2018; published 01 March 2019

FORMULATION, EVALUATION AND CYTOTOXIC POTENTIAL OF METRONIDAZOLE LOADED POLOXAMER 407 HYDROGEL IN SCC-29 CELL LINES

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Keywords:

Metronidazole, Poloxamer 407, Hydrogel, Cytotoxicity, Drug stability

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ABSTRACT: The present research work was planned to formulate poloxamer 407 based hydrogel formulations of metronidazole and the evaluation of various parameters like swelling behavior, drug PH stability, *in-vitro* and *in-vivo* drug release, and *in-vitro* cytotoxic activity. Two different concentrations of metronidazole hydrogel formulations were prepared using poloxamer 407 and were assessed by a validated HPLC method for drug content, pH stability, and *in-vivo* drug release. Further, *in-vitro* anticancer activity was evaluated using sulphorhodamine B (SRB) assay in SCC29 cell lines. Both the formulations F1 and f2 showed better pH stability at pH 3.5, 5.5 and 6.8. The formulation F1 was able to absorb about 152% of its weight of water within 80 min, whereas F2 absorbed 167.4% of its weight of water and remains constant over 100 min. *In-vitro* and *in-vivo* drug release pattern showed half-life at 6 h, AUC_{0-t} 692 and 684ng h/ml, C_{max} 1059 and 1142 ng/ml for F1 and F2 respectively. Hydrogel formulation F1 showed improved percentage control growth when compared to F2 hydrogel formulation and metronidazole alone.

INTRODUCTION: Metronidazole (MT) which is chemically 5 nitroimidazole derivatives with the molecular weight of 171.156, gm/mol and with a molecular formula $C_6H_9N_3O_3$. It is a nitroimidazole which is used for the treatment of vaginitis, amebiasis, giardiasis, trichomonas infections and several anaerobic bacterial infections [1]. It shows antibacterial and protozoal activities, by converting itself active intermediate product in reduced form and which breaks DNA strands, thereby inhibiting DNA synthesis and bacterial cell growth [2].

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.10(3).1354-59

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

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.10(3).1354-59

Ploxomer 407 have been currently received major attention in the field of thermosensitive hydrogels. It is an amphiphilic synthetic copolymer which consisting of a hydrophobic poly (Oxypropylene) (POP) block between two hydrophilic poly (Oxyethylene) (POE) blocks [3-5]. Because of its amphiphilic nature, these molecules can make self-assemble readily to form micelles base on the temperature and concentration.

These hydrogels have been characterized by their ability to carry a significant amount of drug. They are also, nontoxic biodegradable and stable, therefore suitable for uses in controlled release formulations [6]. Extensive literature review on metronidazole revealed that, along with its antiprotozoal and antibacterial activities, the cytotoxic property of MT was also reported.

IJPSR (2019), Volume 10, Issue 3 **(Research Article)**

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Mohammed Muqtader Ahmed[1,*], Farhat Fatima[1], Md. Khalid Anwer[1,*], Saad M. Alshahrani[1], Ahmed Alalaiwe[1] and Prakash Katakam[2]

Biosynthesis, characterization and anti-microbial activity of silver nanoparticle based gel hand wash

https://doi.org/10.1515/gps-2019-0027
Received November 8, 2018; accepted March 26, 2019.

Abstract: In the current study, silver nanoparticles (AgNPs) were biosynthesised by microwave irradiation using Azadirachta indica. The formation of AgNPs was confirmed by surface plasmon resonance (SPR) band at 408 nm at UV-visible spectroscopy due to reduction of silver metal into (AgNPs) and further confirmed its particles in nano range. Nine different smart-gel hand wash were prepared by dispersing (AgNPs) in the HPMC and/or Pluronic F-127 polymers. The prepared smart gel hand wash was optimized based on pH, viscosity, spreadability, foamability, clarity. The optimized hand wash (NH5) had pH (6.6 ± 0.33), viscosity (66 ± 0.77, cp), spreadability (24.34 g-cm/s), foamability (100 mL). The optimized hand wash (NH5) showed a superior efficacy against pathogenic organisms in comparison to germ protection based marketed hand wash.

Keywords: silver nanoparticles; smart-gel hand wash; anti-microbial efficacy; stability

1 Introduction

Hand washing is a religious and cultural habit, the relation between handwashing and infectious disease was recognized only two centuries ago by a Hungarian doctor Ignaz Semmelweis, known as the father of hand hygiene [1,2]. He noticed the spread of infection and mortality of new born given birth in his hospital, which was relatively higher than the adjacent midwife-run maternity hospital. In his investigation, he concluded that doctors with bare hands after performing surgery or autopsy visited the maternity ward were the cause to transmit the infection in new-borns and causes death [3]. In the present scenario challenges of the 21st century include infectious diseases; the second leading cause of death that kills 17 million people in a year worldwide [4]. Majorly transmission of infection takes place by contaminated hands, therefore hand plays a vital role in the spread of infectious diseases in the healthcare setups, industrial setting related to the food manufacturing and also in the community to larger extent [5,6]. Hand hygiene as an intervention to prevent the spread of infections, the term hygiene was derived from the Greek healing goddess Hygeia. In 1961 the Centre for disease control and prevention (CDC) recommended hand wash for health care workers. The recent guideline recommends, use of waterless antiseptic agents instead of soap and water for hand wash [7,8]. Hand hygiene preparation with soap may damage the skin and increases microbial growth over the time. Usage of soap in hand wash may damage the skin which could be more prone to microbial colonization [9,10].

Reports on Triclosan an active antiseptic ingredient commonly used in hand wash proved ineffective than using plain soap [11]. Nowadays researchers pay more attention in natural medicine due to its safety and dependability as compared with synthetic medicine that causes deleterious effects. Nature is the reliance of remedies for all ailments of mankind. Until now, 1340 plants and over 30,000 antimicrobial constituents have been isolated from plant sources [12,13]. *Azadirachta indica* (Neem) leaf showed antimicrobial and antifungal activity due to quercetin, beta-sitosterol, polyphenolic flavonoids [14]. *Azadirachta indica* is an evergreen plant native of India and found in most tropical countries belongs to the family Meliaceae [15]. Metallic nanoparticles are emerging as novel class of biomedical material applied for hygiene in daily to day life. Silver nanoparticles (AgNPs) were the clusters of silver (Ag)

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Research Article

Development of a standardized combined plant extract containing nutraceutical formulation ameliorating metabolic syndrome components

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Received: 6 August 2019 / Accepted: 17 October 2019 / Published online: 25 October 2019

Abstract
Plant bioactives have a great role in combating multifactorial disease conditions like metabolic syndrome (MetS). This research work aims to develop a standardized plant extract combination and formulate it to tablets with nutraceutical potentials. The extract was prepared from the bark powder of *Ficus religiosa*, seed powder of *Syzigium cumini* and leaf powder of *Ocimum bacilicum* chemometrically optimized in the ratio of 1.15:1.15:1.68 (Ashwattha: Jamun: Basil or FR: SC: OB). It is enriched in screened and pharmacologically active plant secondary metabolites. The tablets were prepared by direct compression using single-punch tablet machines. The nutraceutical tablets passed all the prescribed quality control tests with a justified pharmacokinetic profile. Results of animal experimentations have shown the hypoglycemic, hypolipidemic effect and antihypertensive effect of the nutraceutical tablets in relevant animal models. Thus, the nutraceutical formulation that showed effectivity in combating MetS can be opted as an adjunct therapy.

Keywords Metabolic syndrome · Standardized plant extract · Hypoglycemic · Hypolipidemic · Antihypertensive · Nutraceutical formulation · Adjunct therapy

1 Introduction

Metabolic syndrome (MetS) is a very heterogenous complex syndrome with a cluster of events such as glucose intolerance, insulin resistance, abdominal obesity, artherogenic dyslipidemia and hypertension. It is also known by the names of 'Syndome X,' 'insulin resistance syndrome,' 'Reaven's syndrome,' 'metabolic cardiovascular syndrome' [1]. Metabolic syndrome is associated with cardio/cerebrovascular and metabolic risks. This non-communicable disease (NCD) though started in the western world has now become a global health problem. This syndrome triggers the spread of other diseases viz. Type 2 diabetes, coronary diseases, stroke and other disabilities [2]. Inspite of life style interventions (dietary changes, increased physical activity, etc.), many patients with MetS require pharmacological treatment. Sibutramine, Orlistat, metformin, glitazones, rimonabant, calcium antagonists, beta blockers, thiazide diuretics and angiotensin converting enzyme inhibitors are one of the several options but not without side effects [1, 3]. Herbal medicine and the nutraceutical products developed from them with its versatile combinations of pharmacologically active plant secondary metabolites are being used in treatment of several ailments in an evidence based manner. Despite immense potency, lack of proper dosage form, perfect dosimetry, organoleptic unacceptability in crude form, storage, preservation and shelf life issues, the rationale use of herbal medicine gets hindered in many circumstances [4]. Just as

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SN Applied Sciences (2019) 1:1484 | https://doi.org/10.1007/s42452-019-1518-9

Research Article

Open Access

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Turmeric black tea as a multimodal theronostic dietary adjuvant aiding neuroprotection and ameliorating hypertension

Abstract

This study reports the multifunctional potentiality of turmeric black tea (TBT) in alleviating hypertension in salt induced hypertensive animal model and aiding neuroprotection in colchicines induced Alzheimer rat models. TBT prepared basing on the desirability function of central composite design with 3.11g of black tea and 1.46g of ground turmeric exhibited optimal pharmacologic response and organoleptic acceptability. No signs of mortality were observed till 10g/kg b.w. or any hepato-renal adversities with 5000mg/kg doses. LCMS analysis of TBT showed the presence of several tea catechins, theaflavins, gallic acids and curcuminoids. Incorporation of turmeric in black tea aided in value addition as evidenced by *in vitro* and *in vivo* experimental results and has not affected the chemoprofile of black tea studied by FTIR. The multipotency of TBT is attributed due to presence of the variant pharmacologically active molecules.

Keywords: turmeric black tea, hypertension, neuroprotection, desirability function, multifunctional, organoleptic acceptability

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Received: April 19, 2019 | **Published:** May 03, 2019

Abbreviations: ACE, angiotensin converting enzyme; CCBs, calcium channel blockers; AD, Alzheimer's Disease; TBT, turmeric black tea; RSM, Response Surface methodology; ANOV, analysis of variance; BT, black tea decoction; ESI, electrospray ionization; OECD, Organization for Economic Cooperation and Development; ALT, alanine Aminotransferase; AST, aspartate Aminotransferase; ALP, alkaline phosphatase; ROS, Reactive oxygen species; HHL, hippuryl L, histidyl, L, leucine

Introduction

The growing complexities of the diseases is a real challenge to the medical fraternity; thence the treatment strategies have also undergone a radical change and promotes multi-target therapeutic entities, poly therapy, nutraceuticals and food combinatorics, herbo-synthetic combinations as adjuvant therapy to achieve better therapeutic outcomes.[1–3] Hypertension, is a big concern worldwide affecting different levels of socio-economic classes and is the root cause of stroke, cardiovascular disorders, diabetes etc. Excessive stress, sedentary lifestyle, food habits, physical inactivity are other contributing factors. Though several beta blockers, angiotensin converting enzyme (ACE) inhibitors, calcium channel blockers (CCBs) are available in the market but are associated with side effects.[4,5] Alzheimer's Disease (AD), is a progressive worrisome neurodegenerative disorder with devastating complications and till yet with available therapeutic options total curative outcomes has not yet been achieved.[6,7] Epidemiological research evidences has shown that hypertension and dementia are interlinked; sustained hypertension worsens AD conditions by accelerating β-amyloid aggregation, oxidative stress and inflammatory responses; ultimately there is extensive neuronal loss and impairment of neuronal transmission. Patients suffer from cognitive decline.[8–10] Multifaceted health benefits of tea is already on limelight and black tea apart from being a very refreshing beverage specially due to its astringency, its multimodal pharmacology has shown it to be a functional beverage.[11] Researches with functional beverage aim to achieve for value additive synergistic potentials and thus several tea diversification products have captured the global nutraceutical market.[12] Turmeric (*Curcuma longa*), a golden yellow color cooking spice and preservative is specially preferred in Indian subcontinent, hence also called "Indian saffron" is recognized for its versatile applications and health effects.[13] The effectivity of any natural therapeutic entity may it be phytomedicine or phytonutraceuticals are due to the wide array of pharmacologically active molecules present in them that serve as a combinatorial library each exerting its own potential.[14] This research article reports chemometrics guided optimization of TBT for optimal pharmacologic effect and organoleptic acceptability and the ameliorative effect of turmeric black tea (TBT) in hypertension and aiding neuroprotection.

Material and methods

Chemicals

All chemicals and reagents used for the experimentation were all of analytical grade and were purchased either from Merck (India) and Sigma Aldrich. LC-MS grade chemicals were used for LC-MS studies.

Plant material

Fresh tea leaves (TV 25 variety, *Voucher specimen*: IITKGP/HB/2018/T1) used for producing black tea were obtained from the tea garden of IIT Kharagpur and good quality turmeric rhizomes (*Voucher specimen*: IITKGP/HB/2018/T2) from the medicinal garden of Agriculture and food engineering department of IIT Kharagpur.

Maintenance and care of animals

After obtaining permission from the animal ethical committee (Registration No: 1722/RO/ERe/S/13/CPCSEA, Approval No: ARTI/CPCSEA/2015/ARTI 09); animals were purchased from local vendors and healthy, adult male wistar rats weighing 180–200g were used for

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Biosynthesis, characterization and anti-microbial activity of silver nanoparticle based gel hand wash

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Keywords: silver nanoparticles; smart-gel hand wash; anti-microbial efficacy; stability

1 Introduction

Hand washing is a religious and cultural habit, the relation between handwashing and infectious disease was recognized only two centuries ago by a Hungarian doctor Ignaz Semmelweis, known as the father of hand hygiene [1,2]. He noticed the spread of infection and mortality of new born given birth in his hospital, which was relatively higher than the adjacent midwife-run maternity hospital. In his investigation, he concluded that doctors with bare hands after performing surgery or autopsy visited the maternity ward were the cause to transmit the infection in new-borns and causes death [3]. In the present scenario challenges of the 21st century include infectious diseases; the second leading cause of death that kills 17 million people in a year worldwide [4]. Majorly transmission of infection takes place by contaminated hands, therefore hand plays a vital role in the spread of infectious diseases in the healthcare setups, industrial setting related to the food manufacturing and also in the community to larger extent [5,6]. Hand hygiene as an intervention to prevent the spread of infections, the term hygiene was derived from the Greek healing goddess Hygeia. In 1961 the Centre for disease control and prevention (CDC) recommended hand wash for health care workers. The recent guideline recommends, use of waterless antiseptic agents instead of soap and water for hand wash [7,8]. Hand hygiene preparation with soap may damage the skin and increases microbial growth over the time. Usage of soap in hand wash may damage the skin which could be more prone to microbial colonization [9,10].

Reports on Triclosan an active antiseptic ingredient commonly used in hand wash proved ineffective than using plain soap [11]. Nowadays researchers pay more attention in natural medicine due to its safety and dependability as compared with synthetic medicine that causes deleterious effects. Nature is the reliance of remedies for all ailments of mankind. Until now, 1340 plants and over 30,000 antimicrobial constituents have been isolated from plant sources [12,13]. *Azadirachta indica* (Neem) leaf showed antimicrobial and antifungal activity due to quercetin, beta-sitosterol, polyphenolic flavonoids [14]. *Azadirachta indica* is an evergreen plant native of India and found in most tropical countries belongs to the family Meliaceae [15]. Metallic nanoparticles are emerging as novel class of biomedical material applied for hygiene in daily to day life. Silver nanoparticles (AgNPs) were the clusters of silver (Ag)

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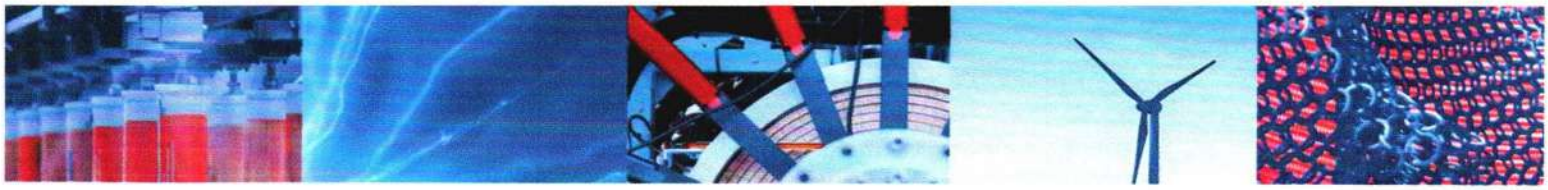

Research Article

Development of a standardized combined plant extract containing nutraceutical formulation ameliorating metabolic syndrome components

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Received: 6 August 2019 / Accepted: 17 October 2019 / Published online: 25 October 2019

Abstract
Plant bioactives have a great role in combating multifactorial disease conditions like metabolic syndrome (MetS). This research work aims to develop a standardized plant extract combination and formulate it to tablets with nutraceutical potentials. The extract was prepared from the bark powder of *Ficus religiosa*, seed powder of *Syzigium cumini* and leaf powder of *Ocimum bacilicum* chemometrically optimized in the ratio of 1.15:1.15:1.68 (Ashwattha: Jamun: Basil or FR: SC: OB). It is enriched in screened and pharmacologically active plant secondary metabolites. The tablets were prepared by direct compression using single-punch tablet machines. The nutraceutical tablets passed all the prescribed quality control tests with a justified pharmacokinetic profile. Results of animal experimentations have shown the hypoglycemic, hypolipidemic effect and antihypertensive effect of the nutraceutical tablets in relevant animal models. Thus, the nutraceutical formulation that showed effectivity in combating MetS can be opted as an adjunct therapy.

Keywords Metabolic syndrome · Standardized plant extract · Hypoglycemic · Hypolipidemic · Antihypertensive · Nutraceutical formulation · Adjunct therapy

1 Introduction

Metabolic syndrome (MetS) is a very heterogenous complex syndrome with a cluster of events such as glucose intolerance, insulin resistance, abdominal obesity, artherogenic dyslipidemia and hypertension. It is also known by the names of 'Syndome X,' 'insulin resistance syndrome,' 'Reaven's syndrome,' 'metabolic cardiovascular syndrome' [1]. Metabolic syndrome is associated with cardio/cerebrovascular and metabolic risks. This non-communicable disease (NCD) though started in the western world has now become a global health problem. This syndrome triggers the spread of other diseases viz. Type 2 diabetes, coronary diseases, stroke and other disabilities [2]. Inspite of life style interventions (dietary changes, increased physical activity, etc.), many patients with MetS require pharmacological treatment. Sibutramine, Orlistat, metformin, glitazones, rimonabant, calcium antagonists, beta blockers, thiazide diuretics and angiotensin converting enzyme inhibitors are one of the several options but not without side effects [1, 3]. Herbal medicine and the nutraceutical products developed from them with its versatile combinations of pharmacologically active plant secondary metabolites are being used in treatment of several ailments in an evidence based manner. Despite immense potency, lack of proper dosage form, perfect dosimetry, organoleptic unacceptability in crude form, storage, preservation and shelf life issues, the rationale use of herbal medicine gets hindered in many circumstances [4]. Just as

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SN Applied Sciences (2019) 1:1484 | https://doi.org/10.1007/s42452-019-1518-9

Research Article
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Turmeric black tea as a multimodal theronostic dietary adjuvant aiding neuroprotection and ameliorating hypertension

Abstract

This study reports the multifunctional potentiality of turmeric black tea (TBT) in alleviating hypertension in salt induced hypertensive animal model and aiding neuroprotection in colchicines induced Alzheimer rat models. TBT prepared basing on the desirability function of central composite design with 3.11g of black tea and 1.46g of ground turmeric exhibited optimal pharmacologic response and organoleptic acceptability. No signs of mortality were observed till 10g/kg b.w. or any hepato-renal adversities with 5000mg/kg doses. LCMS analysis of TBT showed the presence of several tea catechins, theaflavins, gallic acids and curcuminoids. Incorporation of turmeric in black tea aided in value addition as evidenced by *in vitro* and *in vivo* experimental results and has not affected the chemoprofile of black tea studied by FTIR. The multipotency of TBT is attributed due to presence of the variant pharmacologically active molecules.

Keywords: turmeric black tea, hypertension, neuroprotection, desirability function, multifunctional, organoleptic acceptability

Volume 2 Issue 2 - 2019

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Received: April 19, 2019 | **Published:** May 03, 2019

Abbreviations: ACE, angiotensin converting enzyme; CCBs, calcium channel blockers; AD, Alzheimer's Disease; TBT, turmeric black tea; RSM, Response Surface methodology; ANOV, analysis of variance; BT, black tea decoction; ESI, electrospray ionization; OECD, Organization for Economic Cooperation and Development; ALT, alanine Aminotransferase; AST, aspartate Aminotransferase; ALP, alkaline phosphatase; ROS, Reactive oxygen species; HHL, hippuryl L, histidyl, L, leucine

Introduction

The growing complexities of the diseases is a real challenge to the medical fraternity; thence the treatment strategies have also undergone a radical change and promotes multi-target therapeutic entities, poly therapy, nutraceuticals and food combinatorics, herbo-synthetic combinations as adjuvant therapy to achieve better therapeutic outcomes.[1–3] Hypertension, is a big concern worldwide affecting different levels of socio-economic classes and is the root cause of stroke, cardiovascular disorders, diabetes etc. Excessive stress, sedentary lifestyle, food habits, physical inactivity are other contributing factors. Though several beta blockers, angiotensin converting enzyme (ACE) inhibitors, calcium channel blockers (CCBs) are available in the market but are associated with side effects.[4,5] Alzheimer's Disease (AD), is a progressive worrisome neurodegenerative disorder with devastating complications and till yet with available therapeutic options total curative outcomes has not yet been achieved.[6,7] Epidemiological research evidences has shown that hypertension and dementia are interlinked; sustained hypertension worsens AD conditions by accelerating β-amyloid aggregation, oxidative stress and inflammatory responses; ultimately there is extensive neuronal loss and impairment of neuronal transmission. Patients suffer from cognitive decline.[8–10] Multifaceted health benefits of tea is already on limelight and black tea apart from being a very refreshing beverage specially due to its astringency, its multimodal pharmacology has shown it to be a functional beverage.[11] Researches with functional beverage aim to achieve for value additive synergistic potentials and thus several tea diversification products have captured the global nutraceutical market.[12] Turmeric (*Curcuma longa*), a golden yellow color cooking spice and preservative is specially preferred in Indian subcontinent, hence also called "Indian saffron" is recognized for its versatile applications and health effects.[13] The effectivity of any natural therapeutic entity may it be phytomedicine or phytonutraceuticals are due to the wide array of pharmacologically active molecules present in them that serve as a combinatorial library each exerting its own potential.[14] This research article reports chemometrics guided optimization of TBT for optimal pharmacologic effect and organoleptic acceptability and the ameliorative effect of turmeric black tea (TBT) in hypertension and aiding neuroprotection.

Material and methods

Chemicals

All chemicals and reagents used for the experimentation were all of analytical grade and were purchased either from Merck (India) and Sigma Aldrich. LC-MS grade chemicals were used for LC-MS studies.

Plant material

Fresh tea leaves (TV 25 variety, *Voucher specimen*: IITKGP/HB/2018/T1) used for producing black tea were obtained from the tea garden of IIT Kharagpur and good quality turmeric rhizomes (*Voucher specimen*: IITKGP/HB/2018/T2) from the medicinal garden of Agriculture and food engineering department of IIT Kharagpur.

Maintenance and care of animals

After obtaining permission from the animal ethical committee (Registration No: 1722/RO/ERe/S/13/CPCSEA, Approval No: ARTI/CPCSEA/2015/ARTI 09); animals were purchased from local vendors and healthy, adult male wistar rats weighing 180–200g were used for

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DEVISE AND EVALUATION OF CURCUMIN LOADED PERIODONTAL FILMS USING HPMC E15, HPMC E5 AND PVP K30

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ABSTRACT

In present study periodontal films of curcumin were devised and evaluated for faster on set of action using hydrophilic polymers, HPMC E5, HPMC E 15 and PVP K90. Periodontal films were prepared by employing solvent casting method. Propylene glycol was selected as permeation enhancer and plasticizer. Formulations were prepared with the varying concentrations polymers ranging from F1-F12, and all the formulations were evaluated for various physical parameters such as physical appearance, weight variation, thickness, folding endurance, tensile strength, drug content, moisture uptake, moisture content and all the results were found to be were found to be with in the required limits. In vitro drug release studies were conducted by modified method using SS disc with caynoacrylate adhesive. Among all the 12 formulations F6 which contains HPMC E5 350mg shown 94.2% cumulative drug release within 30 min as compared to those those of other HPMC E5, HPMC E15 and poly vinyl pyrolidine-K90. Formulations of HPMC E 15 showed more retarded drug release pattern.

KEY WORDS: ***Periodontal films, Local drug delivery, Curcumin, HPMC E15, HPMC E5, PVP K90, HPMC E 15.***

INTRODUCTION

Periodontal disease is an infection that involves the inflammatory process and the immune response. The presence of periodontal pathogens such as *Porphyromonas gingivalis, Prevotella intermedia* and *Actinobacillus actinomycetemcomitans* are responsible for periodontal destruction. Periodontitis refers to acute and chronic disorder of the soft tissues surrounding the teeth which eventually leads to loss of supporting bone.[1] There is an unmet medical need for new products to confront the high percentage of people with periodontal diseases. Retention of the drug dose at the point of application would facilitate long-term release and more effective treatments.[2] Apart from scaling and root planing, systemic antibiotic therapy is employed in treating periodontitis.[3] Systemic antimicrobials such as adjuncts to mechanical therapy have had a positive effect on clinical as well as microbiological parameters.[4] But the impact of this approach is reduced by the fact that the antibiotic is normally difficult to maintain in therapeutic concentrations at the site over the course of the treatment period. Due to these negative effects, the use of local drug delivery devices containing antibiotics may be explored. These devices can maintain extremely high local concentrations of drug for one month. Several implantable devices like fibers, films[5] and gels were studied. Various biodegradable polymers such as poly (glycolidecold-lactide), polyester poly (capralactone), glycerol mono-oleate, crosslinked atelo-collagen, hydroxypropylcellulose, chitosan[6,7] and alginates were employed as drug carriers. In our earlier studies cross linked sodium alginate[8,9,10] and chitosan were successfully employed as rate retarding polymer for periodontal films for controlled release of drugs. Curcumin is a hydrophobic polyphenolic compound derived from the rhizomes of *Curcuma longa*, shows wide spectrum of antibacterial, anti-inflammatory, and antioxidant properties against a number of periodontal pathogens and hence selected for site-specific delivery in the treatment of periodontitis.[11] Clinical applications of Curcumin as oral gel, prevention of plaque and gingivitis, mouthwash, subgingival irrigant, treating periodontal diseases are reported.[12,13,14,15] As dietary spices, curcumin has been consumed for centuries up to 100 mg/day.[16]Curcumin loaded films of gelatin,[17] ethyl cellulose, HPMC K4M, and Eudragit are formulated and Clinical studies on curcumin-PLGA nanoparticles.18 mucoadhesive films19 and oral curcumin gel were

Ashdin Publishing
Journal of Drug and Alcohol Research
Vol. 9 (2020), Article ID 236154, 6 pages

Research Article

Formulation and *In Vitro*evaluation of Simvastatin Insituperiodontal Gels

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Received 07 January, 2020; **Accepted** 20 January, 2020; **Published** 29 January, 2020

Abstract

Objective of the study: The aim of the present study is to prepare and evaluate biodegradable *in situ* gels of simvastatin for treatment of periodontal diseases. In the present research work is focused to formulate periodontal injectable *in situ* gels containing bone regenerating agent simvastatin, using biodegradable polymer.

Methodology: Appropriate amounts of polymer and solvent were weighed into 5 ml glass vials with proper airtight polypropylene caps. After initial mixing of the contents, vials were placed aside with occasional shaking overnight at room temperature to completely dissolve the polymer. Weigh accurately finely powdered drugs and add to above solution, close the lid and shake well and keep aside with occasional shaking and store in refrigerator at 8°C. The resulting solutions can be directly injected into subgingival pockets. The studies are further done to evaluate the prepared *in situ* gels for various pre-formulation studies, physicochemical characterization, drug content, *in vitro* drug release studies and stability studies.

Conclusion: Periodontal diseases are the conditions that affect the supporting structure of teeth leading to the formation of pocket due to which tooth loss occurs, for which site specific injectable drug delivery systems are gaining importance.

Based on physicochemical characteristics, the *in situ* gel formulation of simvastatin (F3) was optimized. It was concluded that *in situ* gel delivery system is a novel approach that can be developed for the treatment of Periodontitis. The present research showed that the optimized *in situ* gel formulations are more promising for successful delivery of simvastatin and to treat bone regeneration.

Keywords: Simvastatin; Periodontitis; *In situ* gel

Introduction

Periodontitis can be classified based on disease activity (chronic or aggressive), etiology (specific bacterial, fungal or viral infection), by response to treatment (responsive or refractory), by site (localized or generalized). Chronic Periodontitis, formerly known as "adult periodontitis" or "chronic adult periodontitis" is the most prevalent form of periodontitis. It is generally considered to be a slowly progressing disease. However, in the presence of systemic or environmental factors that may modify the host response to disease progression may become more aggressive as shown in **Figure 1** [1].

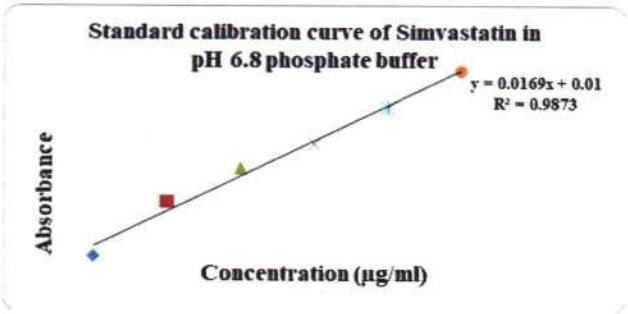

Figure 1: Standard calibration graph of SVS.

Methods

Gels

A gel is a solid or semisolid system of at least two constitutes, consisting of condense mass enclosing and interpenetrated by a liquid. When the coherent liquid is matrix and is rich in liquid, the product is often called a jelly and when the liquid is removed leaving only the framework, the gel is known as xero gels. In a typical polar gel, a natural or synthetic polymer builds a three dimensional matrix throughout a hydrophilic liquid [2].

***In situ* gel:** The *in situ* gelling systems consist of polymer that exhibit sol-to-gel phase transitions due to change in specific physicochemical parameters in the environment [3].

Advantages of *in situ* system

1. These systems reduce toxic effects on the healthy tissue and reach sites that are conventionally inaccessible due to the presence of various barriers.

2. Increase the half life of drugs preventing their rapid

Indo Global Journal of Pharmaceutical Sciences, 2020; 10(1): 12-18

INDO GLOBAL JOURNAL OF PHARMACEUTICAL SCIENCES
ISSN 2249- 1023

An Update on Therapeutic Repurposing Strategies for COVID-19

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Received: 20.04.2020
Accepted: 23.04.2020

Keywords
COVID-19; SARS-CoV-2; Repurposing; Therapeutic Strategies; Treatment.

ABSTRACT: The severe acute respiratory syndrome coronavirus 2, well known as COVID-19 has become the current health distress to the entire world. In the pandemic scenario the research on the rapid development of new drug molecules is highly risky and tedious process. The current COVID-19 emergency demands an urgent development of possible strategies to protect people at high risk of infection and hence the drug repurposing became an emerging approach to fight COVID-19. This review summarizes an update on various therapeutic strategies with special attention on repurposing of drugs to fight against SARS-CoV-2 worldwide. The investigation of existing drugs for new therapeutic purposes is one line of scientific research followed to develop safe and effective COVID-19 treatments. Broad-spectrum antiviral agents (BSAAs) that have been believed to be safe through testing on early phase clinical trials have been hyped as good drug repurposing candidates. Broad-spectrum antiviral drugs such as Ribavirin, Umifenovir were advised for COVID-19 treatment. Some antibiotics may be repurposed as COVID-19 treatments such as teicoplanin, oritavancin, dalbavancin, monensin and azithromycin. Ivermectin an antiparasitic is recently repurposed. Hydroxychloroquine and chloroquine, having immunomodulating effect on humans, have been shown to have antiviral activity at starting and post-entry stages of the SARS-CoV-2 infection. There is a need for global health emergency to call for a courageous, global response at the political and governmental levels. Therefore, the regulatory agencies must act swiftly to lessen any financial obstacles involving private companies and update guidelines for drug licenses by repurposing if necessary.

Cite this article as: Katakam, P.; Adiki, S.K.; Assaleh, F.H.; Ahmed, M.M. An update on therapeutic repurposing strategies for COVID-19. Indo Global J. Pharm. Sci., 2020; 10(1): 12-18. **DOI:** http://doi.org/10.35652/IGJPS.2020.10102 .

INTRODUCTION

The severe acute respiratory syndrome coronavirus 2, well known as COVID-19 has become the current health distress to the entire world. Initially appeared in Wuhan, Hubei, China around December 2019, it had spread to almost 210 countries due to its high contagious nature.[1] Preventive measures remain the only way to stop the person to person transmissions until any successful method of treatment or vaccine is developed. In the pandemic scenario the research on the rapid development of new drug molecules is highly risky and tedious process.

The genetically varied *Orthocoronavirinae* (coronavirus, CoV) family occurs in many avian and mammalian species. Phylogenetically, CoVs are divided into four genera: α (group 1), β (group 2), γ (group 3) and δ (group 4). Three new human CoV have emerged in the past two decades; in the year 2002 severe acute respiratory syndrome CoV (SARS-CoV), in 2012 Middle East respiratory syndrome CoV (MERS-CoV), and now in December 2019 SARS-CoV-2.[2-4] All human CoV are expected to have emerged firstly as zoonoses[5]. The current SARS-CoV-2 pandemic referred to as COVID-19 (Coronavirus disease 2019), has resulted in over 2,630,000 infections and over 184,000 deaths in 213

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ARTIFICIAL INTELLIGENCE IN PHARMACEUTICAL INDUSTRY: THE FUTURE IS HERE

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ABSTRACT

Artificial Intelligence (AI) is the simulation of human behavior in relation to the processes of intelligence involved in problem solving. Such mechanisms include human cognitive science reading, observation, preparation, interpretation, reasoning, correction, speech recognition, linguistics, and other sources. AI simplifies tasks by making machines learn from past experiences, mapping efforts and actions to results, identifying errors, correcting them, adjusting to new and random input values, and effortlessly performing human-like tasks through in-depth scenario analysis. AI simplifies work by analyzing, filtering, sorting, predicting, scoping, and determining large data volumes to follow the best implementation procedures for producing an optimal solution. The major pharmaceutical industry applications of AI as on 2019 are; Discovery and development of new drugs; AI is helping big pharma create cures for complex and rare diseases such as Alzheimer's and Parkinson, Drug-Adherence and Dosage; Using AI to make sense of clinical data and to produce better analytics; Finding more reliable patients faster for clinical trials; Introducing automated robot pharmacies to fill prescriptions and dispensing; and marketing, logistics and supply chain. AI is the future of pharma but the technology is available now. Artificial Intelligence can cut costs down, create new, effective treatments and above all else, help save lives. So biotech companies should start making use of the advantages of AI at the earliest. The industry therefore has a lot to gain from embracing solutions to AI and machine learning. It can be used to create a strong, sustainable pipeline of new medicines to good effect. Using the power of modern supercomputers and machine learning would make it possible for us to produce medicines faster and at reduced costs. This article reviews exhaustively the present status and future prospects of Artificial Intelligence in pharmaceutical sciences with specific attention to pharmaceutical industry. The literature has been collected from Pubmed, Google Scholar and commercial websites related to this field. More emphasis has been given to commercial application of AI in pharmaceutical industry in future. In conclusion, the future lies in cooperation between humans and machines, and alongside technological advances, human clinical experts will need to adapt, learn and grow. Although potential experts will have to be both medical and technology experts, it is evolution of medicine, not extinction.

KEYWORDS: ***Artificial Intelligence, AI, Machine learning, Deep learning, Neural networks, Pharmaceutical Sciences, Pharma Industry, Startups, Drug discovery***

INTRODUCTION

To meet the needs of society and clinicians in the 21st century, the current drug discovery process needs to shift drastically. In particular, artificial intelligence and machine learning offer the pharmaceutical industry a real opportunity to do R & D differently, so that it can operate more efficiently and significantly improve the early stages of drug development success.[1] Artificial Intelligence (AI) is the simulation of the human behavior with regard to intelligence processes involved in problem-solving. Such mechanisms include human cognitive science reading, observation, preparation, interpretation, reasoning, correction, speech recognition, linguistics, and other sources. AI simplifies tasks by making machines learn from past experiences, mapping efforts and actions to results, identifying errors, correcting them, adjusting to new and

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Impact Factor: 3.655 (CIF), 2.78 (IRJIF), 2.62 (NAAS)
Volume VIII, Issue 28
July-September 2020
Formally UGC Approved Journal (63185), © Author

A REVIEW ON: 3D PRINTING IN PHARMACEUTICAL TECHNOLOGY

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Abstract

The 3D PRINTING technology has paid attention towards medical devices industry and pharmaceutical industry due to its applications on various platforms in health care industry. 3D printing is using computer- aided design to plan fast prototyping. The technology allows easy process drug combinations that are required and tailored dosing. It becomes one of the most new and beneficial tools serving as a technology of good manufacturing of developed dosage forms, tissue engineering and disease modeling. It is a valuable strategy to overcome some challenges of conventional pharmaceutical processes The recent introduction of the first FDA approved 3D-printed drug has fulfilled interest in 3D printing technology, which is set for revolutionize the healthcare. Since the use, the rapid prototyping (RP) technology has evolved to such an extent that it is currently being used in a wide range of applications including in tissue engineering, dentistry, construction, automotive and aerospace.

Keywords: *3D printing, Novel drug delivery, personalized medicine.*

1. INTRODUCTION

3D printing plays an important role in multiple active ingredient dosage forms, where the formulation can be a single blend or a multi-layer printed tablets having a sustained release properties. This reduces the frequency and number of dosage form units consumed by the patient on a daily routine. 3D printing technology has a great potential in an individualized dosage form concept i.e the polypill concept [1] This brings about the possibility of all the drugs required for the therapy into a single dosage form unit. Three-dimensional printing is a technology which uses computer aided drafting technology to produce three dimensional objects by layering material onto a substrate.

3DP can be used throughout the drug development process, starting from preclinical development and clinical trials, to the medical care. When compared to the manufacturing process of conventional pharmaceutical product, it

Int. J. Curr. Res. Chem. Pharm. Sci. (2020). 7(4): 1-13

INTERNATIONAL JOURNAL OF CURRENT RESEARCH IN CHEMISTRY AND PHARMACEUTICAL SCIENCES

(p-ISSN: 2348-5213: e-ISSN: 2348-5221)

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DOI: 10.22192/ijcrcps Coden: IJCROO(USA) Volume 7, Issue 4 - 2020

Review Article

DOI: http://dx.doi.org/10.22192/ijcrcps.2020.07.04.001

Recent advances in antiretroviral therapy for HIV/AIDS

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Abstract

Acquired Immune Deficient Syndrome (AIDS) is a deathly human viral infectious disease caused by Human Immune Deficient Virus (HIV) infection. Started as Mono therapy using treatment of HIV, then multiple drugs in schedule given where patients had to eat up 11-16 tablets per day. To apply test and treat policy assisted by WHO, supply of cost effective antiretroviral drugs regularly and newer drugs get approved and challenge for developing countries. Hence we tried reviewing upcoming new molecules which showed potential to be good drugs in various phases of clinical trial. AIDS. First disease killer in US was AIDS in 1993. After one decade hard work, antiviral drug cocktails-high active antiretroviral therapy (HAART) have been invented for almost all HIV infection treatments. HAART medications regularly need to take HIV/AIDS patients and even life-long. Future trends are highlighted.

Keywords: Newer Antiretroviral drugs, HIV, US FDA approved ARV drugs, HAART, antiviral therapy.

Introduction

AIDS is a deadly human disease caused by HIV infections. Due o lack of effective therapeutics at that time, almost every AIDS patient losses his/her life before mid-1990s. HIV/AIDS was once the 1st disease killer in US (1993). Primary treatment using HIV/AIDS patients was chemicals or vaccines. Before the invention of high active antiretroviral therapy (HAART, cocktail therapy), the therapeutic responses of HIV/AIDS patients were very limited. Almost every AIDS patient losses his/her life before mid 1990s-all of the AIDS patients died within 2 years after AIDS episode emergence. At that time, it looks like a capital punishment when a patient infects with HIV.

HIV infected person becomes a easy target for opportunistic infections and diseases. T-helper cell (CD4) multiplies this virus and gradually depletes them. The Two main types are HIV-1 and HIV-2. HIV-1 is the most common type found worldwide And HIV-2 is found mainly in Western Africa, with some cases in India and Europe [1].

WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 9, Issue 5, 2402-2415. Review Article ISSN 2277– 7105

HYDROTROPIC SOLUBILIZATION TECHNOLOGY AN ECOFRIENDLY ANALYSIS TO IMPROVE SOLUBILITY, DISSOLUTION AND BIOAVAILABILITY OF VARIOUS POORLY WATER SOLUBLE ANTIVIRAL DRUGS

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Article Received on
20 March 2020,
Revised on 09 April 2020,
Accepted on 30 April 2020
DOI: 10.20959/wjpr20205-17500

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ABSTRACT

Solubility is one of the most essential parameter to achieve desired concentration of drug in the systemic circulation for pharmacological response to be shown. Drug efficacy can be severely limited by poor aqueous solubility of various drugs. Several drugs also show side effects due to their poor aqueous solubility. There are various techniques are used to enhance the aqueous solubility of poorly water-soluble drugs and hydrotropic solubilisation technique is one of them. A hydrotrope is one of the compound that solubilizes hydrophobic compounds in aqueous solution. Various antiviral drugs belongs to class iv in biopharmaceutics classification system (BCS). The major problem of this drug having poor solubility in biological fluid which result in poor bioavailability after oral administration. Hydrotropic solubilization technique is the best approach to increase the water solubility of poorly water-soluble drugs and overcome problem-related with organic solvents. This review investigates the characterstic of hydrotropy and hydrotropic agents and their different advance toward the pharmaceutical analysis. This review also provides the future prospective concerned with the green pharmaceutical analysis.

KEYWORDS: hydrotropy, Ecofriendly analysis, solubility, antiviral drugs.

ISSN- 2231–5640 (Print)
ISSN- 2231–5659 (Online)

www.asianpharmaonline.org

RESEARCH ARTICLE

Formulation, Characterization and *In Vitro* Evaluation of Lamivudine Microspheres

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ABSTRACT:

Lamivudine is an antiretroviral drug, specifically a nucleoside reverse transcriptase inhibitor. It is used to treat HIV. Retroviruses use the genetic material in the body's cells to produce more viruses which can infect other cells. Adverse effect of Lamivudine headache, fever, chills, and muscle aches, dizziness, nausea, vomiting, insomnia, restlessness, and rash. The main objective of this research work was to prepare hydroxypropyl methyl cellulose microspheres loaded with Lamivudine and in vitro release study. In the present study, emulsification heat stabilization method is used in the preparation microspheres. Microspheres were spherical shape and smooth surface. Infrared spectra showed identical peaks of the drug and polymer. Drug entrapment efficiency was determined by uv-spectrophotometry at 254 nm. In vitro release studies were performed by using shaking flask method about drug was released in 10hrs. It is concluded that hydroxlyproply methylcellulose and microspheres of Lamivudine can be prepared by emulsification heat stabilization in vitro release data is satisfactory.

KEYWORDS: Lamuvidine, Microspheres, HPMC, Emulsification heat stabilization, *In vitro* studies.

INTRODUCTION:

A well planned controlled drug delivery system can defeat some of the harms of conventional therapy and enhance of a given drug. To obtain maximum therapeutic efficacy, it becomes essential to carry the agent to target tissue in the most favorable amount in the right period of time there by causing modest toxicity and minimal side effects. These are various approaches in delivering a beneficial substance to the target site in a sustained controlled release fashion.

The approach facilities the correct delivery of small quantity of the effective drugs, reduced drugs concentration at the site other than the target site and the defense of the liable compound before and after the administration and prior to appearance at the site of action. One such approach is using microspheres as carries of drugs[1]. Microspheres are defined a " monolithic sphere or remedial agent distributed throughout the matrix either as a molecular dispersion of particular dispersion of particles" they can also defined as a structure made up of continuous phase of one or more miscible polymers in which drug particles are dispersed at the molecular or macroscopic level[2-3]. Microspheres are characteristically free flowing powders consisting of proteins or synthetic polymers having a particle size ranging from 1-1000 μm[4]. Lamivudine (2′,3′-dideoxy-3′-thiacytidine) is an antiretroviral medicine used to avoid and treat HIV/AIDS and used to treat perpetual hepatitis B. It is of the nucleoside simple opposite transcriptase inhibitor (NRTI) class[5]. It can hinder both sorts (1 and 2) of HIV reverse transcriptase

Received on 16.10.2016 Accepted on 29.11.2016

Asian J. Res. Pharm. Sci. 2016; 6(4): *235-239.*
DOI: 10.5958/2231-5659.2016.00033.3

The Pharma Innovation Journal 2020; 9(6): 494-499

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2020; 9(6): 494-499

www.thepharmajournal.com
Received: 22-04-2020
Accepted: 24-05-2020

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Design, characterization and *In vitro* evaluation of polymeric nanoparticles containing decitabine

Y Phalguna, Swetha Pothula, Ravinder Kumar Sarepalli and Bobby Murala

Abstract
The point of this investigation is to figure the Decitabine stacked nanoparticles Guar gum and PEG for anticancer treatment, so as to improve the bioavailability and to diminish the portion recurrence. Plans of Decitabine stacked nanoparticles were set up by Nano precipitation strategy. Fourier transmission infrared spectroscopy considers demonstrated no compound association among medication and polymer. Scanning electron microscope instrument indicated nanoparticles having a discrete circular structure without conglomeration the normal molecule size was discovered 141±132 nm. % yield was appeared in the middle of 54.29 ± 0.02 to 61.42 ± 0.02 and Entrapment effectiveness was appeared in the middle of 48.32 ± 0.02 to 74.62 ±0.02. The zeta potential was seen as - 4.2mV. *In vitro* discharge examines were performed by utilizing Franz diffusion cell apparatus. The FN9 detailing indicated sedate arrival of 94.16% for a time of 12hrs.

Keywords: Decetabine, nano precipitation, FTIR, franz diffusion, Zeta potential

1. Introduction
Leukaemia is a clonal illness of hematopoietic immature microorganisms, and it is a harmful tumour that truly undermines human lives [1]. Intense myeloid leukaemia (AML) is a typical sort of leukaemia that happens in the two kids and grown-ups. It is portrayed by a quickly detonating populace of unusual white platelets that aggregate and lead to diminished creation of typical platelets. Nano scale plan has huge low molecule size that may prompt sensational changes in the pharmacokinetics of medications with poor solvency or porousness issues. As an outcome, Nano definition permits progressively detached dissemination and infiltration of medication around 15-250 times more prominent than that of miniaturized scale particles through the natural films [2]. The accomplishment of oral chemotherapy can significantly change the clinical act of chemotherapy and fundamentally improve the personal satisfaction of the disease patients. The oral course is by a wide margin the most favoured course because of higher patient consistence, simplicity of organization, less expensive expenses, and so forth [3]. Leukaemia speaks to a lot of harmful illnesses described by an anomalous collection of platelets, commonly WBCs (white platelets). Based on the movement of the illness and hematopoietic heredities included, leukaemia's arranged as intense versus incessant and myeloid versus lymphoid [4]. Scientists have been attempting to improve the conveyance of decitabine on various frameworks, for example, Nano gels [5], nanostructured lipid bearers [6, 7], liposomes [8] and designed erythrocyte (Erythrocyte-Magneto-Hem agglutinin Virosomes, EMHVs) tranquilize conveyance framework [9]. At all occasions, the significant undertakings for analysts are to improve the capture of the medication in the conveyance framework and to upgrade the bioavailability. Here, the Nano particulate conveyance frameworks expect to improve the dependability of medication, its length of helpful activity, and bioavailability, while limiting its debasement, digestion and cell efflux [10, 11]. Decitabine (DEC) or 5-aza-2′-deoxycytidine, is a particular cytosine simple with a property to repress DNMTs. It synthetically turns around quality quieting of tumour silencer qualities, and has become an energizing methodology for disease treatment [12]. It's endorsed by the US FDA for use as a immunotherapeutic operator against haematological malignancies [13]. It has effectively demonstrated remedial activity in patients with myelodysplastic disorder (MDS) in clinical preliminaries at higher stages. DEC is likewise dynamic in both intense and constant leukaemia's too [14].

WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 9, Issue 6, 1788-1795. Research Article ISSN 2277– 7105

FORMULATION AND EVALUTION OF TELMISARTAN SOLID DISPERSION USING DIFFERENT POLYMERS

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Article Received on
01 April 2020,

Revised on 22 April 2020,
Accepted on 12 May 2020,

DOI: 10.20959/wjpr20206-17620

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ABSTRACT

The goal of this examination was to plan and assess solid dispersion of Telmisartan to build dissolvability and for improvement of bioavailability. The solid dispersion were set up by physical blend strategy utilizing PEG 20000, PEG 6000, HPMC E15, HPC LH21, β-Cyclodextrin as a bearer in different proportions. Improved solid dispersion was assessed for % CDR and Time for CDR, FTIR, and in vitro tranquilize discharge study. The outcomes indicated that among the different groups containing the polymer being utilized in the examination, F8 plan containing critical improvement in solvency and disintegration profile of the medication.

KEYWORDS: Telmisartan, Solid dispersion, Physical Mixture method, Invitro studies.

INTRODUCTION

The oral course of prescription association is the course of choice for the formulators and continues telling the zone of drug movement progresses. Regardless, anyway notable, this course isn't liberated from imperatives of ingestion and bioavailability in the milieu of gastrointestinal tract. At whatever point an estimation shape is coordinated orally, sedate in the portion outline is released and separates in the including gastrointestinal fluid to outline an answer.[1] This technique is dissolvability limited. When the medicine is in the course of action outline, it goes over the movies of the phones covering the gastro-Intestinal tract. This method is permeability confined. By then onwards the medicine is acclimatized into major scattering. To lay it out simply, the oral digestion and therefore bioavailability of drug is constrained by the level of prescription dissolvability and vulnerability. Medication

Indo Global Journal of Pharmaceutical Sciences, 2020; 10(1): 12-18

INDO GLOBAL JOURNAL OF PHARMACEUTICAL SCIENCES
ISSN 2249- 1023

An Update on Therapeutic Repurposing Strategies for COVID-19

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Received: 20.04.2020
Accepted: 23.04.2020

Keywords
COVID-19; SARS-CoV-2; Repurposing; Therapeutic Strategies; Treatment.

ABSTRACT: The severe acute respiratory syndrome coronavirus 2, well known as COVID-19 has become the current health distress to the entire world. In the pandemic scenario the research on the rapid development of new drug molecules is highly risky and tedious process. The current COVID-19 emergency demands an urgent development of possible strategies to protect people at high risk of infection and hence the drug repurposing became an emerging approach to fight COVID-19. This review summarizes an update on various therapeutic strategies with special attention on repurposing of drugs to fight against SARS-CoV-2 worldwide. The investigation of existing drugs for new therapeutic purposes is one line of scientific research followed to develop safe and effective COVID-19 treatments. Broad-spectrum antiviral agents (BSAAs) that have been believed to be safe through testing on early phase clinical trials have been hyped as good drug repurposing candidates. Broad-spectrum antiviral drugs such as Ribavirin, Umifenovir were advised for COVID-19 treatment. Some antibiotics may be repurposed as COVID-19 treatments such as teicoplanin, oritavancin, dalbavancin, monensin and azithromycin. Ivermectin an antiparasitic is recently repurposed. Hydroxychloroquine and chloroquine, having immunomodulating effect on humans, have been shown to have antiviral activity at starting and post-entry stages of the SARS-CoV-2 infection. There is a need for global health emergency to call for a courageous, global response at the political and governmental levels. Therefore, the regulatory agencies must act swiftly to lessen any financial obstacles involving private companies and update guidelines for drug licenses by repurposing if necessary.

Cite this article as: Katakam, P.; Adiki, S.K.; Assaleh, F.H.; Ahmed, M.M. An update on therapeutic repurposing strategies for COVID-19. Indo Global J. Pharm. Sci., 2020; 10(1): 12-18. **DOI:** http://doi.org/10.35652/IGJPS.2020.10102 .

INTRODUCTION

The severe acute respiratory syndrome coronavirus 2, well known as COVID-19 has become the current health distress to the entire world. Initially appeared in Wuhan, Hubei, China around December 2019, it had spread to almost 210 countries due to its high contagious nature.[1] Preventive measures remain the only way to stop the person to person transmissions until any successful method of treatment or vaccine is developed. In the pandemic scenario the research on the rapid development of new drug molecules is highly risky and tedious process.

The genetically varied *Orthocoronavirinae* (coronavirus, CoV) family occurs in many avian and mammalian species. Phylogenetically, CoVs are divided into four genera: α (group 1), β (group 2), γ (group 3) and δ (group 4). Three new human CoV have emerged in the past two decades; in the year 2002 severe acute respiratory syndrome CoV (SARS-CoV), in 2012 Middle East respiratory syndrome CoV (MERS-CoV), and now in December 2019 SARS-CoV-2.[2-4] All human CoV are expected to have emerged firstly as zoonoses[5]. The current SARS-CoV-2 pandemic referred to as COVID-19 (Coronavirus disease 2019), has resulted in over 2,630,000 infections and over 184,000 deaths in 213

Ashdin Publishing
Journal of Drug and Alcohol Research
Vol. 9 (2020), Article ID 236154, 6 pages

Research Article

Formulation and *In Vitro*evaluation of Simvastatin Insituperiodontal Gels

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Received 07 January, 2020; **Accepted** 20 January, 2020; **Published** 29 January, 2020

Abstract

Objective of the study: The aim of the present study is to prepare and evaluate biodegradable *in situ* gels of simvastatin for treatment of periodontal diseases. In the present research work is focused to formulate periodontal injectable *in situ* gels containing bone regenerating agent simvastatin, using biodegradable polymer.

Methodology: Appropriate amounts of polymer and solvent were weighed into 5 ml glass vials with proper airtight polypropylene caps. After initial mixing of the contents, vials were placed aside with occasional shaking overnight at room temperature to completely dissolve the polymer. Weigh accurately finely powdered drugs and add to above solution, close the lid and shake well and keep aside with occasional shaking and store in refrigerator at 8°C. The resulting solutions can be directly injected into subgingival pockets. The studies are further done to evaluate the prepared *in situ* gels for various pre-formulation studies, physicochemical characterization, drug content, *in vitro* drug release studies and stability studies.

Conclusion: Periodontal diseases are the conditions that affect the supporting structure of teeth leading to the formation of pocket due to which tooth loss occurs, for which site specific injectable drug delivery systems are gaining importance.

Based on physicochemical characteristics, the *in situ* gel formulation of simvastatin (F3) was optimized. It was concluded that *in situ* gel delivery system is a novel approach that can be developed for the treatment of Periodontitis. The present research showed that the optimized *in situ* gel formulations are more promising for successful delivery of simvastatin and to treat bone regeneration.

Keywords: Simvastatin; Periodontitis; *In situ* gel

Introduction

Periodontitis can be classified based on disease activity (chronic or aggressive), etiology (specific bacterial, fungal or viral infection), by response to treatment (responsive or refractory), by site (localized or generalized). Chronic Periodontitis, formerly known as "adult periodontitis" or "chronic adult periodontitis" is the most prevalent form of periodontitis. It is generally considered to be a slowly progressing disease. However, in the presence of systemic or environmental factors that may modify the host response to disease progression may become more aggressive as shown in **Figure 1** [1].

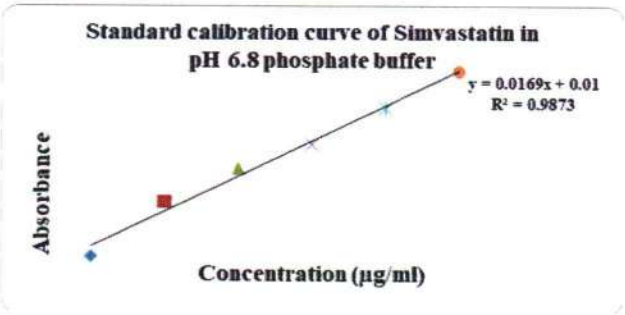

Figure 1: Standard calibration graph of SVS.

Methods

Gels

A gel is a solid or semisolid system of at least two constitutes, consisting of condense mass enclosing and interpenetrated by a liquid. When the coherent liquid is matrix and is rich in liquid, the product is often called a jelly and when the liquid is removed leaving only the framework, the gel is known as xero gels. In a typical polar gel, a natural or synthetic polymer builds a three dimensional matrix throughout a hydrophilic liquid [2].

***In situ* gel:** The *in situ* gelling systems consist of polymer that exhibit sol-to-gel phase transitions due to change in specific physicochemical parameters in the environment [3].

Advantages of *in situ* system

1. These systems reduce toxic effects on the healthy tissue and reach sites that are conventionally inaccessible due to the presence of various barriers.

WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.632
Volume 9, Issue 5, 1284-1292 Research Article ISSN 2278 – 4357

DESIGN AND OPTIMIZATION OF DILTIAZEM MATRIX TABLETS AS SUSTAINED RELEASE

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Article Received on
12 March 2020,

Revised on 02 April 2020,
Accepted on 22 April 2020

DOI: 10.20959/wjpps20205-16081

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ABSTRACT

In present day pharmaceutical innovation the continued and controlled medication exchange frameworks are the more celebrated frameworks. Presentation of framework measurements structure as supported release(SR) has given another leap forward for novel dynamic substance move framework in the field of Pharmaceutical innovation. Diltiazem was generally indicated for the management of chronic stable angina. The sustained release (SR) form of the drug has been found to result in better compliance. The medication and the excipient compatability examines are finished by utilizing the FTIR studies. Dry granulation method with the help of excipients was attempted for the formulation development of matrix tablets of Diltiazam. The tablets were characterized for various parameters like bulk density, tapped density, Angle of repose, Hauner's ratio, carr's index. All results are within the limits and tablets were evaluated for thickness, weight variation, friability, Disintegration and dissolution studies. The formulation F7 shows the sustained-release matrix tablets of diltiazem.

KEYWORDS: Diltiazem, Matrix tablets, HPMC, EC, Dry granulation, *Invitro* studies.

1. INTRODUCTION

Present days novel medication conveyance frameworks are critical for transportation of the medicine to the human body. Presently the customary frameworks are recuperated by the novel medication conveyance frameworks.[1-2] In present day pharmaceutical innovation the continued and controlled medication exchange frameworks are the more celebrated frameworks. Presentation of framework measurements structure as supported release (SR)

Design and Evaluation of Press Coated Formulation of Aceclofenac and Comparison with Marketed Preparations.

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3. School of Pharmacy Swami Ramanand Tirth Marathwada University, Nanded, Maharashtra, India.

Abstract

The primary objective of the studies is to investigate whether compression coating could be used to produce tablets providing maximum drug plasma concentration 6 to 8 hours after an evening dose taken at approximately 22:00. Fast Dispersible core tablets containing Aceclofenac were prepared using superdisintegrants like Ac-Di-Sol, Crospovidone and Sodium starch glycolate through wet granulation method and evaluated for various parameters. Prepared press coated tablets were characterized for physical parameters, drug content, lag time, in vitro drug release characteristics. Aceclofenac formulation tablets of batch F4 containing combination Methocel K4M and Methocel K100M showed desired lag time along with drug release as compare to other formulations. The Comparative dissolution study of optimized formulation containing Aceclofenac was carried with marketed preparations also showed good results.

Keywords: Press coated Tablets, lag time, Aceclofenac.

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Adiki et al. Futur J Pharm Sci (2021) 7:217
https://doi.org/10.1186/s43094-021-00372-7

Future Journal of Pharmaceutical Sciences

RESEARCH Open Access

Experimental design optimization of RP-HPLC method for simultaneous estimation of metsulfuron-methyl, chlorantraniliprole and chlorimuron-ethyl residues in stems of *Oryza sativa*

Shanta Kumari Adiki[1*], Prakash Katakam[2] and Fathi H. Assaleh[3]

Abstract

Background: The study aims to develop a chemometrics optimized D-optimal mixture design approach assisted RP-HPLC method for the determination of pesticide residues of metsulfuron-methyl, chlorantraniliprole, and chlorimuron-ethyl in the stems of *Oryza sativa*. Chromatographic separation was achieved on a C18 column using a mobile phase consisting of a pH 3.5 phosphate buffer and acetonitrile in the ratio 85:15.

Results: The optimized HPLC method gave a sharp resolution of metsulfuron-methyl, chlorantraniliprole and chlorimuron-ethyl at a retention time of 2.599 min, 3.805 min and 4.661 min receptively. Linearity was observed in the range 100–500 µg/mL for metsulfuron-methyl ($r^2 = 0.999$), 4–20 µg/mL for chlorantraniliprole ($r^2 = 0.999$) and 100–500 µg/mL for chlorimuron-ethyl ($r^2 = 0.999$). The developed method was validated as per ICH guidelines.

Conclusion: The proposed chemometrics optimized RP-HPLC method was found to be successful in the resolution of pesticide residues in the stems of *O. sativa*. The developed method can be applied to routine quantification of metsulfuron-methyl, chlorantraniliprole and chlorimuron-ethyl.

Keywords: Pesticides, *Oryza sativa*, Metsulfuron-methyl, Chlorantraniliprole, Chlorimuron-ethyl, Chemometrics, Validated

Background

Pesticides and herbicides are used to destroy the insects or other organisms harmful to cultivated plants in modern agricultural practices to enhance the yield and upgrade the quality of the agricultural crops. Nearly 30% of the food production is lost in third world countries due to insects, pests, plant pathogens, weeds, rodents, birds during storage. However, the unregulated and indiscriminate application of pesticides has raised serious concerns regarding environmental pollution and human health issues [1–6]. The pesticides ought to be checked for viability, natural, and toxicological tests to get enrolled by the government for legitimate use in determining applications. Sustained accumulation of pesticides in agrarian items is a matter of grave concern for its far-reaching adverse health consequences [2–4]. *Oryza sativa* is the most widely consumed cereal grain as a staple food for a large part of the world's human population, especially in Asia.

Metsulfuron-methyl (CAS 74223-64-6, molecular formula $C_{14}H_{15}N_5O_6S$, and MW 381.37) is methyl

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Ashdin Publishing
Journal of Drug and Alcohol Research
Vol. 9 (2020), Article ID 236154, 6 pages

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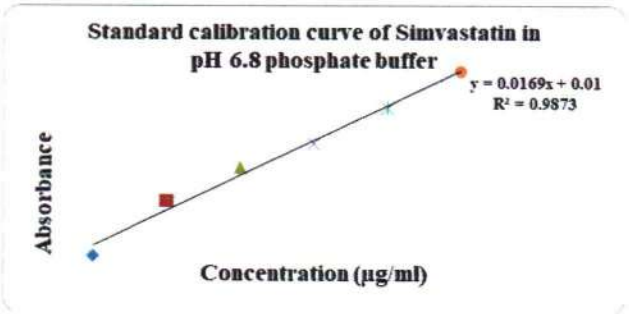

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Advantages of *in situ* system

1. These systems reduce toxic effects on the healthy tissue and reach sites that are conventionally inaccessible due to the presence of various barriers.
2. Increase the half life of [illegible] preventing their rapid

marine drugs

MDPI

Article

Development and Characterization of Calcium-Alginate Beads of Apigenin: In Vitro Antitumor, Antibacterial, and Antioxidant Activities

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Abstract: The objective of this work was to develop sustained-release Ca-alginate beads of apigenin using sodium alginate, a natural polysaccharide. Six batches were prepared by applying the ionotropic gelation technique, wherein calcium chloride was used as a crosslinking agent. The beads were evaluated for particle size, drug loading, percentage yield, and in vitro drug release. Particle size was found to decrease, and drug entrapment efficiency was enhanced with an increase in the polymer concentration. The dissolution study showed sustained drug release from the apigenin-loaded alginate beads with an increase in the polymer proportion. Based on the dissolution profiles, BD6 formulation was optimized and characterized for FTIR, DSC, XRD, and SEM, results of which indicated successful development of apigenin-loaded Ca alginate beads. MTT assay demonstrated a potential anticancer effect against the breast cancer MCF-7 cell lines. The antimicrobial activity exhibited effective inhibition in the bacterial and fungal growth rate. The DPPH measurement revealed that the formulation had substantial antioxidant activity, with EC50 value slightly lowered compared to pure apigenin. A stability study demonstrated that the BD6 was stable with similar ($f2$) drug release profiles in harsh condition. In conclusion, alginate-based beads could be used for sustaining the drug release of poorly water-soluble apigenin while also improving in vitro antitumor, antimicrobial, and antioxidant activity.

Keywords: apigenin; antimicrobial; beads; Ca-alginate; DSC; DPPH; FTIR; in vitro dissolution; MTT; SEM; XRD

Citation: Aldawsari, M.F.; Ahmed, M.M.; Fatima, F.; Anwer, M.K.; Katakam, P.; Khan, A. Development and Characterization of Calcium-Alginate Beads of Apigenin: In Vitro Antitumor, Antibacterial, and Antioxidant Activities. *Mar. Drugs* **2021**, *19*, 467. https://doi.org/10.3390/md19080467

Academic Editors: Maila Castellano and Andrea Dodero

Received: 14 July 2021
Accepted: 18 August 2021
Published: 20 August 2021

1. Introduction

Marine-based polysaccharides originate from ocean life plants, sea animals, or marine bacteria. Marine polycarbohydrates—agar, alginic acid, chitin, chitosan, cellulose, glucan, including long-chain polymeric carbohydrates and low-molecular-weight carbohydrates—are isolated from fungi, algae, and organisms [1]. Marine-derived polymers have anticancer, antioxidant, antimicrobial, anticoagulant, and anti-inflammatory bioactivities [2,3]. A natural hydrophilic polysaccharide-alginic acid, also called algin, with metals such as sodium, calcium, and its salts, are known as alginates. Sodium alginate (sodium 3,4,5,6-tetrahydroxyoxane-2-carboxylate) is extracted from the cell wall of brown seaweed and it appears as yellowish fibrous or granular powder jelly bodies [4]. The biosynthesis of alginate is materialized by D-fructose-6-phosphate precursor, followed by epimerization of d-mannuronic residues, catalyzed by mannuronan C-5-epimerases. Sodium alginate (SAG) is viscous, has non-Newtonian consistency in water, is insoluble with ether and ethanol,

Review Article

Precision medicine: Recent progress in cancer therapy

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Mediterranean Journal of Pharmacy and Pharmaceutical Sciences

Article information

Received
06-02-2021
Revised
14-02-2021
Accepted
16-02-2021
Published
31-03-2021

DOI: xxxxxxxxxxxxxxxxxx

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Abstract

This review was aimed to describe a new approach of healthcare performance strategy based on individual genetic variants. Personalized medicine is a model for health care which is a combination of preventive, personalized, participatory and predictive measures. It is an approach for a better treatment by identifying the disease causing genomics makeup of an individual. This work features key advancements in the improvement of empowering advances that further the objective of customized and precision medication and the remaining difficulties that, when tended to, may produce phenomenal abilities in acknowledging genuinely individualized patient consideration. Customized treatment for patients determined to have strong tumors has brought about a few advances as of late. To improve a multi-drug approach ready to coordinate DNA and RNA adjustment, proteomics and metabolomics will be essential. The execution of translational examinations dependent on fluid biopsy and organoids or xenografts to assess molecular changes because of clonal weight produced because of the utilization of target specialists or tumor heterogeneity would help in the recognition of systems of opposition, proposing opportunities for novel mixes. The investigation of massive data in oncology can profit altogether from being engaged by artificial intelligence and machine learning strategies.

Keywords: *Accuracy medication, artificial intelligence, cancer therapy, machine learning, personalized medicine, precision medicine, translational oncology*

Introduction

Personalized medicine is a special strategy which refers to a tailoring of clinical treatment for the individual characteristics of patients. These drugs are made based upon the genetic setup of the human genome. It becomes the fundamental difficulty for the diagnosis, prevention and therapy of any disorder and personalized medicine is based totally on the pharmacogenomics and genomics. Personalized medicine is a model for health care which is a combination of preventive, personalized, participatory and predictive measures. It is an approach for better treatment by identifying the disease causing genomic makeup of an individual. Personalized medicine is a broad field and it can be used for the diagnosis of various diseases like cancer, Alzheimer, hepatitis, cardiac diseases etc. Precision medicine according to the National Institutes of Health (NIH), precision medicine is "an emerging approach for disease treatment and prevention that takes into account individual variability in genes, environment and lifestyle for each person" [1]. On January 30, 2015, US president, Obama, declared subsidizing for an Initiative in Precision Medicine [2]. After three years, National Academy of Sciences Board of Trustees report clarified exactly how an activity could quicken progress in clinical consideration and exploration [3]. This methodology will allow doctors and investigators to anticipate more definitively which treatment and anticipation techniques for an extraordinary disease will work at gatherings of individuals. It is in conflict with a one-size-fits-all approach in which infection treatment

Review Article

Precision medicine: Recent progress in cancer therapy

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Mediterranean Journal of Pharmacy and Pharmaceutical Sciences

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Karle *et al.*
Bulletin of the National Research Centre (2022) 46:110
https://doi.org/10.1186/s42269-022-00783-3

Bulletin of the National Research Centre

RESEARCH Open Access

Screening of *Manilkara zapota* (L) P. Royen stem bark ethanolic extract for in vitro α-glucosidase inhibition, preliminary antidiabetic effects, and improvement of diabetes and its complications in alloxan-induced diabetes in Wistar rats

Pravin P. Karle[1*], Shashikant C. Dhawale[1], Rajesh J. Mandade[2] and Vijay V. Navghare[1]

Abstract

Background: A perusal of the literature suggested that *Manilkara zapota* (L.) P. Royen stem bark (MZSB) is enriched with several bioactive phytoconstituents but had not been yet screened for its in vitro and in vivo antidiabetic potentials. Thus, the present study aimed to investigate the effects of 70% ethanolic extract of *Manilkara zapota* (L) P. Royen stem bark (EMZSB) in DPPH- and H_2O_2-scavenging assay, in vitro α-glucosidase inhibition assay, ameliorating diabetes and its complications in alloxan-induced diabetes in Wistar rats.

Results: With a maximum extractive yield of 9.16% w/w, EMZSB has shown the presence of various phytochemicals like flavonoids, phenolic compounds, tannins, anthraquinone glycosides, steroids, terpenoids, and alkaloids. EMZSB has elucidated a considerable in vitro free radical scavenging potential by DPPH and H_2O_2 assays when compared with absolute ethanolic extract of *Manilkara zapota* (L) P. Royen stem bark (AEMZSB), while ascorbic acid was taken as the standard. Further, EMZSB demonstrated high in vitro α-glucosidase enzyme inhibition potential ($IC_{50} = 119.79 \pm 1.52$ µg/mL) than AEMZSB ($IC_{50} = 129.92 \pm 2.29$ µg/mL) with a significant difference ($p < 0.01$), when acarbose was taken as reference inhibitor ($IC_{50} = 86.43 \pm 1.26$ µg/mL). During acute toxicity studies EMZSB was safe up to 2000 mg kg^{-1} doses while, found causing moribund status followed by mortality in mice at 3000 mg kg^{-1} and above doses. A preliminary antidiabetic study with EMZSB-250 mg kg^{-1} in normal rats showed no sign of hypoglycemia; however, a dose-dependent antihyperglycemic effects were observed in oral glucose tolerance test in glucose-loaded rats. In vivo assessment with EMZSB-250 mg kg^{-1} in alloxan-induced rats demonstrated significant blood glucose-lowering effects with perfection in serum lipid profile, body weight enhancement, cardiovascular risk indices, nephroprotective effects, augmentation in liver glycogen content, and histopathological evidence of normal architecture of kidneys with no marks for nephritis.

Conclusions: EMZSB-250 showed significant antidiabetic effects and ameliorated diabetic complications by improving glycemic control and accompanying biochemical alteration.

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Research article | Published: 04 February 2022

Amelioration of diabetes and its complications by *Manilkara zapota* (L) P. Royen fruit peel extract and its fractions in alloxan and STZ-NA induced diabetes in Wistar rats

Pravin P. Karle, Shashikant C. Dhawale & Vijay V. Navghare

Journal of Diabetes & Metabolic Disorders **21**, 493–510 (2022)

Abstract

Purpose

This study aims to evaluate the effects of *Manilkara zapota* (L) P. Royen fruit peel extract (EMZFP) and its fractions in ameliorating diabetes and its complications in alloxan and STZ-NA induced diabetes in Wistar rats.

Methods

Antidiabetic effects of EMZFP were assessed in alloxan (150 mg kg^{-1}) induced diabetes in differently grouped rats (n=6). Diabetic rats were treated with EMZFP 150, 300, and 600 mg kg^{-1} while, glimepiride (0.09 mg kg^{-1}) was used as a reference standard. Treated animals were assessed for various biological parameters i.e. blood glucose, serum lipids, nephroprotective markers, cardiovascular risk indices, liver glycogen, neuropathy, body weight, and histopathology of kidneys. However, for evaluating antidiabetic effects of fractions (chloroform, acetone, ethyl acetate, and remaining ethanol fraction) of EMZFP, diabetes was induced by streptozotocin (60 mg kg^{-1})–nicotinamide (120 mg kg^{-1}/ml) in differently grouped male rats (n=6). Diabetic rats were treated with EMZFP fractions 200 mg kg^{-1} however; glibenclamide (10 mg kg^{-1}) was a reference standard and evaluated for blood glucose, serum lipids, cardiovascular risk indices, and diabetic neuropathy.

Results

Technical Article | Published: 13 October 2022

On Mechanical, Physical, and Bioactivity Characteristics of Material Extrusion Printed Polyether Ether Ketone

Ranvijay Kumar, Gurminder Singh, Amutha Chinappan, Erfan Rezvani Ghomi, Sunpreet Singh, Kamalpreet Sandhu, Seeram Ramakrishna, Roger Narayan & Prakash Katakam

Journal of Materials Engineering and Performance (2022)

Abstract

High-performance polyether ether ketone (PEEK) thermoplastic is considered to be one of the most desirable materials for its intended biomedical implications, including oral implantology, prosthodontics, dental implants, and orthopaedics. Therefore, the processing of PEEK through material extrusion (ME) as a 3D printing process has been preferred due to its affordability, better process parameters, and mass customization. In the present study, attempts have been made to study the effects of various input process parameters of an in-house modified ME system on tensile strength, surface finish, and bioactivity. Underlining the scientific importance of input process parameters of ME, including nozzle temperature (Nt), printing speed (Ps), layer thickness (Lt), and build-platform temperature (Bt), their effects on the aforementioned characteristics of 3D printed PEEK specimens have been studied through employing Taguchi's statistical analysis. The in-vitro cell viability test has been performed using Sprague–Dawley rat bone marrow-derived cells for 21 days. In addition to this, Scanning electron microscopic analysis has also been performed at various stages of this experimental study for supporting micro-characterization. This study indicated that the selected input process parameters strongly influence the tensile strength and surface finish of the as-printed

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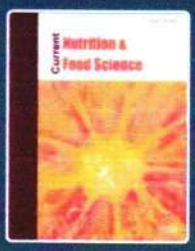

Current Nutrition & Food Scienc

Editor-in-Chief »

ISSN (Print): 1573-4013
ISSN (Online): 2212-3881

Review Article

Phytosomes: A Novel Phytoconstituent Delivery Approach to Improve the Efficacy of Obesity Treatment

Author(s): [redacted], [redacted], Srikala Kamireddy, Prakash Katakam and Iswarya Obilineni

Volume 19, Issue 3, 2023

Published on: 01 November, 2022

Page: [229 - 237]

DOI: 10.2174/1573401318666220901125859

Price: $65

Pages: 9

Abstract

INTERNATIONAL JOURNAL OF PHARMACY AND ANALYTICAL RESEARCH

ISSN:2320-2831

IJPAR |Vol.8 | Issue 1 | Jan – Mar - 2019
Journal Home page: www.ijpar.com

Research article Open Access

Development and validation of UV spectroscopic method for simultaneou estimation of dapagliflozin and saxagliptin in synthetic mixture

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ABSTRACT

Aim

Simple, precise and accurate UV-Spectrophotometric Simultaneous Equation method for estimation of Dapagliflozin and Saxagliptin were developed and validated as per ICH guidelines.

Experimental and Results

The objective of the work is to develop UV spectroscopic method for simultaneous estimation of Dapagliflozin (DAPA) and Saxagliptin (SAXA). This Method involve solving of simultaneous equations based on measurement of absorbance at two wavelengths 223 nm and 212 nm. Both the drugs obey the Beer's law in the concentration ranges 4-24 µg mL and 5-50 µg mL respectively. Results of the methods were validated statistically. Novel, simple, sensitive, rapid, accurate and economical Spectrophotometric methods have been developed for simultaneous estimation of Dapagliflozin and Saxagliptin .The method can be used to estimate the amount of Dapagliflozin and Saxagliptin in mixture containing Dapagliflozin and Saxagliptin.

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International Journal of Pharmacy

Journal Homepage: http://www.pharmascholars.com

Original Article **CODEN: IJPNL6**

Stabity indicating Dissolution Method Development for Estimation of Paracetamol & Chlorzoxazone in Combine Dosage form

H.N khan[1*], M D Zameeruddin[2], Mirza Shahed Baig[2], Mahajan Swarali[2], V.B Bharkad[2]

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Received on: 30-10-2017; Revised on: 04-11-2017; Accepted on: 06-11-2017

ABSTRACT

The present work concerns with development and validation of dissolution test for Paracetamol and Chlorzoxazone in combine tablets dosage form using spectrophotometric method. 0.1M HCl (pH 1.0, 900 mL) was used as dissolution medium, using a paddle apparatus, stirring rate was 50 rpm. The percent drug release was determined by UV spectrophotometric method the wavelength selected for analysis are 242.80 nm for Paracetamol and 279.80 nm for Chlorzoxazone from results it can be concluded that the method developed consists in an efficient alternative for assay of this tablets combination. The method was validated to meet requirements for a global regulatory filing which includes validation parameters as linearity, accuracy, precision, ruggedness and robustness which are as per ICH guidelines. In addition, filter suitability and drug stability in medium were demonstrated.

Keywords: Dissolution, Paracetamol, Chlorzoxazone, *In vitro* drug release, Spectrophotometry, Simultaneous equation method, Validation

INTRODUCTION

Paracetamol (PCM) is 4-hydroxyacetanilide it is official in Indian Pharmacopoeia [1]. Paracetamol is centrally and peripherally acting non opioid analgesic and antipyretic property overdose of Paracetamol can lead to hepatic necrosis or renal failure [2]. Chemical structure of PCM is given in Figure 1.

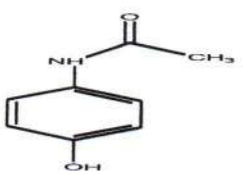

Figure 1: Chemical structure of Paracetamol

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International Journal of Pharmacy

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Journal Homepage: http://www.pharmascholars.com

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H.N khan[1*], M D Zameeruddin[2], Mirza Shahed Baig[2], Mahajan Swarali[2], V.B Bharkad[2]

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Received on: 30-10-2017; Revised on: 04-11-2017; Accepted on: 06-11-2017

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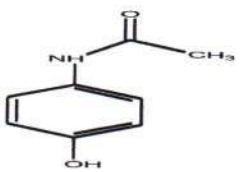

Figure 1: Chemical structure of Paracetamol

International Journal of Innovative Research and Advanced Studies (IJIRAS)
Volume 4 Issue 6, June 2017

ISSN: 2394-4404

Second Derivative Spectrophotometric Method For Determination Of Minoxidil And Finasteride In Bulk And Pharmaceutical Formulation

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Miss. H. N. Khan
Guide

Abstract: ***Simple and reliable second derivative spectrophotometric method was developed and validated for simultaneous estimation of Minoxidil and Finasteride in bulk and Pharmaceutical formulation. The quantitative determination of second derivative were carried out using second derivative values measured at 228 nm 236 nm for Minoxidil and Finasteride respectively. The solution of standard and sample were prepared in DMSO: Methanol (1:9 v/v) and Potassium Phosphate buffer (PH7.2) respectively. The calibration graphs constructed at their wavelengths of determination were linear in concentration range of 15-65 µg/ml and 0.5-2.5 µg/ml for Minoxidil and Finasteride respectively. The developed second derivative spectrophotometric method validated according to ICH guideline.***

Keywords: Minoxidil, Finasteride, Dimethyl Sulfoxide (DMSO), Methanol, Potassium Phosphate buffer (PH 7.2).

I. INTRODUCTION

Minoxidil (MINO) chemically is 2,4-diamino-6-piperidinopyrimiddine-3-oxide (Figure 1) is act by relaxing arteriolar smooth muscle with little effect on venous capacitance. It increased rennin release and proximal tubular Na^+ reabsorbing and water retention. Minoxidil also increase hair growth by acting on alteration of androgenic effect on genetically programmed hair follicles and direct stimulation of resting hair follicles.

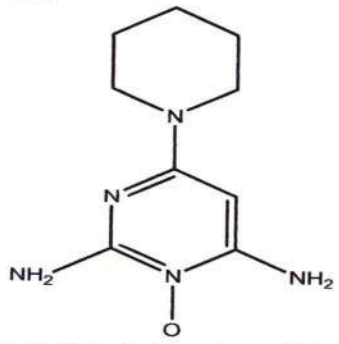

Figure 1: Chemical structure of Minoxidil

Finasteride (FNS) chemically is 17β-(N-tert-butyl carbamoyl)-4-aza-5α-androst-1-en-3-one (Figure.1). It is competitive inhibitor of enzyme 5α-reductase which converts testosterone responsible for androgen action in tissues including prostate gland and hair follicles. Finasteride is antiandrogenic drug and also found effectively in male baldness. It is effective orally, metabolized in liver and excreted in urine faeces.

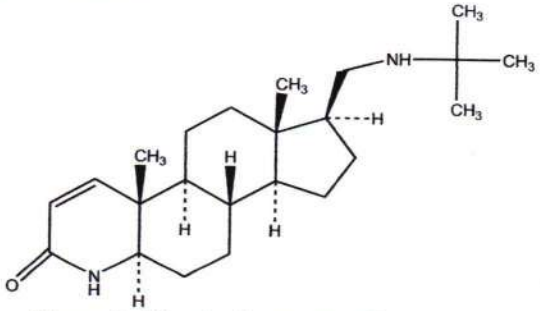

Figure 2: Chemical structure of Finasteride

Litrature survey revealed UV, HPLC and UPLC analytical methods for Minoxidil and Finasteride estimation.

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Journal of PharmaResearch
http://www.jprinfo.com/

JPR INFO
Journal of Pharma Research

Vol. 6, Issue 11, 2017 ISSN: 2319-5622 USA CODEN: JPROK3

Research Article

STABITY INDICATING DISSOLUTION METHOD DEVELOPMENT FOR ESTIMATION OF PARACETAMOL AND CHLORZOXAZONE IN COMBINE DOSAGE FORM

Hajera Khan *, Mohammad Zameerodin
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Received on: 13-11-2017; Revised and Accepted on: 24-11-2017

ABSTRACT

The aim of this work was to develop dissolution test method for Paracetamol and Chlorzoxazone in combination tablet. The dissolution established conditions were 900 mL of 0.1M HCl pH 1.0 as dissolution medium, using a paddle apparatus at a stirring rate of 50 rpm. The assay was performed by spectrophotometry for the better conditions stirring speed of 50 rpm, is used .Ahead of results it can be concluded that the method developed consists in an efficient alternative for assay of dissolution for tablets. The method was validated to meet requirements for a global regulatory filing which includes linearity, precision, accuracy robustness and ruggedness. In addition, filter suitability and drug stability in medium were demonstrated.

KEYWORDS:*Dissolution study of Paracetamol and Chlorzoxazone, In vitro release, Spectrophotometry, Q-Analysis Method, Validation.*

INTRODUCTION

Paracetamol (PCM) chemically is 4-hydroxyacetanilide[1]. Paracetamol acts by complex and includes the effects of both the peripheral (COX inhibition) and central (COX serotonergic descending neuronal pathway, L-arginine/NO Pathway, cannabinoid system) antinociception processes and redox mechanism [2]. Paracetamol is well tolerated drug and produces few side effects from the gastrointestinal tract. Chemical structure of PCM is given fig .1.

Chlorzoxazone Chemically is 2(3H)-Benzoxazolone,5-chloro-5-chloro-2 benzoxazolinone[3].

Chlorzoxazone acts by inhibiting multi synaptic reflexes involved in producing and maintaining skeletal muscle spasm of varied aetiology.It acts on the spinal cord by depressing reflexes. CHN a synthetic compound, inhibits antigen-induced bronco spasms.CHN inhibits degranulation of mast cells. Subsequently preventing the release of histamine and slow-reacting substance of anaphylaxis(SRS-A), mediators of type-1 allergic reactions. CHZ also may reduce the release of inflammatory leukotrienes[4]. CHZ is given fig.2.

Literature survey revealed that various analytical technique such as spectrophotometric technique [5-8]. Several method based on separation technique including HPLC[9-11], have been reported. The method was validated as per the International Conference on Harmonization (ICH) guidelines [12,13].

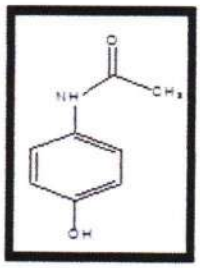

Fig. 1: chemical structure of Paracetamol

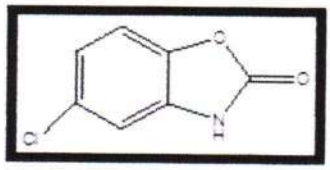

Fig. 2: chemical structure of Chlorzoxazone

MATERIALS AND METHODS

Materials:

Paracetamol was received as a gift samples from Glenmark Pharmaceuticals Ltd. (Goa, India) and Chlorzoxazone was received as a gift samples from Flemingo Pharmaceuticals Nanded, India.

Instrumentation:

Dissolution test was performed in a ELECTROLAB (VK7025) Model(TDT-06L)[14]dissolution apparatus, multi-bath (n=6), in accordance to USP Pharmacopoeia generalmethod. The medium were vacuum degassed under in house vacuum and weremaintained at 37.0 ± 0.5°C by using a thermostatic bath. A double-beam UV-Visiblespectrophotometer (Model:UV 1800,Shimadzu] with a fixed slit width (2 nm)using1.0 cm quartz cell was used for all absorbance measurements. Elico pH analyzer(Model: Elico 11610) was used to determine the pH of all solutions.

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World Inventia Publishers

Journal of PharmaResearch

http://www.jprinfo.com/

Vol. 6, Issue 11, 2017 ISSN: 2319-5622 USA CODEN: JPROK3

Research Article

STABITY INDICATING DISSOLUTION METHOD DEVELOPMENT FOR ESTIMATION OF PARACETAMOL AND CHLORZOXAZONE IN COMBINE DOSAGE FORM

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Received on: 13-11-2017; Revised and Accepted on: 24-11-2017

ABSTRACT

The aim of this work was to develop dissolution test method for Paracetamol and Chlorzoxazone in combination tablet. The dissolution established conditions were 900 mL of 0.1M HCl pH 1.0 as dissolution medium, using a paddle apparatus at a stirring rate of 50 rpm. The assay was performed by spectrophotometry for the better conditions stirring speed of 50 rpm, is used .Ahead of results it can be concluded that the method developed consists in an efficient alternative for assay of dissolution for tablets. The method was validated to meet requirements for a global regulatory filing which includes linearity, precision, accuracy robustness and ruggedness. In addition, filter suitability and drug stability in medium were demonstrated.

KEYWORDS:*Dissolution study of Paracetamol and Chlorzoxazone, In vitro release, Spectrophotometry, Q-Analysis Method, Validation.*

INTRODUCTION

Paracetamol (PCM) chemically is 4-hydroxyacetanilide[1]. Paracetamol acts by complex and includes the effects of both the peripheral (COX inhibition) and central (COX serotonergic descending neuronal pathway, L-arginine/NO Pathway, cannabinoid system) antinociception processes and redox mechanism [2]. Paracetamol is well tolerated drug and produces few side effects from the gastrointestinal tract. Chemical structure of PCM is given fig .1.

Chlorzoxazone Chemically is 2(3H)-Benzoxazolone,5-chloro-5-chloro-2 benzoxazolinone[3].

Chlorzoxazone acts by inhibiting multi synaptic reflexes involved in producing and maintaining skeletal muscle spasm of varied aetiology.It acts on the spinal cord by depressing reflexes. CHN a synthetic compound, inhibits antigen-induced bronco spasms.CHN inhibits degranulation of mast cells. Subsequently preventing the release of histamine and slow-reacting substance of anaphylaxis(SRS-A), mediators of type-1 allergic reactions. CHZ also may reduce the release of inflammatory leukotrienes[4]. CHZ is given fig.2.

Literature survey revealed that various analytical technique such as spectrophotometric technique [5-8]. Several method based on separation technique including HPLC[9-11], have been reported. The method was validated as per the International Conference on Harmonization (ICH) guidelines [12,13].

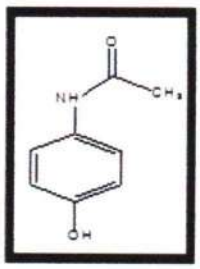

Fig. 1: chemical structure of Paracetamol

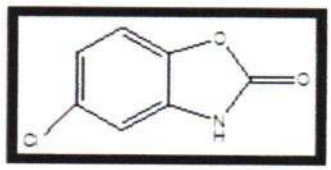

Fig. 2: chemical structure of Chlorzoxazone

MATERIALS AND METHODS

Materials:

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Dissolution test was performed in a ELECTROLAB (VK7025) Model(TDT-06L)[14]dissolution apparatus, multi-bath (n=6), in accordance to USP Pharmacopoeia generalmethod. The medium were vacuum degassed under in house vacuum and weremaintained at 37.0 ± 0.5°C by using a thermostatic bath. A double-beam UV-Visiblespectrophotometer (Model:UV 1800,Shimadzu] with a fixed slit width (2 nm)using1.0 cm quartz cell was used for all absorbance measurements. Elico pH analyzer(Model: Elico 11610) was used to determine the pH of all solutions.

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ChemTech

International Journal of ChemTech Research
CODEN (USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555
Vol.11 No.06, pp 305-313, 2018

Stability Indicating Validated Dissolution Method for Determination of Propranalol and Hydralazine by Simultaneous equation method and Q-Analysis method.

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Abstract : The aim of this work was development and validation of a dissolution method for Propranolol and Hydralazine(Carbetazine Tablets). The dissolution established conditions were 900 mL of 0.1M HCl (pH 1.0) as dissolution medium, using a paddle apparatus at a stirring rate of 50 rpm. The drug release was evaluated by UV spectrophotometric method the area of solution were recorded at288.20nm and 259.20nm for Propranolol and Hydralazine respectively for Simultaneous equation method and at 288.20nm(PRP) and 236.00nm(Isobestic point) for Q-Analysis method. Ahead of the results it can be concluded that the method developed consists in an efficient alternative for assays of dissolution for tablets.

Key Words : Dissolution, Spectroscopy, Simultaneous equation method, Q-Analysis method, Stability, alidation.

Introduction

Propranolol hydrochloride (PRP)chemically is (RS)-1-[(1-methylethyl) amino]-3-(naphthalene-1-yloxy) propan-2-olhydrochioride [1]and chemical structure of PRP is given in the fig. 1.

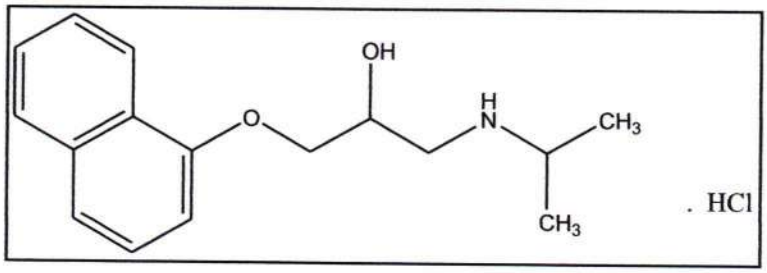

Figure I:Propranolol

H.N Khan *et al* /International Journal of ChemTech Research, 2018,11(06): 305-313.

DOI= http://dx.doi.org/10.20902/IJCTR.2018.110639

ISSN 2349-7203

IJPPR
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November 2017 Vol.:10, Issue:4

Development and Validation of RP-HPLC Method for Simultaneous Estimation of Clonidine HCl and Chlorthalidone in Bulk Form

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Submission: 31 October 2017
Accepted: 7 November 2017
Published: 30 November 2017

HUMAN JOURNALS
www.ijppr.humanjournals.com

Keywords: Clonidine HCl, Chlorthalidone, RP-HPLC, Validation.

ABSTRACT

A Reverse phase High-Performance Liquid Chromatography method (HPLC) was developed for the simultaneous estimation of Clonidine HCl and Chlorthalidone in laboratory mixture. The chromatographic separation was achieved by Zorbax Eclipse XDB-C18 (4.6x250mmx5µ) column and Methanol-Ortho Phosphoric Acid (50:50 V/V) was used as mobile phase at a flow rate of 1ml/min. Detection was carried out at 236nm. The retention time of Clonidine HCl and Chlorthalidone were found to be 2.510 min and 3.403 min respectively. The method has been validated for linearity, accuracy, and precision. Linearity observed was 5-25 µg/ml for both drugs. The developed method was found to be accurate, precise and rapid for Simultaneous estimation of Clonidine HCl and Chlorthalidone in laboratory mixture.

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Available online at www.derpharmachemica.com

ISSN 0975-413X
CODEN (USA): PCHHAX

Der Pharma Chemica, 2017, 9(20):55-58
(http://www.derpharmachemica.com/archive.html)

Development and Validation of RP-HPLC Method for Simultaneous Determination of Aspirin and Omeprazole

Hajera N Khan*, Swapna S Bandewar, Mohammad Zameeruddin, Vishvanath B Bharkad

SSS Indira College of Pharmacy, Vishnupuri, Nanded-431606, India

ABSTRACT

In this study, reverse phase high performance liquid chromatographic method have been developed and validated for the simultaneous determination of aspirin and omeprazole. The chromatographic separation was achieved in a Zorbax Eclipse XDB- C18 (4.6 × 250 mm × 5 µ) as a stationary phase Acetonitrile: Water (50:50, v/v) as mobile phase at a flow rate of 1 ml/min. UV detection was performed at 293 nm. The retention time of aspirin and omeprazole was found to be 3.260 and 1.787 min respectively. The results of analysis were validated statistically and by recovery studies. Linearity, accuracy and precision were acceptable in the ranges (2-14 µg/ml) for aspirin and (2-18 µg/ml) for omeprazole. The % recovery for aspirin and omeprazole was 99.79 and 99.61, respectively. The results of the studies showed that the proposed Reverse Phase High Performance Liquid Chromatography (RP-HPLC) method was simple, rapid, precise and accurate, which can be used for the routine determination of aspirin and omeprazole.

Keywords: Aspirin, Omeprazole, Liquid chromatography, Validation

INTRODUCTION

Aspirin (ASP) was Nonsteroidal anti-inflammatory, antirheumatic, antithrombic and chemically it was 2-Acetoxy benzoic acid. Chemical Structure of Aspirin was given in Figure 1, molecular formula was $C_9H_8O_4$, molecular weight is 180.16 g/mol [1].
Omeprazole (OME) was proton pump inhibitors chemically it was 5-Methoxy-2-[[(4-methoxy-3,5-dimethyl-2-pyridinyl)-methy]sulfinyl]-1H-benzimidazole, chemical structure of omeprazole was given in Figure 2, molecular formula was $C_{17}H_{19}N_3O_3S$, molecular weight is 345.42 g/mol [2].

Literature survey revealed that there are various methods have been reported for estimation of ASP and OME by High Performance Liquid Chromatography (HPLC) method [3-7], UV-spectroscopic methods [8-10], Liquid Chromatography-Mass Spectrometry (LC-MS) [11-13] and High-performance Thin-Layer Chromatography (HPTLC) method [14] individually and in combined dosage form with other drugs. But no single method is available in combination by using this mobile phase. The present work therefore emphasizes on the quantitative estimation of ASP and OMP in synthetic mixture by HPLC. The proposed method was validated as per the International Conference on Harmonization (ICH) analytical method validation guidelines [15].

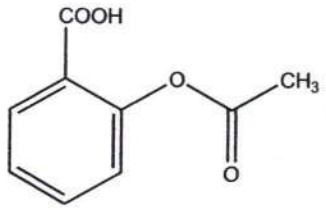

Figure 1: Aspirin

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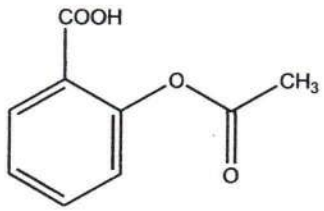

Figure 1: Aspirin

CODEN [USA]: IAJPBB ISSN: 2349-7750

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STABITY INDICATING DISSOLUTION METHOD DEVELOPMENT FOR ESTIMATION OF METHYLDOPA AND HYDROCHLOROTHIAZIDE IN COMBINE DOSAGE FORM

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Nanded Pharmacy College, Nanded-431606, Maharastra, India.

Abstract:

The aim of this work was to develop validate a dissolution test for Methyldopa and Hydrochlorothiazide in combination tablets using spectrophotometric method. The dissolution established conditions were 900 mL of 0.1M HCl pH 1.0 as dissolution medium, using a paddle apparatus at a stirring rate of 50 rpm. The drug release was evaluated by UV spectrophotometric method the areas of solution were recorded at 274-284 nm and266-276 nm for Methyldopa *and Hydrochlorothiazide respectively. It can be concluded that the method developed consists in an efficient alternative for assay of dissolution for tablets. The method was validated to meet requirements for a global regulatory filing which includes linearity, precision, accuracy robustness and ruggedness. In addition, filter suitability and drug stability in medium were demonstrated*

Keywords: *In vitro release, Stability, Dissolution study of methyldopa and Hydrochlorothiazide, Spectrophotometry, Area under curve method, Validation.*

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QR code

Please cite this article in press as Hajera N. Khan et al. ***Stabity Indicating Dissolution Method Development for Estimation of Methyldopa and Hydrochlorothiazide in Combine Dosage Form,*** *Indo Am. J. P. Sci, 2017; 4(09).*

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Vishnupuri, Nanded-06.

JOURNAL OF PHARMACEUTICAL SCIENCE AND BIOSCIENTIFIC RESEARCH (JPSBR)

(An International Peer Reviewed Pharmaceutical Journal that Encourages Innovation and Creativities)

Area Under Curve Spectrophotometric Method for Determination of Finasteride in Pharmaceutical Formulation

S.S. Gaikwad*, H.N. Khan, Mohammad Zameeruddin, V. B. Bharkad

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Article history:

Received 14 July 2017
Revised 16 November 2017
Accepted 17 November 2017
Available online 01 Dec 2017

Citation:

Gaikwad S. S., KhanH. N., Zameeruddin M., Bharkad V. B. Area Under Curve Spectrophotometric Method for Determination of Finasteride in Pharmaceutical Formulation **J Pharm Sci Bioscientific Res.** 2017. 7(5):310-313

**For Correspondence:*
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Department of Quality Assurance, SSS Indira college of Pharmacy, Vishnupuri, Nanded, Maharashtra, India.

(www.jpsbr.org)

ABSTRACT:

A simple, accurate and precise Area Under Curve spectrophotometric method was developed for determination of Finasteride in pharmaceutical dosage form. This method involves the calculation of integrated value of absorbance with respect to the wave-length between two selected wavelengths. The area selected between 210-220 nm for the determination of Finasteride. The drug follows Beer-Lambert's law over the concentration range of 2-10 µg/ml for Finasteride. The % estimation of the drug 99.546% representing the accuracy of the method. The recovery of Finasteride found near to 99.68. The validation of the proposed method was carried out for its accuracy, precision, limit of detection and limit of quantitation according to ICH guidelines. The proposed methods can be successfully applied in routine work for the determination of Finasteride in its pharmaceutical dosage form.

KEY WORDS: Spectroscopy, Area under curve,Methanol, Dimethyl Sulfoxide (DMSO), Finasteride, validation.

INTRODUCTION:

Finasteridechemically is 17β-(N-tert-butylcarbamoyl)-4-aza-5α-androst-1-en-3-one (Figure. 1).It is white in colour and crystalline powder. The molecular weight of Finasteride is 372.6g/ml and molecular formula is $C_{23}H_{36}N_2O_2$.[1]. It is competitive inhibitor of enzyme 5α-reductase which converts testosterone responsible for androgen action in tissues including prostate gland and hair follicles. Finasteride is antiandrogenicdrug and also found effectively in male baldness. It is effective orally,metabolized in liver and excreted in urine faeces.[2]Literature survey revealed UV ,HPLC and UPLC analytical methods for its estimation.[3-17] The validation of the proposedmethod was carried out by ICH guidelines.[18]

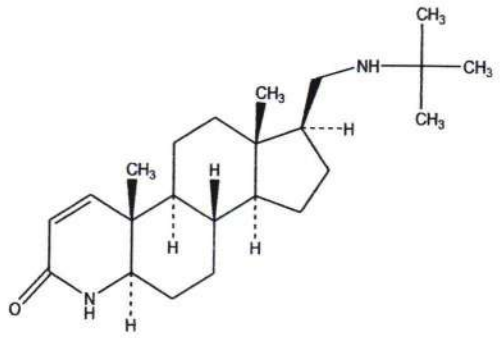

Figure 1: Chemical structure of Finasteride

MATERIAL AND METHODS:

Chemical:

A standard sample ofFinasteride was obtained as gift from Cipla Ltd. Mumbai, Maharashtra. FINAST 5mg tablet was