

CONTENT

REVIEW ARTICLE

- **PAT: A New Weapon for Pharmaceutical Industry**

Mitesh D Phale.....611

ABSTRACT

The quality of drugs governs by modern analytical tools. The pharmaceutical industry is based around innovation. But rigid regulatory system is unfavorable to innovation. Process Analytical Technology (PAT) emerged as a solution to this.

US FDA has introduced PAT for robust and efficient manufacturing in pharmaceutical industry. PAT includes chemical, physical, microbiological, mathematical and risk analysis conducted in an integrated manner. Multivariate tools are used in PAT for design, data acquisition and analysis.

With the help of advanced instrumentation, PAT is not only managing to have better manufacturing but also reduces the time, efforts and cost of the process.

The sharp features of the PAT enable continuous quality improvement. PAT has the potential to deliver significant shift in the economics of the pharmaceutical sector.

KEYWORDS: PAT, Process Analytical Technology, Process analyzers, multivariate methodology, Process control tools

- **Future of Cancer Therapy-COX-2 Inhibitors: A Review**

Bhasker. S, Sandeep. G and Ranganath YS.....617

ABSTRACT

Cyclooxygenases (COX) are the principle enzymes involved in the metabolism of arachidonic acid generating prostaglandins which are the genuine mediators of inflammation and pain. COX are classified into Type-1 and Type-2 which are constitutive and inducible respectively. Recent research has brought into light the possible role of these PGs in the COX-2 cascade of tumor proliferation, angiogenesis and metastasis with significant overexpression. Thus COX-2 can serve as a useful biomarker in the early diagnosis and can be selectively targeted in the tumour cells with greater proven safety. The review deals with the potential role of COX-2 inhibitors in canceling the PG mediated Signaling, the role of COX-2 in different types of cancers. (Lung, Head and Neck, Bladder, Cervical Cancer and Other Oncology applications), the beneficial outcomes of combination therapy of COX-2 inhibitors along with either chemotherapy or radiotherapy. In conclusion a note on future research options for treating neuroblastomas with COX-2 inhibitors was elucidated.

KEYWORDS: Cyclooxygenases, Prostaglandins, cancer, angiogenesis and over expression.

• **Significance of Stability Studies on Degradation Product**

Poonam Kushwaha.....621

ABSTRACT

Drug degradation in formulations is a very complex and often unpredictable process. Degradation products arise during manufacture and storage of formulation. Common degradation products are derived from oxidation (by air, light, trace metal), hydrolysis, dehydration, adduct formation, dimerization, rearrangement, excipient reaction, and often the combination of these processes. For ensuring the stability of drug products over entire self life, various regulatory authorities requires, the stability data must be submitted with the NDA or ANDA. ICH and various other regulatory authorities have published guidelines on stability studies. Stress testing and stability indicating assays are also conducted to obtain stability data.

KEYWORDS: degradation product; degradation mechanism; stability studies; stress testing; stability indicating assay.

• **Oligomeric Proanthocyanidines: Grape Seed Extract**

RK Mohamed Mutahar,,BM Dinesh, and Vinod Kumar.....628

ABSTRACT

Proanthocyanidins (PCs) are a class of phenolic compounds that take the form of oligomers or polymers of polyhydroxy flavan-3-ol units. The (PCs) are an integral part of the human diet, and are found in high concentrations in Grape seed extract (GSE). Oligomeric Proanthocyanidins (OPCs) are the most abundant polyphenolic substances found in GSE. From the point of view of OPCs potential protective action towards cardiovascular disease and the oxygen free radical scavenger capacity, it has attracted considerable attention of the international scientific community during the last thirty years. The purpose of this article is to give a lucid explanation of the Structure, Monograph and Biological properties, and also shed a light on both the laboratory and clinical research of the OPCs obtained from GSE, and making them a potentially valuable therapeutic tool for the treatment of a variety of ill health conditions.

KEYWORDS: Flavonoid, Grape seed extract, Oligomeric Proanthocyanidins, Polyphenols,

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MH Deghan, Varsha M Gaikwad and Baby Dandge.....634

ABSTRACT

The large surface area of the nasal mucosa offers a rapid onset of therapeutic effect, potential for direct to central nervous system delivery; no first pass metabolism and non invasiveness all of these maximize patient convenience, comfort and compliance. Interest in intranasal administration as a non invasive route of drug delivery continues to grow rapidly. Although there is an increasing need to identify novel approaches by which to improve the efficacy of drug transport from nasal cavity. For this, it is necessary to know about the mechanism of the nasal absorption, factors affecting absorption and what are the strategies that will help to improve the nasal absorption of the drug.

KEYWORDS:

• **Isotachopheresis: A Technique of Electrophoresis for the Separation of Charged Particles**

Shobhit Shrivastava, Ashish Jain, Sushil Mhaske and Satish Nayak.....642

ABSTRACT

An overview mapping recent trends in the isotachopheresis technique, for separation and analysis of wide range of bioactive. Isotachopheresis utilizes electro-separation technique, which is generally based on the electro-kinetic phenomenon. In Isotachopheresis the separation occurs according to difference in ions motilities. An overview focused on technique used, instrumentation, advantages in isotachopheresis. It also comprises diverse researches that have been done by the isotachopheresis.

KEYWORDS: Isotachopheresis, Electrophoresis, Separation Technique

- **Quality Education in Pharmacy: Need of 21st Century**

Bharti D Shewale, Pravin O Patil, Satish B Kosalge, Ravindra A Fursule, Nidhi P Sapkal.....648

ABSTRACT

Pharmacy has suffered from a fractionated vision of the profession due to the conflicting perspectives of different practitioner groups. Although a unified vision for all segments of the profession likely will occur with time, the changes in pharmaceutical education and in the health care and pharmaceutical industries are focusing pharmacists' efforts on utilizing their advanced pharmacologic knowledge to build pharmacy profession. The expansion and improvement of pharmaceutical education include collaboration with other health care professionals improve patient outcomes and to control spiraling pharmaceutical and health care costs. The increased use of automation and the emphasis on the value of the pharmacist's unique knowledge and skills are other factors that may result in expansion of pharmacists' roles. The future health care environment may hold many opportunities for pharmacists if the leadership and management of the profession can respond quickly to focus the profession's efforts on improving patients' drug therapy outcomes.

KEYWORDS: Education, Professionals, Pharmacy

- **Buccal Drug Delivery System – An Overview**

M Alagusundaram, C Madhusudhana Chetty, K Umasankari, P Anitha, K Gnanprakash and D Dhachinamoorthi.....653

ABSTRACT

The oral cavity has long been a site for mucosal and transmucosal delivery of drugs via Buccal route. However, as Buccal delivery, because of its undeniable advantages, has become popular for systemic drug delivery and prolonged well controlled release has been identified as beneficial, especially for chronic diseases. The buccal mucosa offers an alternative route to conventional, parenteral administration. It associated with buccal drug delivery have rendered this route of administration useful for a variety of drugs. The strategies to overcome the main obstacles that drugs meet when administered via the buccal route include the employment of new materials that, possibly, combine mucoadhesive, enzyme inhibitory and penetration enhancer properties. Buccal mucosa offers innovative drug delivery systems which, besides improving patient compliance, favor a more intimate contact of the drug with the rapid buccal absorption in mucosa. Developing a dosage form with the optimum pharmacokinetics is a promising area for continued research. With the right dosage form design, local environment of the mucosa can be controlled and manipulated in order to optimize the rate of drug dissolution and permeation. Further, these dosage forms are self administrable, cheap and have superior patient compliance.

KEYWORDS: Buccal delivery, Transmucosal delivery, Controlled release, Patient compliance.

- **An Overview on Designing of Multilayered Matrix Tablets**

Bendgude Namdeo and Poddar Sushilkumar.....664

ABSTRACT:

Development of oral controlled release tablets for highly water-soluble drugs with the maintenance of a predetermined constant drug release rate has always been a challenge to pharmaceutical technologist. The variety of versatile controlled release layered matrix system have been reported to achieve zero-order or near zero-order release profiles with each individual layer of the matrix possibly exhibiting a different release mechanism for example, first layer swellable, second layer erodible, and third disintegrating. Simply by changing the position of layers strategically it is possible to modify the drug release kinetics. Introduction of barrier-inert layers (either hydrophobic or hydrophilic) on both faces of tablet is one of the smart techniques to modulate the drug release of conventional matrix tablets. Barrier layers keep the core layer away from its interaction with dissolution medium; as a result release rate retarded due to an increase in diffusional resistance and/or a decrease in effective area at the diffusion front. By the continuous diffusion of drug from core layer to barrier layer diffusional length is increased, improving the probability

of continuous constant rate release. Current article focuses on design and development of such multi-layered devices and their industrial applicability by replacing earlier used different geometries and diverse coated systems for controlled release formulations.

KEYWORDS: Multi-layered, sandwiched, compression coated sustained release, extended release, zero-order release.

- **Natural Anticonvulsants: A Review**

Surendra Nath Pandeya, Rajeev Kumar and Ashish Kumar Pathak.....670

ABSTRACT

Epilepsy is a neurological disorder affecting a large scale of the population, which accounts for about 1% of the world's burden of diseases. A large number of agents called antiepileptic drugs are available to treat various types of seizures with the objective to reduce seizure frequency and severity within a framework of an acceptable level of side effects. There are number of drugs available for treatment of epilepsy in modern therapy. But the major disadvantage being faced is their chronic side effects. Treatment of epilepsy with herbal drugs as adjuvant seems to be more beneficial and is gaining more popularity due to their fewer side effects. Herbal drugs are acting at target site having same mechanism of action as that of synthetic drugs. There is still a need for new antiepileptic drugs (AEDs), may be derived from natural sources, as the clinical efficacy tolerability, toxicity properties of existing synthetic AEDs may not be satisfactory. This review focuses on the use of natural products for control of epilepsy.

KEYWORDS: Natural AEDs, Herbal anticonvulsants.

RESEARCH ARTICLE

- **Preparation and Evaluation of Microspheres of Rifabutin using Eudragit Polymers**

Nighute A B and Bhise S B.....680

ABSTRACT

The objective of the present study was to foster the photo-stability of rifabutin, an antitubercular drug, with a sustained drug release by preparation of microspheres using eudragit polymers. Rifabutin (log p 4.218) is spiroiridyl-rifamycin derivative with low aqueous solubility. Microspheres of rifabutin were prepared by emulsion solvent diffusion process using eudragit RL PO and RS PO polymers. Microspheres were screened for dissolution, photo-stability, SEM, XRD pattern, DSC, accelerated stability, moisture uptake and flow properties. Release of the drug from these polymeric microspheres was sustained up to 12 hrs. SEM analysis confirmed spherical shape of the microspheres, while XRD and DSC graphs confirmed amorphous nature of the untreated drug and prepared microspheres. Photo and accelerated stability of the drug entrapped in microspheres was found to be improved, whereas the flow properties of the microspheres were fair to pass the test.

KEYWORDS: Rifabutin, Eudragit, Emulsion solvent diffusion

- **Formulation, Characterization and in vitro Evaluation of Methotrexate Solid Lipid Nanoparticles**

Jameel Ahmed Mulla, Sarasija Suresh and Imtiyaz Ahmed Khazi.....685

ABSTRACT

Solid lipid nanoparticles (SLNs) of methotrexate were produced by microemulsion method in an acidic aqueous system. The SLNs were composed of low melting fatty acid (glyceryl monostearate), surfactants (Egg lecithin and tween 80) and water. All the formulations were subjected to particle size analysis, zeta potential, drug entrapment efficiency and in vitro release studies. The SLNs formed were in nano-size range with maximum entrapment efficiency. Formulation with 253 nm in particle size and 85.12% of drug entrapment was subjected to scanning electron microscopy (SEM) for surface morphology, differential scanning calorimetry (DSC) for thermal analysis and short term stability studies. SEM confirms that the

SLNs are circular in shape. The drug release behavior from SLN suspension exhibited biphasic pattern with an initial burst and prolonged release over 24 h.

KEYWORDS: Solid lipid nanoparticles (SLNs) • Methotrexate (MTx) • Particle size analysis • Entrapment efficiency • In vitro release study

- **Mitochondrial Anti-Oxidant Enzymes Caused by Cigarette Smoke in Experimental Wistar Rat**

Adesh Upadhyay, Arun Mishra, Sachin Chaudhury and Pronobesh Chattopadhyay.....690

ABSTRACT

Cigarette smoking not only cause physiological damage to respiratory tract but also contributes to cardiovascular disease progression and to pathophysiological development of larynx, oral cavity, esophagus, pancreases, kidney, stomach, liver, and leukemia and colon cancer due depletion anti-oxidant enzymes. Wistar rats were divided into sham-operated control Group (I) ($n = 6$), Smoking group, exposed for 60 minutes every day in an inhalation chamber (10 liters) for the two week (14 days) Group (II) ($n = 6$). After sacrifice animals lung were removed and mitochondria were isolated. Mitochondrial antioxidant marker enzymes viz. Reduced Glutathione, Superoxide Dismutase and Catalase were measured and pathological changes were measured by histopathology. Smoking group was showed the depletion of anti-oxidant enzymes and severe degeneration of lung cells as compared to sham operated control rats.

KEYWORDS: Cigarette smoking, Mitochondria, Antioxidant Enzymes

- **Simultaneous RP-HPLC Method for Estimation of Metformin Hydrochloride and Fenofibrate in Synthetic Mixture**

Lata Kothapalli, Shivaji Mare, Veeren Dewoolkar, Anupam Banerjee, Asha Thomas, RK Nanda and AD Deshpande.....694

ABSTRACT

The proposed method is a simple, accurate, precise, specific and rapid method for the simultaneous estimation of Metformin hydrochloride and Fenofibrate in bulk and synthetic mixture using C18 column (Kromosil, 4.6mm x 25 cm, 5 μ m) with Acetonitrile: 0.02 M Ammonium acetate buffer (80: 20 v/v) as a mobile phase, at a flow rate of 1.0 ml/min and detection was done at 249.0 nm. The retention time for metformin hydrochloride and fenofibrate was found to be 2.63 \pm 0.011 and 9.26 \pm 0.017 min. respectively. Linearity of metformin hydrochloride and fenofibrate were found in the range of 5–50 μ g/ml and 0.8-8.0 μ g/ml respectively. The percentage assay of metformin hydrochloride and fenofibrate was found between 98% to 102%. The statistical parameters were found satisfactory.

KEYWORDS: Metformin hydrochloride (MET), Fenofibrate (FNB), RP-HPLC

- **Effect of Casting Solvent on Permeability of Antihypertensive Drugs through Cellulose Acetate Films**

N Narasimharao, P Srinivasa Babu, V Sai Kishore and TE Gopala krishna murthy.....698

ABSTRACT

In the present work, Cellulose acetate films were prepared and evaluated as rate controlling membrane for transdermal drug delivery systems. Acetone-methanol (8:2), chloroform-methanol (8:2), dichloromethane-methanol (8:2) and ethyl acetate-methanol (8:2) were used as solvents in the preparation of films. Dibutyl phthalate at a concentration of 40% w/w of the polymer was used as a plasticizer in the preparation films. The solvent evaporation technique was found to be giving thin uniform films. The dry films were evaluated for Physical appearance, Thickness uniformity, Folding endurance, Water Vapour Transmission, Drug diffusion and Permeability Coefficient. Both Water vapour transmission and Drug diffusion rate followed zero order kinetics. The mechanism of drug release was governed by peppas model. The diffusion exponent of release profiles (slope) has a value of $n > 1$, which indicates non anomalous transport diffusion. The results

obtained in the present study thus indicated that the solvents used in the preparation of films have been shown significant influence on the water vapour transmission, drug diffusion and permeability of the films. Cellulose acetate films employed with ethyl acetate:methanol in 8:2 ratio as casting solvent shown high Permeability when compared to other films for both drugs .

KEYWORDS: Solvents, Water Vapour Transmission, Drug diffusion and Permeability Coefficient.

- **Reverse Phase - High Performance Liquid Chromatography Method for the Analysis of Paracetamol**

Abhishek K Jain, C. P. Jain and Anshu Sharma.....701

ABSTRACT

An accurate, simple, reproducible and sensitive method for the determination of paracetamol was developed and validated. Paracetamol was identified using a , Microsorb-MV 100-5 C18 column (250 x 4.6 mm; North America) by binary gradient elution with a flow rate of 0.5 ml/min. The mobile phase composition was methanol: water (30:70) (v/v) and spectrophotometric detection was carried out at 245 nm. The linear range of determination for paracetamol was 0.816-250 µg/ml. The method was shown to be linear, reproducible, specific and sensitive.

KEYWORDS: Paracetamol, Reverse phase-High performance liquid chromatography, Validation.

- **Natural Gums as Matrix and Coating Material for Colon Specific Drug Delivery**

HK Kunjwani, AM Manikrao, Rajesh KS, Sable VP and NH Indurwade.....705

ABSTRACT

Colon specific matrix and coated tablet of 5-amino salicylic acid were formulated using biodegradable natural gums, Guar gum and Xanthan gum. The drug release behavior of fabricated tablets was investigated. Colon specific matrix tablet containing 200mg of 5- amino salicylic acid using different drug gum ratio of guar gum and Xanthan gum were prepared by wet granulation method. Formulations were optimized on the basis of acceptable tablet properties like hardness, friability, weight uniformity and in vitro drug release. In vitro dissolution studies were done in presence of fresh human feces for microbial degradation of gums. Results of in vitro dissolution studies indicated that matrix tablet containing 20 % guar gum was most successful showing better drug release profile. Xanthan gum when combined with guar gum further retards drug release.

KEYWORDS: colon specific drug delivery, biodegradable gums, matrix tablet, and inflammatory bowel diseases

- **Preparation and In-Vitro Characterization of Diclofenac Sodium Niosomes for Ocular Use**

Karthikeyan D and Pandey VP.....710

ABSTRACT

Drugs are commonly applied to the eye for a localized action on the surface or in the interior of the eye. A major problem in ocular therapeutics is the attainment of an optimal drug concentration at the site of action. Poor bioavailability of drugs from diclofenac sodium ocular dosage form is mainly due to the precorneal loss factors which include tear dynamics, non-productive absorption, transient residence time in the cul-de-sac, and the relative impermeability of the corneal epithelial membrane. Niosomes have been reported as a possible approach to improve the low corneal penetration and bioavailability characteristics shown by conventional ophthalmic vesicles. In the present study, the nonionic surfactant vesicles were prepared by lipid film hydration method using span 60 and cholesterol with various molar ratios and characterized for entrapment efficiency, in-vitro drug release study, surface charge, rheological character and physical stability. The span 60: cholesterol in molar ratio of 100:60 showed higher entrapment of drug and released 77.34 % ± 1.04 at 10th h. Study may be concluded that the non-ionic surfactant vesicles formulated with span 60: cholesterol in a molar ratio of 100:60 showed potential approach to improve the ocular bioavailability of diclofenac sodium for the prolonged period of time.

KEYWORDS: Diclofenac sodium, Niosomes, Ocular delivery and Non-ionic surfactant vesicles.

• **Antimicrobial Evaluation of Lipid Extract of Pongamia pinnata Leaves**

Sumathi R, Pavni S. and Sivakumar T.....714

ABSTRACT

The aim of the present study was to evaluate the antimicrobial activity of selected plant *Pongamia pinnata* used in ancient days for the treatment of so many skin diseases. Surface lipids of the selected plant were extracted using chloroform. The crude lipid extract was subjected to column chromatography, by using different solvents pentane, 1% ethyl acetate in hexane, 5% ethyl acetate in hexane, chloroform, methanol yielding five fractions from the crude lipid extract. These fractions were tested against bacterial and fungal strains using agar cup bioassay method and broth dilution method. *Bacillus subtilis*, *Bacillus sphearicus*, *Staphylococcus aureus*, *Staphylococcus epidermis*, *Escheritia coli*, *Pseudomonas aerogenosa*, *Klebsella pneumoniae*, *Candida albicans*, *Candida rugosa*, *Sacharomyces cerevisiae*, *Aspergillus niger*, *Aspergillus flavus* were the 12 microbial strains used for the in vitro antimicrobial study. Pentane and 1% ethyl acetate in hexane fractions showed no activity on all microbial strains except *S.epidermidis* where as all other fractions showed moderate activity on all microbial strains except *E.coli* and *B.subtilis*. All the fractions showed greatest activity against *S.epidermidis*. In case of antifungal assay, pentane and 1% ethyl acetate fractions showed no activity on all fungal strains, where as rest of the fractions showed moderate activity on all fungal strains. This study supports the selected plant showed encouraging results, as it found to contain substances that had antimicrobial activity because of, the isolated compounds of *Pongamia pinnata* were active against 10 out of 12 microbial strains.

KEYWORDS: Surface lipids, *Pongamia pinnata*, Antibacterial activity, Antifungal activity.

• **Formulation and Evaluation of the Suspending Properties of Leucaena latisiliqua Gum on Acetaminophen Suspension**

V Senthil, R Suresh Kumar, D Nagasamy Venkatesh, GNK Ganesh, N Jawahar and MK Samanta.....719

ABSTRACT

A pharmaceutical suspension, like other disperse systems, is thermodynamically unstable and therefore it is necessary to include in the dosage form, a stabilizer or suspending agent which reduces the rate of settling and permits easy to redispersion of any settled particulate matter both by protective colloidal action and by increasing the consistency of the suspending medium. Natural gum collected from dried pods of *Leucaena latisiliqua*, and using as a suspending agent at different concentration in acetaminophen suspension. Different evaluation tests were carried out and reported. Due to high viscosity of *Leucaena latisiliqua* gum had the strongest suspending ability, (the suspending ability of all the materials was found to be in the order: *Leucaena latisiliqua* > compound tragacanth gum > acacia gum and act as a stabilizer. It can also serve as a good thickening agent as compared to other materials.

KEYWORDS: *Leucaena latisiliqua*, suspending agents, sedimentation volume, Rheology, particle size.

• **Simultaneous Spectrophotometric Estimation of Valsartan and Hydrochlorothiazide in Tablet Formulations**

Choudhari GB, Kalyane NV, Karjagi SR and Zambare YB.....723

ABSTRACT

A simple, precise and economical procedure for the simultaneous estimation of Valsartan (VAL) and Hydrochlorothiazide (HCT) in tablet formulation have been developed. VAL is a antihypertensive drug belonging to the family of angiotensin II receptor antagonists and HCT is one of the oldest thiazide diuretics. The oral administration of VAL with HCT has been found to be more effective than either drug alone in the treatment of hypertension in patients whose blood pressure is not adequately controlled by monotherapy. The present method involves the solving of simultaneous equations (Vierodt's method).VAL has absorbance maxima at 250nm in methanol and HCT has absorbance maxima at 271nm in methanol. Both these drugs

obey Beer's law in the concentration range employed for the present method. The result of analysis has been validated statistically by recovery studies. The slope and intercept for VAL were 0.0265 and -0.003 and for HCT were 0.0571 and -0.0214 respectively as determined by the method of least squares. The results were found satisfactory and reproducible. The method was applied successfully for the estimation of VAL and HCT simultaneously in tablet dosage form without the interference of common excipients.

KEYWORDS: Valsartan, Hydrochlorothiazide, Vierodt's method.

- **Extractive Spectrophotometric Determination of Clopidogrel Bisulphite In Pharmaceutical Formulation**

M Padmalatha and K Vanitha Prakash.....727

ABSTRACT

Three simple, economical, precise, reliable and reproducible visible spectrophotometric methods (A, B and C) have been developed for the estimation of Clopidogrel bisulphite in bulk as well as in Tablet formulation. The developed methods A, B and C are based on the formation of chloroform extractable complex of Clopidogrel bisulphite with Bromothymol Blue (Method A), Orange II (Method B), and Metanil yellow (Method C) which shows absorbance maxima at 440 nm, 490 nm and 410 nm respectively. The absorbance-concentration plot is linear over the range of 2.5-25 mcg/ml for Method A, and 2.5-20 mg/ml for Method B and 2.5-15 mcg/ml for Method C. The different experimental parameters affecting the development and stability were studied carefully and optimized. Results of analysis for all the methods were validated statistically and by recovery studies.

KEYWORDS: Clopidogrel bisulphite, Bromothymol Blue, Orange II, Metanil yellow, Ultraviolet-Visible double beam spectrophotometer.

- **Estimation of Diltiazem Hydrochloride from Tablet Formulation Using Spectrophotometric Methods**

Nagasuri Ravindra, Singhvi Indrajeet and Pillai Sujit.....730

ABSTRACT

Three simple and sensitive visible spectrophotometric methods have been developed for the quantitative estimation of diltiazem hydrochloride (DITZ) from tablet dosage form. The developed methods are based on formation chloroform extractable colored complex of drug with metanil yellow (MY, method A), tropaeolin 000 (TRP, method B) and alizarin red (AR, method C). The colored complex formed in method A, B, and C showed absorbance maxima at 405.5, 484.5 and 426.0 nm and linearity was observed in the concentration range of 3-24 µg/ml, 3-24 µg/ml and 10-80 µg/ml of DITZ respectively. The results obtained were statistically validated and were found to be reproducible.

KEYWORDS: Diltiazem hydrochloride, Tablets, Spectrophotometric method.

- **Development, In vitro Evaluation and Method selection for Preparation of Mucoadhesive Microcapsule for Oral delivery of Famotidine**

Nayak Bhabani Shankar, Ghosh Sunil Kumar, Nayak Udaya Kumar, Patro K. Balakrishna and Patro K. Tripati Balaji.....732

ABSTRACT

The present study concerns with the preparation, evaluation and selection of a suitable method for the preparation of famotidine incorporated microcapsules using carbopol-934 as rate controlling polymer. Microcapsules were prepared from various methods, namely modified ionic gelation method (F1), emulsification-internal gelation method (F2), emulsification gelation method (F3), extrusion method (F4), emulsification-ionic gelation method (F5), emulsion-evaporation method (F6), ionotropic gelation method (F7), coacervation phase separation method (F8) and complex emulsion method (F9). The prepared microcapsules were evaluated for parameters such as percentage yield, particle size measurement, drug

content estimation, drug entrapment efficiency, surface morphology study by scanning electron microscopy, sphericity determination, loose surface crystal study, percentage of moisture loss, *in vitro* drug release profile, *in vitro* drug release kinetic study, *in-vitro* mucoadhesion wash off test and accelerated stability studies. The famotidine microcapsules thus obtained were with good structure, satisfactory yield and high entrapment efficiency. Microcapsules exhibited slow release of famotidine over 9 hours with zero order release kinetic fashion. Among all the methods, ionotropic gelation method (F7) was most successful method in sustaining the release of famotidine in a controlled fashion from carbopol-934 microcapsules, which could be a novel trend for effective management of peptic ulcer. All data were verified statistically by employing one way ANOVA and found to be significant at 5 % level of significance.

KEYWORDS: Swelling index, sphericity, ionotropic gelation, mucoadhesion.

- **Phyto-Physico Chemical Investigation, Anti-inflammatory and Antimicrobial Activities of *Polianthes tuberosa* Linn**

J Ramamoorthy, S Venkataraman, R Meera, N Chidambaranathan and P Devi Devisree.....738

ABSTRACT

The leaves of the plant *Polianthes tuberosa* were extracted with petroleum ether and ethanol by soxhlet extraction. The extracts were vacuum dried and subjected to anti inflammatory and anti microbial activities. Anti inflammatory activity by carrageenan induced paw edema method and antimicrobial activity was evaluated by disc diffusion method. The anti inflammatory activity at those levels of 200 mg/kg and compared to standard drug Diclofenac sodium. The activity results were found to be significant ($p < 0.01$) against control. The crude ethanolic extracts (EEPT) inhibited the growth of Gram positive bacteria (*Bacillus subtilis*, *Staphylococcus aureus*, *Micrococcus luteus*) and Gram negative bacteria (*Escherichia coli*, *Pseudomonas aureginosa* and *Salmonella typhi*). The Gram positive bacteria tested appeared to be more susceptible to the extracts than the Gram negative bacteria. Both the extracts at the concentration range 100, 250 and 500 µg/ml disc showed inhibitory activity against all tested bacteria. The extracts also showed significant antifungal activity against *Aspergillus niger*, *Candida albicans*. All tested microorganisms showed dose dependent susceptibility towards the ethanol extracts. The antibacterial and antifungal activity of the extracts and standard drugs were statistically significant. Based on the current findings it can be concluded that the plant possess potent antimicrobial and anti inflammatory activity.

KEYWORDS: *Polianthes tuberosa*, Anti microbial, Anti inflammatory, Phyto chemical investigation

- **Simultaneous Estimation of Montelukast Sodium and Levocetirizine Hydrochloride from Tablet Dosage Form**

ASK Sankar, GN Baskar, D Nagavalli, K Anandakumar and T Vetrichelvan.....743

ABSTRACT

Three simple, accurate, economical and reproducible UV-Spectrophotometric methods for simultaneous estimation of Montelukast sodium (MK) and Levocetirizine hydrochloride (LC) from combined tablet dosage form have been developed and validated. First method uses absorbance correction principle using 287 and 232 nm, in which at 287nm LC has no absorbance. Second method uses multi wavelength, the wavelengths selected for estimation of MK were 232.2 and 229 nm where LC shows same absorbance. A third wavelength, 232 nm was selected for estimation of LC by applying absorbance correction principle. Third method was developed making use of first order derivative spectrophotometry 231.1 nm (Zero crossing point for LC) is utilized for estimation of MK and 216.5 nm (zero crossing point for MK) for estimation of LC.

KEYWORDS: Absorbance correction method, first derivative spectrophotometry, multi wavelength spectrophotometry, montelukast sodium, levocetirizine hydrochloride.

- **A Validated High Performance Thin Layer Chromatographic Method for Simultaneous Estimation of Nebivolol Hydrochloride and Valsartan in Pharmaceutical Dosage Form**

Shradhanjali M Singh, Kirti S Topagi, and Mrinalini C Damle.....746

ABSTRACT

A simple, accurate and precise high performance thin layer chromatographic method has been developed for the estimation of Valsartan and Nebivolol hydrochloride simultaneously from a tablet dosage form. The method employed silica gel 60 F₂₅₄ precoated plates as stationary phase and a mixture of Ethyl acetate: Methanol: Ammonia (6.5:2.5:0.5 %v/v/v) as mobile phase. Densitometric scanning was performed at 280 nm using Camag TLC scanner 3. Beer's law was obeyed in the concentration range of 800ng/spot-2400ng/spot for Nebivolol hydrochloride and 200ng/spot-1000ng/spot for Valsartan. The Retention factors for Nebivolol hydrochloride is 0.75 ± 0.04 and for Valsartan is 0.27 ± 0.01 . The method was validated as per ICH Guidelines, proving its utility in estimation of Valsartan and Nebivolol hydrochloride in combined dosage form.

KEYWORDS:

- **A Validated RP-HPLC Method for Simultaneous Determination of Ramipril and Valsartan in Pharmaceutical Formulation**

Shradhanjali M Singh, Kirti S Topagi, and Mrinalini C Damle.....749

ABSTRACT

A simple, fast, accurate and precise method has been developed for the simultaneous determination of Ramipril and Valsartan from pharmaceutical formulation by reverse phase high performance liquid chromatography (RP-HPLC). The separation was carried out on Hypersil gold CN column using Acetonitrile and Water [pH adjusted to 3.0 with Orthophosphoric acid (0.08%)] in the ratio (70:30v/v). The retention times of Ramipril and Valsartan were 5.08 ± 0.02 and 3.68 ± 0.02 minutes respectively. The developed method was validated as per ICH Guidelines.

KEYWORDS: Ramipril, Valsartan, RP-HPLC, Validation.

- **Formulation Development of Tramadol Hydrochloride Rapid-disintegrating Tablets Using Simplex Lattice Design**

Vinit B Ekshinge and Kevin C Garala.....753

ABSTRACT

The effect of a mixture of super disintegrants on the disintegration time and in vitro drug release rate was studied. In this study, an attempt had been made to prepare rapid disintegrating tablets of the drug using different super disintegrants following wet granulation method. The sodium starch glycolate, cross carmellose sodium and pregelatinized starch (Starch 1500[®]) were used in different concentration according to the simplex lattice design as the super disintegrants. The tablets were evaluated for diameter, thickness, hardness, friability, weight variation, wetting time, percentage of water absorption, disintegration time and in vitro dissolution studies. The disintegration time of all formulation showed less than 75 seconds. The formulation F4 showed low disintegration time that is 14 seconds and the percentage drug release was 97.33 within 10 minutes. The tablets containing equal quantity of Starch 1500[®] and cross carmellose sodium showed lowest disintegration time than other formulation containing Starch 1500[®], cross carmellose sodium and sodium starch glycolate in various proportions shown in Table-1.

KEYWORDS: Tramadol hydrochloride, Simplex lattice design, Super disintegrants, Spray drying.

- **Design and Characterization of Extended Release Ranolazine Matrix Tablet**

Bawankar DL, Deshmane SV, More SM, Channawar MA, Chandewar AV and Shreekanth J.....756

ABSTRACT

The objective of present investigation was to develop an extended release matrix tablet for Ranolazine in the treatment of chronic angina pectoris using wet granulation technology. HPMC E 15, EC, HPMC phthalate and different Eudragit grades form release layer. All lubricated formulation was compressed using 16.5 x 8mm oval shaped punches. Compressed tablets were evaluated for uniformity of weight, content of active

ingredients, friability, hardness, thickness, invitro dissolution using paddle in 0.1 N HCl at 50 rpm for 24 hrs study. All the formulation showed compliance with pharmacopoeial standards. The batch number (F8) showed extended release of drug according to USP limits. Selected formulation (F8) was subjected to stability studies for three months at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and 75% RH and showed stability with respect to release pattern. The kinetic treatment showed that lease of drug follows diffusion release and Higuchi model. The result of current study clearly indicate, a promising potential of Ranolazine extended release 500 mg tablets as an alternative to conventional dosage form.

KEYWORDS: Extended release, matrix tablet, ranolazine, and Angina pectoris.

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- **Preparation and In vitro Evaluation of Buccoadhesive Tablets of Carvedilol Using Dried Mucilage Powder of *Aegle marmelose***

Nath Bipul, Nath LK and Kumar PY.....762

ABSTRACT

The purpose of this research was to develop and evaluate buccal mucoadhesive tablets of Carvedilol using dried mucilage powder of *Aegle marmelose* as primary mucoadhesive polymer and HPMC, NaCMC as secondary polymers. Carvedilol which undergoes extensive first pass metabolism were used as model drug. Effect of polymer type, proportion and combination was studied on the drug release rate, release mechanism and mucoadhesive strength of the prepared formulations. Buccal mucoadhesive tablets were prepared by direct compression and were characterized for content uniformity, weight variation, friability, surface pH, thickness and mechanism of drug release. Results indicated acceptable physical characteristics of designed tablets with good content uniformity and minimum weight variation. Drug release and mucoadhesive strength were found to depend upon polymer type and its proportion. The formulations prepared using dried mucilage of *Aegle marmelose* gave maximum mucoadhesion, and strength decreases with decrease in its content. The buccoadhesive tablets containing 1:1 ratio of mucilaginous powder and HPMC showed suitable release kinetics, and properties for adhesion to the buccal mucosal surface. The release data seem to fit better with Higuchi model indicating that drug release from the buccoadhesive tablet was diffusion controlled.

KEYWORDS: Mucilage, Carvedilol, first pass effect, buccoadhesive, swelling, Higuchi model.

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- **Development and Quantification Of HPTLC Method for the Estimation of Kutkin in *Picrorrhiza kurroa***

Jadhao M.P, Bhusari KP, Shrikhande BK, Ghormade JM and Shrikhande VN.....768

ABSTRACT

A simple and reproducible high performance thin layer chromatography method was developed and validated for the estimation of kutkin in *Picrorrhiza kurroa* . The stationary phase used was precoated silica gel 60F254. The solvent system of chloroform: methanol (8.5:1.8, v/v) was used as mobile phase. the detection of spot was carried out at 258 nm. the method was validated in terms of linearity, accuracy, precision and specificity. The linearity was observed in the range of 480-1440 ng. The Kutkin content of 246.90 μg per 100mg was observed in the sample. The average percentage recovery value of 98.55% was obtained. The proposed method being precise and sensitive can be used for detection, monitoring and quantification of Kutkin in *Picrorrhiza kurroa*.

KEYWORDS: Validation., *Picrorrhiza kurroa*, Kutkin, HPTLC

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- **Development of Colon Targeted Delivery of Ketoprofen Using Natural Gums as Carrier**

Deshkar Sanjeevani, Talole Kranti , Shirsat Ajinath , Bhalerao Aparna, Shirolkar Satish Padm and DY Patil.....771

ABSTRACT

The aim of present study was to develop colon targeted drug delivery system for Ketoprofen using natural polysaccharides such as guar gum and locust bean gum as carrier. Matrix and compression coated tablets of Ketoprofen were prepared using both the gums. All the formulations were evaluated for the hardness, % drug content, and subjected to in vitro drug release studies. The amount of Ketoprofen released from tablets at different time interval was estimated by UV visible spectrophotometer. Guar gum and locust bean gum matrix tablets released about 60 % and 80 % of the Ketoprofen, respectively, within 5 h of the dissolution study and failed to control the drug release in the physiological environment of stomach and small intestine. The tablets compression coated with 300mg of guar gum and locust bean gum released about 10 % and 4 % of Ketoprofen respectively within 5 h of the dissolution study. When the dissolution study was further continued in presence of rat caecal content medium, there was increase in release of Ketoprofen due to biodegradation of gum coat. The results of the study showed that compression coated Ketoprofen tablets with 300 mg of guar gum coat are most likely to provide targeting of Ketoprofen for local action in the colon owing to its minimal release in the first 5 h. Differential scanning calorimetry indicated no interaction between Ketoprofen and gums.

KEYWORDS: Colon targeted, Ketoprofen, Guar gum, Locust bean gum.

- **Preliminary Phytochemical Screening, Antimicrobial activity and Nutritional Analysis of Methanol Extract of *Asparagus racemosus* (Willd) Roots**

N. Raaman, S. Selvarajan, D. Balakrishnan and G. Balamurugan.....777

ABSTRACT

The roots of the plant *Asparagus racemosus* Willd. was extracted with methanol by soxhlet extraction. The extracts were vacuum dried and subjected to antibacterial (*Staphylococcus aureus*, *Bacillus cereus*, *Escherichia coli* and *Pseudomonas aeruginosa*) and antifungal (*Aspergillus niger* and *Candida albicans*) screened by agar disc diffusion method. Minimum inhibitory concentration required for the cessation of the microbial growth was also evaluated. Preliminary phytochemical screening was performed to identify the different phytoconstituents and nutritional analysis was carried out to evaluate the concentration of nutritive factors. The extract exhibited moderate activity against the bacterial strains but significant activity was noticed against the fungal organisms. Concentrations of various nutritive factors were determined and proved a good source of nutritional supplement.

KEYWORDS: *Asparagus racemosus*, antibacterial, antifungal, Minimum inhibitory concentration, nutritional analysis.

- **Difference Spectroscopy Validated Method Development for Ciprofloxacin in Tablet by UV-Spectrophotometer**

Kumar P, Chaudhary M and Juyal V.....780

ABSTRACT

A simple, specific, precise and accurate Spectrophotometric method was developed for the determination of Ciprofloxacin by Spectrophotometric method in tablet dosage forms. Method was difference spectroscopy in which difference spectra were obtained by measuring the absorbance in acidic solution and basic solution. The drug shows absorption maxima and minima at wavelength 278 and 272 nm in basic and acidic solution respectively. The Method was validated according to ICH Guidelines. Spectrophotometric method linear response obtained was in the concentration range of 2-22 µg/ml with correlation coefficient 0.9993, recovery of the drug was found to be 99.40% and relative standard deviation was found to be less than 2 % for precision studies. The newly developed methods can be used for routine analysis of Ciprofloxacin in tablet dosage forms.

KEYWORDS: Ciprofloxacin, Difference Spectroscopy, Validation.

- **Isolation, Purification, Partial Characterization and Antibacterial Activities of Compound Produced By Some Actinomycetes from Sedimented Waters**

Sumathi R, Saravana kumar A, Rajeswari R and Pavani S.....783

ABSTRACT

The aim of present study was the isolation, purification, partial characterization and antibacterial activities of compound produced by some actinomycetes from sedimented waters. Actinomycetes are gram positive, non motile, non capsulated bacteria that are characterized by the formation of branching filaments. The emergence of pathogenic bacteria which are resistant to multiple antibiotics, represent growing threat to human health and has given additional importance to the search for the newer drugs. Approximately two-thirds of the known secondary metabolites are produced by members of the order actinomycetales. The water samples of the region of Tamilnadu, Uttar Pradesh, and Madhya Pradesh have the capability to produce Actinomycetes. Luria-Bertani agar medium was one of the best medium for the isolation of Actinomycetes from sedimented water. The antibacterial assay of isolated Actinomycetes was carried out against some gram positive and gram negative microorganisms. The cultural characteristics of the isolated strains were studied from the antibacterial assay and the strain ST6 was selected for further study. Fermentation of ST6 was carried out by using synthetic medium 1. The recovery of the fermentation broth was carried by vacuum filtration and centrifugation. Extract of supernatants S1, S2 were carried out by using solvent ethyl acetate, chloroform. The two extracts SAM 1, SAM 11 were recovered. Their antibacterial activity was studied by using E.coli (ATCC 11880), S.aureus (ATCC 29737), S. typhi (ATCC 2356), M.luteus (ATCC 11880). The zone of inhibition was observed. Sam 11 showed good zone of inhibition as compared to SAM 1. The analysis of the two extracts were carried out by the R_f values were found to be as 0.8 (SAM 1), 0.79 (SAM 11). Also from UV and IR studies the SAM 1 and SAM 11 showed the λ_{max} of 230nm and 250nm. The IR spectrum of SAM 1 indicated the functional groups like C=O, C-O, NH, aromatic substituted compound and for SAM 11 indicated the functional groups like C=O, C-O, NH, HX and aromatic substituted compound. The DNA of ST6 was extracted by cell lysis technique and purification was carried out by agarose gel electrophoresis. The DNA bands were separated according to the molecular weight as compared with standard marker DNA.

KEYWORDS: actinomycetes, agarose gel, dna, anti bacterial, anti biotic.

- **Anti-Diabetic Activity of Aqueous Extract of Leaves of Pavonia zeylanica in Rats**

Hepty Kalarani D, Venkatesh P and Dinakar A.....789

ABSTRACT

The hypoglycemic effect of aqueous extract of leaves of *Pavonia zeylanica* (AEPZ) was evaluated in normal, glucose fed and alloxan-induced diabetic rats. Oral administration of extract (200 and 400mg/kg body wt) for 7 days resulted in a significant reduction in blood glucose level. The effect was compared with 0.5gm/kg (I.P) glibenclamide.

KEYWORDS: Pavonia zeylanica, AEPZ, alloxan, hypoglycemic.

- **Preparation of Acyclovir Loaded Non ionic Surfactant Vesicles (Niosomes) Using Reverse Phase Evaporation Technique**

Wafa Mossa Ramadan and Ajay Pal Singh.....793

ABSTRACT

The purpose of this research was to prepare acyclovir (AC) niosomes in a trial to improve its poor and variable oral bioavailability. According to the Biopharmaceutical Classification System (BCS) acyclovir was categorized as a class III drug due to its high solubility and low permeability. Hollow and acyclovir-loaded niosomes were formulated by using reverse phase evaporation technique and evaluated for their morphological characteristics, entrapment efficiency as well as *in-vitro* drug release profile by using membrane of Kukkutandatwak (Shell of Hen's Egg). The non ionic surfactant vesicles were prepared with the lipid mixture consisted of cholesterol and tween 80, in the molar ratio of 7:4, 7:6, and 7:7 respectively. The percentage entrapment efficiency was found to be 14.6%, 17.79%, 27.50% of AC used in the preparation. Most of the niosomes was found to be unilamellar spherical in shape. *In-vitro* drug release profile data revealed that higher concentration of cholesterol is responsible for higher drug entrapment efficiency but same time prolonged the drug release from the niosomes due to stabilization of the niosomes.

Thus niosomal formulation could be a promising drug delivery system for acyclovir with improved bioavailability.

KEYWORDS: Acyclovir Nano-niosomes, Reverse phase evaporation, tween 80

- **Azithromycin Recrystallized Agglomerates with Hydrophilic Polymers and Surfactant by Neutralization Technique**

AV Yadav and VB Yadav.....796

ABSTRACT

In this study the significant effect of recrystalline azithromycin alone and with hydrophilic polymers and surfactant were studied on improving the solubility, dissolution rate and other physicochemical properties by neutralization technique. The raw crystals of azithromycin was dissolved in the 0.1N HCl and poured the azithromycin solution into 0.1N NaOH solution. To the precipitated or recrystallized azithromycin immediately add the aqueous solution of different hydrophilic polymers like HPMC, PEG-6000, and surfactant like Poloxomer during the stirring process at room temperature. After 30 minutes add chloroform drop wise as bridging liquid for agglomeration of recrystallized azithromycin with polymers and surfactant. The pure azithromycin drug substance and prepared recrystallized agglomerates with polymers and surfactants were evaluated in terms of solubility, drug content, dissolution rate, flowability, wettability and packability. The raw azithromycin drug and prepared recrystallized agglomerates were characterized by thermal behavior (Differential Scanning Calorimetry-DSC), X-ray powder diffraction (XRD), Fourier transforms infrared spectroscopy (FTIR) and scanning electron microscopy (SEM).The prepared recrystallized agglomerates with polymers HPMC and surfactant Poloxomer showed improvement in solubility, dissolution rates other physicochemical properties. The particle sizes of prepared recrystallized agglomerates were drastically reduced during precipitation process but increased after agglomeration with bridging liquid. The DSC showed reduced in the melting point enthalpy indicating disorder in the crystalline content. The XRD and FTIR also revealed a characteristic decrease in crystallinity and the chemistry of azithromycin in recrystallized agglomerates.

KEYWORDS: Neutralization technique, Recrystallized agglomerates, Surfactant, Hydrophilic polymers, physicochemical properties.

- **Venlafaxine Extended Release Tablets: A Chitosan Based Once a Day Technology**

Mitesh Nagar and AV Yadav.....803

ABSTRACT

Proposed research work was carried out with an objective to utilize chitosan as a release controlling polymer in developing a once daily formulation of a freely water soluble drug Venlafaxine hydrochloride (VNH) and demonstrate its potential in oral controlled release systems. Triple layered tablets containing VNH equivalent to 150 mg of Venlafaxine were prepared in which middle drug layer containing Hydrogenated vegetable oil (HVO), in order to conceal maximum surface area available for drug release was covered from upper and lower side with polymeric barrier layers consisting of hydrophilic and lipophilic excipients, which together with chitosan gave flexibility as well as strength to the formulation. Limited available surface area from the middle layer produced controlled diffusion of drug as the rigid lipid core virtually submerged in the swollen backing layers producing a pH independent dissolution rate. Formulation was optimized with 3 level factorial design to obtain a desired 20 hrs release profile in distilled water. Amounts of chitosan (X_1) and hydrogenated vegetable oil (X_2) were selected as independent variables and times required for 20% (T_{20}), 50% (T_{50}) and 90% (T_{90}) drug release were selected as dependent variables. A mathematical model was generated for each response parameter and release profile of optimized composition was fitted for different controlled release models concluding that the lipophilic middle layer and hydrophilic chitosan layers were required to obtain desired drug release pattern fitting to peppas model and the formulation also shown stability on storage at room temperature and accelerated conditions of temperature and humidity.

KEYWORDS: Venlafaxine hydrochloride; Once daily; Chitosan; Triple layer tablet

- **Formulation and Evaluation of Floating Drug Delivery System of Cefpodoxime Proxetil**

Pathan DN, Shaikh NH, Thube RT, Bhise KS and Polshettiwar SA.....812

ABSTRACT

The objective of the present study was to develop floating drug delivery system of Cefpodoxime proxetil to increase its residence time in stomach as high solubility, chemical and enzymatic stability and absorption profile was observed in acidic pH value. The floating tablets of Cefpodoxime proxetil were prepared by direct compression method using sodium bicarbonate as floating agent and HPMC as rate retarding polymer. A 3² full factorial design was constructed to study the effect of the amount of HPMC and sodium bicarbonate on the drug release profile from the formulations. The formulations were evaluated for floating lag time, floating duration time and in vitro drug release studies. The optimized formulation showed sufficiently sustained drug release and remained buoyant on the surface of medium for more than 10 hours. It was observed that the increase of floating agent concentration displayed a common phenomenon that the drug release rate and extent were increased in all cases. As the concentration of HPMC increases in the formulation the release rate was found to be decreased. Accelerated stability studies were performed as per ICH guidelines at temperature of 40 ± 2 °C and humidity 75 ± 5 %RH for a period of 3 months. The results indicated that these formulations remained stable. It can be concluded that floating drug delivery system of Cefpodoxime proxetil can be successfully formulated as an approach to increase gastric residence time and thereby improve its bioavailability.

KEYWORDS: Cefpodoxime proxetil, floating, gastro retentive, HPMC.

- **Phytochemical Screening of Crude Bark extracts of *Tecoma stans* Linn. (Bignoniaceae).**

C. Das, A. Mohanty, S. Dash, D.C. Sahoo, N.S.K. Choudhury, V.J. Patro and S.K. Kanungo.....816

ABSTRACT

The paper presents the physicochemical studies of bark of *Tecoma stans* Linn. a traditional medicinal plant of which organoleptic, and physicochemical properties have been studied. The present study will provide the information in respect of its identification.

KEYWORDS: *Tecoma stans* Linn. Bark, Physico-chemical, Fluorescence, phytochemical.

- **Colon Specific Drug Delivery System of Mesalamine for Eradication of Ulcerative Colitis**

S. Sudarshan, S. Sangeeta, NR Sheth, P. Roshan, YV Ushir and R. Gendle.....819

ABSTRACT

Ulcerative colitis is a disease of the intestine, explicitly the large intestine or colon that includes characteristic ulcers, or open sores, in the colon. For eradication of Ulcerative colitis, there are various methods among that delivery of drug to colon is one of them. Colon specific delivery can achieve by using polymer, which will release the drug at specific pH, or by enzyme depended system, which will break the bond between drugs and polymer. Present study was slanting to explore the utility of coating technology for colonic targeting of single unit tablet systems. Mesalamine USP Tablets were prepared using synthetic polymer as binders and methoxy polymer as release retardant. Different polymer such as Eudragit E100 and S100 used to get desired release of drug to colon for specific time. Core tablet were coated in singular percentage as 5%, 7.5% and 10%. Similarly core tablet were coated using triple coating using release retardant. The coated tablets were tested *in-vitro* for their suitability as colon specific drug delivery systems in different pH 1.2, 6.0 and 7.2. Drug release was delayed as on going on increasing the concentration of coating polymer. Triplicate coating gave 0.61% at pH 1.2, 0.49% at pH 6.0 and 87.28% at pH 7.2 from 75 mg tablet. Drug content was determined by UPLC and it was found 98.33% of drug was present in a tablet. The statistical analysis of the parameters of dissolution data obtained before and after storage for 3 month at 25°C/60%RH and 40°C/75%RH as per ICH guidelines showed no significant changes indicating the two dissolution profile were similar.

KEYWORDS: Ulcerative colitis, Mesalamine, Eudragit E100, Eudragit S100.

- **Synthesis and Biological Evaluation of Chloroacetyl Derivatives of Some Schiff's Bases**
P Muthumani, R Meera, Pratesh, N Chidambaranathan, P Devi and B Kameswari.....824
-

ABSTRACT

Synthesis of substituted 2-Azetidinone derivatives with chloro acetyl chloride along with their derivatives has been done. The entire synthesized compounds were characterized by UV, IR and ¹HNMR spectroscopy. The antimicrobial activity of the synthesized compounds was evaluated, on *Staphylococcus aureus*, *Pseudomonas aeruginosa*. The anticonvulsant activity and anti inflammatory activities were also evaluated. The present investigation deals with the synthesized compounds possessing good anticonvulsant and anti inflammatory activity, moderate antibacterial activity.

KEYWORDS: Chloro acetyl derivative, 2-Azetidinone, Antimicrobial activity, Anti convulsant activity, Anti inflammatory activity.

- **Synthesis and Anti-Inflammatory Activity of Some New Pyrimidine Derivatives**
Ramesh B. and Babitha S.830
-

ABSTRACT

Some new pyrimidine derivatives were synthesized by reacting chalcones of 2-acetyl thiophene with guanidine hydrochloride in the presence of alcohol. The synthesized compounds were identified by spectral data and screened for anti-inflammatory activity. Some of these compounds showed moderate to considerable anti-inflammatory activity.

KEYWORDS: Synthesis, Pyrimidines, Anti-inflammatory activity.

- **Formulation and Evaluation of Mucoadhesive Buccal Films of Losartan Potassium**
YB Ubarhande, T Regupathy, C Vijaya and SV Deshmane.....833
-

ABSTRACT

Besides acting as platforms for sustained release dosage forms, bioadhesive polymers can themselves exert some control over the rate and amount of drug release and thus contribute to the therapeutic efficacy of bioadhesive drug delivery system. The buccal route has been particularly popular among medical staff and patients alike. The mucosa is relatively permeable with a rich blood supply. The oral transmucosal drug delivery bypasses liver and avoids pre-systemic elimination in the GI tract and liver. The buccal mucoadhesive film using losartan potassium as drug and HPMC K (15M), Eudragit RS 100, Eudragit RL 100, SCMC and ethyl cellulose as polymer has prepared. The prepared buccal film from various batches was subjected to evaluation test. The bioadhesive strength of formulation F7 was higher (i.e.12.10 gm), due to higher concentration of SCMC among all the formulation SCMC having higher mucoadhesive property and less in F8 (i.e.7.48gm). The force required to break the film strip is more in formulation F1 containing HPMC 4:0 ratio, because of good cross-linking with drug molecules. The maximum drug release was shown by formulation F7 due to higher concentration of SCMC compared to other formulation it having higher drug release values due to swelling property. The lower drug release was shown by formulation F8 (73.97%) due to ethyl cellulose which is water insoluble. It was concluded that, HPMC and SCMC in equal concentration has good bioadhesive properties and released drug in sustained manner, hence best polymer for buccal drug delivery system.

KEYWORDS: Buccal film, Bioadhesive, Tensile strength and Sustained release

- **Protective effect of green tea extract on chemically induced testicular damage in rats**
Leena Patil and Balaraman R.....837

ABSTRACT

Green tea extract, *Camellia sinensis* (Theaceae) was administered orally to rats at the dose levels of 100 mg/kg to investigate its effect on cisplatin (5mg/kg, i.p.) induced testicular toxicity. Treatment with cisplatin alone caused decrease in body weight, sperm count, serum testosterone and also reduction in the levels of antioxidant enzymes such as in superoxide dismutase, catalase and reduced glutathione, membrane bound enzymes like Na⁺K⁺ATPase, Ca²⁺ATPase, Mg²⁺ATPase and increase in serum levels of creatinine, urea, uric acid and lipid peroxidation. However, the combined treatment of green tea extract with cisplatin restored the body weight, sperm count, testosterone level, lipid peroxidation, histopathological changes and serum markers of toxicity, with significant increase in levels of antioxidant enzyme and membrane bound enzymes in testes, indicating protection afforded by green tea extract administration. These findings indicate that green tea extract might be having protective effect against cisplatin induced testicular toxicity.

KEYWORDS: Antioxidant, Cisplatin, Free radicals, Green tea, Testicular toxicity.

- **Antiparkinsonian Effect of Cassia tora on Oxotremorine Induced Parkinson Methodology**
Suryawanshi CP, Patil VR, Chaudhari RY, Kale MK, Firake SD Pimprikar RB, Patil MD, Yeshwante SB and Saindanem DS.....842

ABSTRACT

The Parkinson's disease is mainly distinguished from other diseases based on the key feature that is tremors. Oxotremorine induced oxidative stress is implicated as a common pathway in development of Parkinson's symptoms like, tremor, salivation and temperature variation. Hence Oxotremorine-induced tremor model was used to evaluate antiparkinsonian drugs. Different extracts of plant of *Cassia tora* such as, petroleum ether (200mg/kg) p.o., methanolic (200mg/kg) p.o. and ethyl acetate extract (200mg/Kg) p.o. were used to investigate antiparkinsonian effect on oxotremorine induced Parkinson's symptoms in mice. Procyclidine, an anticholinergic, antiparkinsonian drug was administered as a standard drug at a dose of 5mg/kg p.o., 1hr prior the administration of oxotremorine (0.5mg/kg) S.C. Methanolic extract at 200mg/kg p.o route of administration decreased (p<0.05) Parkinson's symptoms, while petroleum ether extract (200mg/kg)p.o and ethyl acetate extract (200mg/kg)p.o shows moderate action. This study suggests that *cassia tora* is a plant with possible therapeutic value for Parkinson's disease.

KEYWORDS: Parkinson's disease, oxotremorine, tremor, procyclidine.

- **Synthesis of Some New Bioactive Chalcones and Flavones**
SS Mogle, MA Sayyed, AY Vibhute, SV Khansole, YS Nalwar and YB Vibhute.....846

ABSTRACT

New chalcones (3a-g) were synthesized from 5-chloro-2-methoxybenzaldehyde (2) and halohydroxysubstitued acetophenones (1a-g) via Claisen-Schmidt condensation. Further new flavones (4a-g) were synthesized by oxidative cyclisation of chalcones (3a-g).The structure of synthetic compounds were confirmed by IR, ¹H NMR and elemental analysis. These compounds were screened for their antibacterial activity and studied the effect on seed germination of wheat (*Triticum aestivum*).

KEYWORDS: Chalcones, flavones, antibacterial activity, seed germination of wheat.

- **Studies on Antibacterial, Anthelmintic and Larvicidal Efficacy of Pothos Scandens L**
KS Vinayaka, TR Prashith Kekuda, N Rajkumar, Chandrashekar MB, Shivakumar Banakar and Shruti V Hegde.....850

ABSTRACT

The present study describes the phytochemical, antibacterial, anthelmintic and larvicidal activity of extracts of a traditionally used medicinal plant of Western Ghats *Pothos scandens* L. The powdered plant material was subjected to soxhlet extraction using methanol solvent. The extracts were tested for the presence of

various phytoconstituents. Antibacterial activity by Agar well diffusion method. Wormicidal activity was tested using adult Indian earthworm model by determining paralysis and death of worms in the presence of extracts. The larvicidal activity in terms of Percentage larval mortality was determined using second instar larvae of *Aedes aegypti*. The preliminary phytochemical analysis showed the presence of terpenoids, alkaloids, steroids, and saponins. The methanol extract showed antibacterial activity against gram positive and gram negative bacteria. The minimum inhibitory concentration of the extract was determined for each of the test bacteria. Gram positive bacteria were inhibited at low concentrations than Gram negative bacteria. The activity may be attributed to the presence of various phytochemicals present in them. Further, the extracts could be used against infections by bacteria, mosquito vectors and the parasitic worms. Further experiments in animal models could possibly reveal the *in vivo* efficacy of the extract.

KEYWORDS: *Pothos scandens*, Agar well diffusion, Larvicidal activity, Anthelmintic activity

- **Central Nervous System (CNS) Depressant and Analgesic Activity of Methanolic Extract of *Drypetes roxburghii* Wall in Experimental Animal Model**

Sudharshan SJ, Chinmaya A, Valleesha NC, Prashith Kekuda TR, Rajeshwara AN and Syed Murthuza.....854

ABSTRACT

Drypetes roxburghii Wall also called *Putranjiva roxburghii* Wall is a deciduous, evergreen tree and is used in cold, fever, rheumatism and inflammation. The aim of the present study was to evaluate the analgesic and CNS depressant property of methanol extract of seeds of *Drypetes roxburghii* Wall in mouse model. The analgesic activity of methanol extract was evaluated by Tail flick method. CNS depressant activity was determined using digital Actophotometer. The preliminary phytochemical analysis of methanol extract showed the presence of phenols, alkaloid, saponin, steroids, flavonoids, and glycosides while terpenoids and tannin were not detected. In analgesic activity, the reaction time increased significantly for the extract and standard groups when compared to the predrug treatment. The locomotor activity count in the extract and standard drug treated group was significantly reduced when compared to control group. The analgesic and CNS depressant activity of extract was found to be more than that of the standard drug. Further studies are needed to isolate the active constituents responsible for the observed effect and to reveal the possible mechanisms of action responsible for the analgesic and CNS activity.

KEYWORDS: *Drypetes roxburghii* Wall, Soxhlet extraction, Analgesic activity, CNS depressant activity

- **Analgesic and Anti-Inflammatory Studies of *Memecylon umbellatum* Burm Roots in Experimental Animals**

SG Killedar and HN More.....858

ABSTRACT

The aqueous (AqRMU) and acetone (AcRMU) extracts of the roots of *Memecylon umbellatum* Burm (Melastomataceae) were screened for analgesic and anti-inflammatory activities in mice and rats. Pain responses were studied in mice using the hot plate test while carrageenan induced paw oedema was used to access anti-inflammatory activity. The two extracts exhibited significant analgesic compared with the control (saline, 10ml/kg) as evidenced by increase significant ($p < 0.01$) in reaction time. The analgesic activity was higher in AcRMU compared to pentazocine (5mg/kg, p.o). The extracts progressively reduced rat paw oedema induced by subplantar injection of carrageenan, the acetone extract showing more pronounced effect than the aqueous extract. Thus the results showed that *Memecylon umbellatum* had significant analgesic and anti-inflammatory activity as reflected by the parameters investigated. Further investigations are, however, necessary to explore mechanism(s) of action involved in these pharmacological activities.

KEYWORDS: *Memecylon umbellatum*, inflammation, analgesic activity, anti-inflammatory, carrageenan.

- **Effect of Concentration of Gellan Gum and Calcium Chloride Solution on Entrapment Efficiency and Drug Release from Calcium Gellan Beads.**

Patil SV, Lade PD, Janugade BU, Babar SA and Ghewade YB.....862

ABSTRACT

Gellan gum has wide variety of applications, mainly concentrated in ophthalmic drug delivery and oral sustained release preparations. Due to the characteristic property of cation induced gelation, it has been widely used in the formulation at in situ gelling ophthalmic preparations. The objective of this study was to evaluate concentration dependant effect of gellan gum and calcium chloride solution on entrapment efficiency and drug release of diclofenac sodium through calcium-gellan beads by ionotropic gelation. Prepared beads were evaluated for percentage yield, percentage entrapment efficiency and drug release. It was found that as concentration of gellan gum increases entrapment efficiency increases and as concentration of calcium chloride increases entrapment efficiency decreases. Also as concentration of gellan gum increases drug release decreases and as concentration of calcium increases drug release increases.

KEYWORDS: Calcium-gellan beads, Deacetylated gellan gum, Ionotropic gelation.

- **Design and Dissolution Study of Colon Specific Drug Delivery System of Tinidazole**

Mukund G Tawar and PD Chaudhari.....866

ABSTRACT

A novel, colon-targeted delivery system, which uses lactulose, was investigated in this study. Lactulose is not absorbed in the upper GI tract, but degraded to organic acids by enterobacteria in the lower gastrointestinal tract, especially the colon. A CODESTM consists of three components: a core containing lactulose and the drug, an inner acid-soluble material layer, and an outer layer of an enterosoluble material. A CODESTM containing Tinidazole shown protections against pH 1.2 and pH 6.8 upto six hour study. Formulation shown release at pH 5.0. The results of this study show that lactulose can act as a trigger for drug release in the colon, utilizing the action of enterobacteria.

KEYWORDS: Oral drug delivery; Colon targeting; Lactulose; Tinidazole.

- **Evaluation of Anti-inflammatory Activity of Flemingia strobilifera linn. Fabaceae**

Mohd. Tauqeer A and Itankar PR.....869

ABSTRACT

In this study, the anti-inflammatory effects of 200 and 400 mg/kg body weight of methanol and hydro-alcoholic extracts obtained from aerial parts of *Flemingia strobilifera*, the so-called MEFS and HAFS were investigated in Swiss albino mice respectively. The effects of MEFS and HAFS on the acute and sub acute phases of inflammation were studied in carrageenan induced paw oedema and cotton pellet-induced granuloma methods, respectively. In acute and sub acute phases of inflammation, amongst the two extracts selected for study the HAFS showed maximum inhibition of 37.06, 41.17 % (P < 0.01) at the dose of 400 mg/kg respectively. The results suggest that HAFS possess potent anti-inflammatory activity.

KEYWORDS: Anti-inflammatory activity, Fabaceae, *Flemingia strobilifera*, Kusrun, Wild hops.

- **Anti inflammatory activity of Folklore: Pithecellobium dulce Benth**

M. Sugumaran, T. Vetrichelvan and S. Darlin Quine.....872

ABSTRACT

Ethanollic and aqueous leaf extracts of *Pithecellobium dulce* were studied for its anti-inflammatory activity using carrageenan –induced paw edema in rats. Both extracts showed significant anti-inflammatory activity by lowering paw volume at the tested dose level. The aqueous extract showed more activity than the ethanol extract which was comparable to diclofenac sodium, a standard anti-inflammatory drug.

KEYWORDS: *Pithecellobium dulce*, anti-inflammatory activity, carrageenan –induced paw edema

- **Formulation and Evaluation of Diuretic Herbal Liquid Syrup from Hemidesmus Indicus**
Waghulkar VM, Alaspure RN, Shrikhande VN, Ghormade JM and Baitule AW.....874

ABSTRACT

Plant medicines are traditionally used for the treatment of some renal diseases and also have been reported to show significant diuretic activity. In the present study powder of *Hemidusmus indicus* root was extracted with distilled water to get aqueous extract. During development of syrup, several combinations of sucrose, sorbitol, glycerin, methyl paraben, propyl paraben and distilled water were tried. The formulation was checked for its stability and consistency. Depending upon the results of evaluation, the formula had been finalized for liquid syrup preparation. Among different compositions, good consistency was obtained using sucrose, sorbitol, glycerin, methyl paraben, propyl paraben in the ratio 30:10:2.2:0.07:0.03. Also, better acceptability was obtained by incorporation of mint flavor (0.2%). The specific gravity of syrup was found to be 1.06068 g/ml. The refractive index and viscosity was found to be 1.339 and 2.4216cp. The pH was found to be 5.62. The single drug preparation can be used for diuretic activity for elderly patients *since* oral route for single drug preparation is one of the simplest and claimed to be safest.

KEYWORDS: Hemidusmus indicus, herbal syrup, diuretic, Asclepiadaceae.

- **Aging of Honey Enhances Its Antibacterial Activity**
Disha M Dhabarde, HV Shahare, SS Gedam, PK Bhojar and RO Ganjiwale.....876

ABSTRACT

Honey possesses the antibacterial activity. In the present investigation, we reported enhancement in antibacterial activity of honey by ageing. The antibacterial activity of the samples was assayed by the agar well diffusion method.

KEYWORDS:

- **Direct Spectrophotometric Determination of Metformin Hydrochloride in Pure Form and in Pharmaceutical Formulations**
PM Patil, MA Phanse, VL Gaikwad and PD Chaudhari.....878

ABSTRACT

A new simple, sensitive spectrophotometric method in ultraviolet region has been developed for the determination of Metformin hydrochloride in bulk and dosage form. Metformin hydrochloride was shown maximum absorbance at 232 nm with apparent molar absorptivity of 1.0781×10^4 l/mol.cm. Beer's law was obeyed in the concentration range of 10 to 50 ug/ml. Results of analysis were validated statistically and by recovery studies. The developed method was found to be sensitive, accurate, precise and reproducible and can be used for the routine quality control analysis of metformin hydrochloride.

KEYWORDS: Metformin hydrochloride, spectrophotometric, Assay, Recovery.

- **Gas Chromatographic Ethanol Determination in Bhunimbadi Kwath**
JY Nehete, VV Shewale, VN Deshmukh and MR Narkhede.880

ABSTRACT

Ayurvedic formulations, has to check for self generated as well as added alcohol concentration within specified limits. In present study Gas chromatographic method developed for determination of Bhunimbadi Kwath self generated alcohol concentration. In polyherbal formulation alcohol percentage determined using calibration curve. Bhunimbadi Kwath alcohol concentration was found to be 5.04% v/v, which was within prescribed limit. The method has been applied successfully for the assay of ethanol in Bhunimbadi Kwath.

KEYWORDS: Polyherbal formulation, Gas chromatography, Bhunimbadi Kwath.

- **A Simple and Precise Method for the Estimation of Simvastatin in Formulations by UV-Visible Spectrophotometer**

Hepcy Kalarani D, Venkatesh P, Ravindra Reddy K and Dinakar A.....882

ABSTRACT

A simple and precise spectrophotometric method in ultra violet region has been developed for the estimation of simvastatin in its pharmaceutical dosage forms. Simvastatin exhibited maximum absorbance at 237.8nm in ethanol. It obeys Beer's law in the concentration range of 1-40mcg/ml. Results of the analysis were validated statistically and by recovery studies, repeatability studies.

KEYWORDS: Simvastatin, UV, λ_{\max}

- **Spectrophotometric Determination of Quetiapine Fumarate in Bulk and Dosage Form**

R Xavier Arulappa, M Sundarapandian, S Venkataraman, M Boopathi and Manish Kauraw.....884

ABSTRACT

A simple, rapid, economical and sensitive visible spectrophotometric method for the estimation of Quetiapine fumarate has been developed based on the formation of ion-pair of Quetiapine fumarate with dye bromocresol green in acidic medium, which was extracted into chloroform. It has absorption maxima at 415nm. Beer's law limit was found to be 5-25mcg/ml. The molar absorptivity was found to be 4.5×10^4 ($\text{mole}^{-1} \text{cm}^{-1}$) and sandell's sensitivity was 0.01949 ($\mu\text{g}/\text{cm}^2/0.001$ absorbance unit). The correlation coefficient (r) was found to be 0.9999. The limit of detection (LOD) and limit of quantification (LOQ) was found to be 0.29 and 0.88 mcg/ml respectively of Quetiapine fumarate. The result of estimation in marketed formulations were found to be 97.44 ± 0.3286 and 96.68 ± 0.07854 . The proposed method was applied successfully for the determination of Quetiapine fumarate in tablets with average recovery of 98.83 ± 0.2738 and 98.98 ± 0.3535 . The method was then validated statistically as per ICH guidelines, which yielded good results concerning range, linearity, precision and accuracy.

KEYWORDS: Quetiapine fumarate, Bromo cresol green, Spectrophotometry.

- **Comparative Studies of Release of Ambroxol Hydrochloride from It's Gum Based Matrices**

Maushumi Kulkarni, Kiran Bhise, Rashmi Tambe, Aney Joice and Parvez Shaikh.....886

ABSTRACT

The purpose of this research was to formulate matrices of Ambroxol hydrochloride with natural gums like Xanthan gum and κ -Carrageenan gum and their combinations in different ratios to develop a sustained release dosage form. Various parameters were evaluated such as their physical tests like hardness, thickness, friability. A comparative study was done on the release from various gum matrices. The matrix swelling was studied in pH 6.8 phosphate buffer. Xanthan gum, κ -Carrageenan and guar gum retarded the drug's release when used individually. It can thus be concluded from the studies that natural gums can be effectively used for oral sustained release dosage form.

KEYWORDS: sustained release, gums, swelling, matrices.

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