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EDITORIAL

REVIEW ARTICLE

- **Fingerprinting of Traditional Medicines through RAPD Technology: - A Newer Approach**

K. Shukla, S.S. Shukla, V. Jain, R. Pandey, S. Jain, Swarnlata Saraf and S. Saraf..... 63

ABSTRACT

In Ancient time when the traditional medicines were developed, standardization and quality control of Ayurvedic formulation was maintained by fully committed and professional. Due to process of evolution, commercialization and environmental effects identification and quality control of botanicals become more difficult. Other factors like cultivation, collection and environmental variation also created difficulties in standardization of traditional formulations. Chromatographic techniques like TLC, HPLC and HPTLC requires chemical markers that are therapeutically active and has its own limitations. Secondary plant metabolites that are used as marker may change due to environmental factors and hence correct identification of botanicals is a difficult task. Each herb contains large number of compounds, so it is not possible to analyze the presence or absence of all compounds quantitatively or qualitatively. These serious difficulties in testing of active principal or chemical constituents are well known. Random amplified Polymorphic DNA (RAPD) techniques based on the polymerase chain reaction (PCR) is one of the most commonly used molecular techniques to develop DNA markers. RAPD markers are amplification products of anonymous DNA sequences using single, short and arbitrary oligonucleotide primers, and thus do not require prior knowledge of a DNA sequence. Low expense, efficiency in developing large number of DNA markers in a short time and requirement of less sophisticated equipment has made the RAPD technique valuable for identification of components in traditional preparation and in development of fingerprints for traditional formulations.

KEY WORDS Fingerprinting, Traditional medicine, RAPD,

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- **Clinical Trial of Herbal Drugs and Products in India: Past and Current Status and Critical Issues**

Shrivastava Alankar, Jain R., Agrawal R.K. and Ahirwar D.....69

ABSTRACT

Use of plants as a source of medicine has been inherited and is an important component of the health care system in India. In the Indian systems of medicine, most practitioners formulate and dispense their own recipes. There are about 45,000 plant species in India, with concentrated hotspots in the region of Eastern Himalayas, Western Ghats and Andaman & Nicobar Island. The officially documented plants with medicinal potential are 3000 but traditional practitioners use more than 6000. India is the largest producer of medicinal herbs and is appropriately called the botanical garden of the world. There are currently about 250 000 registered medical practitioners of the Ayurvedic system (total for all traditional systems: approximately 291,000), as compared to about 700,000 of the modern medicine system. In rural India, 70 per cent of the population is dependent on the traditional system of medicine, the Ayurveda. The major hindrance in the amalgamation of herbal medicines into modern medical practices is the lack of scientific and

clinical data, and better understanding of efficacy and safety of the herbal products. It requires thorough search for medicinal plants, proper guidelines for their identification, validation of the scientific methods of isolation of active ingredients, pre-clinical evaluation of their pharmacological and toxicological profiles, and lastly, the clinical evidence of their usefulness needs to be obtained.

KEY WORDS Clinical Trial, Herbal Drugs, Ayurveda

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RESEARCH ARTICLE

- **Antioxidant and Antiulcer Activities of an Ethnomedicine: *Alternanthera sessilis***

Amit Roy and S. Saraf.....75

ABSTRACT

We present here in vitro antioxidant and in vivo antiulcer activities of the chloroform insoluble fraction of defatted ethanolic extract of whole plant of *A. sessilis* (CIAE). Antioxidant activity was determined by three in vitro methods- DPPH and H₂O₂ radical scavenging and reducing power. To study the antiulcer activity of CIAE (100 and 200mg/kg) using different models of ulceration in rats, viz. pylorus ligation, aspirin induced and cold-restraint stress-induced gastric lesions in rats. Parameters taken to assess anti-ulcer activity were volume of gastric secretion, pH, free acidity, total acidity, ulcer index and % inhibition of gastric ulcers in pylorus ligation model. While in aspirin and cold resistant stress induced models, ulcer index and % inhibition of gastric ulcers was determined. Famotidine (20mg/kg) was used as a reference drug. CIAE exhibited significant (p<0.001) and dose dependant radical scavenging and reducing power. CIAE treated animals exhibited protective effect on ulceration induced by pylorus ligation, aspirin induced and cold restraint stress in rats. Control animals had ulcers and hemorrhagic streaks, while animals treated with CIAE showed reduction in ulcer index in all the models in a dose dependant manner; it significantly (p < 0.001) decreased the volume of gastric acid secretion and also reduced free acid and total acid with respect to control and comparable to the standard drug. These results indicate that the *A. sessilis* has antisecretory and citoprotective effects that may be related to the presence of various phytochemicals present in it and detected during phytochemical analysis.

KEY WORDS Anti-Ulcer, Antioxidant, Ethnomedicine, *Alternanthera sessilis*.

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- **Simultaneous Estimation of Metoprolol and Amlodipine from Tablet Dosage Form**

Sohan S. Chitlange, Md. Imran, Sagar, B. Wankhede and Dinesh M. Sakarkar..... 80

ABSTRACT

Simple spectrophotometric methods have been developed for simultaneous estimation of Metoprolol (MET) and Amlodipine (AMD) in two component tablet formulation. The methods employed are Absorbance corrected for interference method and Area under curve method. For Absorbance corrected for interference method the working wavelengths selected are 224 nm for MET and 362.5 nm for AMD. Similarly for Area under curve method the working wavelength ranges selected are 234-242 nm ($\lambda_1 - \lambda_2$) for AMD and 218-228 nm ($\lambda_3 - \lambda_4$) for MET. For both the methods linearity was observed in the concentration range of 10-50 µg/ml for MET and 4-20 µg/ml for AMD. The recovery studies confirmed the accuracy of proposed method and the methods were validated as per ICH guidelines.

KEY WORDS Metoprolol; Amlodipine; Absorbance corrected for interference; Area under curve

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- **Simultaneous Estimation of Atorvastatin calcium and Nicotinic acid from Tablet Formulation**

S. Pillai, I.Singhvi and Mousumi Kar.....83

ABSTRACT

Three simple, accurate, economical and reproducible UV spectrophotometric methods for simultaneous estimation of two component drug mixture of atorvastatin calcium and nicotinic acid from combined tablet dosage form have been developed. First developed method involves formation and solving of simultaneous equations using 254.0 nm and 270.0 nm as two wavelengths. Second method is based on two wavelength calculation, wavelengths selected for estimation of atorvastatin calcium were 260.4 nm and 275.6 nm and for nicotinic acid 240.4 nm and 265.2 nm. Third method was developed making use of first order derivative spectroscopy using 233.2 nm and 304.4 nm as zero crossing points for estimation of nicotinic acid and atorvastatin calcium respectively. The results of analysis have been validated statistically and by recovery studies.

KEY WORDS Spectrophotometric, Atorvastatin calcium, Nicotinic acid.

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- **Simultaneous Spectrophotometric Methods for Estimation of Metformin and Fenofibrate in synthetic mixture**

Kothapalli L.P., Mare S.G., Thomas A.B., Nanda R.K. and Deshpande A.D.86

ABSTRACT

Two simple, rapid, accurate and economical methods have been developed for the estimation of metformin and fenofibrate in synthetic mixture. Metformin has absorbance maxima at 237.5 nm and fenofibrate at 287.5 nm but the wavelength selected for the proposed methods is 266.0 nm using methanol as solvent. The linearity was observed in concentration range of 5-30µg/ml for metformin and 0.8-4.8µg/ml for fenofibrate. First method is based on solving the simultaneous equation for the two drugs and second method is based on multicomponent analysis. The results of both methods have been statistically validated and found to be satisfactory. The recovery studies confirmed the accuracy of the proposed methods.

KEY WORDS Metformin hydrochloride, Fenofibrate, Simultaneous equation, Multicomponent.

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- **Antihistaminic Effect of Sitopaladi Churna Extract**

Bharti Ahirwar, Dheeraj Ahirwar and Alpana Ram.....89

ABSTRACT

Anti-inflammatory and mast cell stabilizing activity of sitopaladi churna extract was studied on the egg albumin-induced edema, Carrageenin-induced edema in hind paw, cotton pellet implantation, and degranulation of mast cells by compound 48/80. Sitopaladi churna extract exhibited good anti-inflammatory effects in rats, causing a dose-related inhibition of the increase in the paw circumference (acute inflammation) induced by subplantar injection of fresh egg albumin and Carrageenin. It also significantly decreased the weight of cotton pellet (chronic inflammation). It also protected mast cell disruption induced by compound 48/80. These findings reveal that antihistaminic and anti-inflammatory activity of sitopaladi churna extract may be due to inhibition of release of inflammatory mediators and mast cell stabilizing potential.

KEY WORDS Histamine, Carrageenin, Anti-inflammatory

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- **Development and Characterization of Modified Ocular Inserts with Improved Ocular Compatibility**

Karthikeyan D., Sonkar S., Pandey V.P., Nandha kumar J., Sengottuvelu S., Bhowmick M. and Shivakumar T.....93

ABSTRACT

The objective of the present work is to develop modified ocular inserts of Indomethacin having a single film instead of tri-film and evaluate its potential for sustained ocular delivery. The advantage of having a single film is that it considerably reduces the thickness and weight of ocular insert as well as is better retained in the cul-de-sac of the eye. The modified ocular insert was prepared by solvent casting method using polymers Eudragit RS 100 (ERS) and Ethyl cellulose (EC). Dichloromethane (DCM) and Dibutyl phthalate (DBP) were used as solvent and plasticizer respectively. The modified ocular inserts were evaluated for drug-excipient interaction, physico-chemical characteristics, stability studies, sterility studies, ocular irritation test, in-vitro and in-vivo release studies. Attenuated total reflectance Fourier Transform Infra-red spectroscopy (ATR-FTIR) was used to study the interaction between drug and excipients, which enable the modified ocular insert to be examined directly without further preparation (in contrast to KBr method). The in-vitro release study of the formulations follow zero order kinetics and revealed that the drug released by super case II kinetics ($n > 1$). The optimized formulation F7, when inserted into the eye of rabbit showed controlled release upto 24 hours. There was a good correlation between in-vitro and in-vivo release data. On the basis of above studies, it can be concluded that the modified ocular insert having a single film provided the desired drug release for 24 hours and remained stable and intact at ambient conditions.

KEY WORDS Modified ocular inserts, Single film, Atr-Ftir, Super case II kinetics

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- **Preparation and Evaluation of Mucoadhesive Microcapsules of Captopril for Oral Controlled Release**

Sanjib Bahadur, Ranabir Chanda, A. Roy, A. Choudhury, S. Das and S. Saha..... 100

ABSTRACT

Captopril is an ACE inhibitor that is used for the treatment of hypertension. The purpose of this study was to encapsulate the drug in different polymer having mucoadhesive property and thus combining the advantages of microparticulates with mucoadhesive drug delivery system. The microcapsules with a coat consisting of alginate and a mucoadhesive polymer such as sodium carboxymethylcellulose (SCMC), methylcellulose, Carbopol 934P and hydroxyl propylmethylcellulose (HPMC) E15V were prepared by ionotropic gelation technique, where gelation was achieved with oppositely charged counter ions to form microparticulates. The prepared microcapsules were subjected for various evaluations. The resulting microparticulates were discrete, large, spherical and free-flowing. Captopril release from these microcapsules was slow and extended over longer period of time. Drug release for some formulation was diffusion controlled and others exhibited anomalous behavior. The prepared microcapsules exhibited good mucoadhesive property in the *in vitro wash-off* test. Among all formulations, batch containing sodium alginate and carbopol 934 showed higher encapsulation efficiencies, good flow property and maximum prolongation of drug release and good mucoadhesion properties.

KEY WORDS Captopril , microparticulates, mucoadhesion properties.

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- **Quantitative Structure Pharmacokinetic Relationship Studies for Drug Clearance of Quinolone Drugs**

Yash Paul, Avinash S. Dhake, Milind Parle and Bhupinder Singh.....106

ABSTRACT

Quantitative Structure Pharmacokinetic Relationships (QSPR) studies tend not only to establish the quantitative relationships between structural properties and the pharmacokinetic parameters of new compounds, but also provide great help for better elucidation of factors influencing the pharmacokinetic fate of drugs. Clearance (CL_{tot}) value is one of the most imperative pharmacokinetic parameters related directly to dispositional characteristics of drug(s). It can be used to determine the dosing rate and steady state concentration of a drug in clinical pharmacokinetics. The current study was conducted to investigate QSPR for CL_{tot} values in man amongst 24 quinolone drugs employing extrathermodynamic approach. Analysis of several hundreds of QSPR correlations developed in the current study revealed extremely high degree of cross-validated coefficients (Q^2) using leave-one-out (LOO) method ($p < 0.001$). CL_{tot} shows positive linear dependence on topological parameters (e.g., BLI and negative linear dependence on electrostatic parameters (e.g., Q_{max} , QO_{max} , $Q_{max}-Q_{min}$). Influences of lipophilic parameters like log P, geometrical parameters like ZXS/ZXR and constitutional parameters like Cn and Brel was also noticed during multi-parameter studies. The joint dependence of clearance values on topological and electro parameters signifies the importance of diffusion and ionization of quinolones drugs *in vivo*. The overall predictability was found to be quite high ($R^2=0.9132$, $F=26.78$, $S^2=6.72$, $Q^2=0.7256$, $p < 0.001$). Logarithmic transformation of clearance did not yield much improvement in the significance of correlations, but the inverse transforms showed improved correlation ($R^2=0.9332$, $F=34.52$, $S^2=0.0014$, $Q^2=0.8136$, $p < 0.001$).

KEY WORDS Quantitative structure pharmacokinetic relationships (QSPR), clearance, ADME.

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- **Isolation and Screening of Endophytic Actinomycetes Producing Antibacterial Compound from Different Parts of *Citrus aurantifolia***

K. Kamalakannan, U. Kumar, K. C. Kandpal, S. Minz, M. Pradhan, A. Saravanakumar and T. Sivakumar.....112

ABSTRACT

Actinomycetes are a diverse group of heterotrophic prokaryotes forming hyphae at some stage of their growth hence referred to as filamentous prokaryotes. This group is a potential producer of many enzymes, enzyme inhibitors, growth promoting substances and antibiotics. Endophytic actinomycetes have been defined as that can be isolated from the disinfected surfaces of plant tissues or that can be extracted from within the plant that do not cause visible harm to the host. They can promote the growth of many field crops by producing plant growth-promoting substances and potential sources of novel natural products for exploitation in medicine, agriculture and industry. It is noteworthy that, of the nearly 300,000 plant species that exist on the earth, in our study we have isolated the endophytic actinomycetes from the different parts of the citrus plants. The total 7 actinomycetes were isolated from different parts of citrus plant of different species (*Citrus aurantifolia*) using Starch Casein agar and YMA media, out of 7 actinomycetes strains, 3 actinomycetes showing antibacterial activity were recovered using Bennet agar media. Two from *Citrus aurantifolia* twig using Starch Casein agar and one actinomycetes was isolated from *Citrus aurantifolia* twig using YMA media. The production of antibacterial compound was performed using L.B. Broth. Out of 3 actinomycetes strain only one show (CT1 isolated from *Citrus aurantifolia* twig) the strong antibacterial activity and fermentation carried out using L.B. Broth for 15 days. After fermentation, extraction of the supernatant was carried out using solvent petroleum ether. The antibacterial compound was recovered using TLC and Column Chromatography. The R_f value of the compound was found to be (0.61403). The structural study of the extracted compound was carried out by UV-spectroscopy, FT-IR and NMR. The antibacterial compound was effective against *E. coli*, *S. typhi*, *K. pneumoniae*, *S. aureus* bacteria some of them got resistance against some antibiotic drug.

KEY WORDS Endophytic actinomycetes, *Citrus aurantifolia*, Antibacterial activity, Structure elucidation.

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SHORT COMMUNICATION

- **Preliminary Phytochemical Screening, Free radical Scavenging and Antimicrobial activities of *Justicia tranquebariensis* Linn.**

G. Balamurugan, M. P. Arunkumar, P. Muthusamy and S. Anbazhagan.....116

ABSTRACT

The aerial portions of the plant *Justicia tranquebariensis* Linn were successively extracted with chloroform and ethanol by soxhlet extraction. The extracts were vacuum dried and subjected to antibacterial (*Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli* and *Klebsiella pneumoniae*) and antifungal (*Aspergillus niger* and *Candida albicans*) screening by agar disc diffusion method. Minimum Inhibitory Concentration required for cessation of microbial growth was evaluated by Agar streak dilution method. Preliminary phytochemical screening was performed and different Phytoconstituents present in the extracts were identified. The ethanolic extract of the aerial portions of *Justicia tranquebariensis* was tested for free radical scavenging activity using 1, 1-Diphenylpicrylhydrazyl radicals.

KEY WORDS *Justicia tranquebariensis*, Antibacterial, Antifungal, Free radical scavenging Phytoconstituents, Minimum Inhibitory Concentration (MIC).

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