



INTERNATIONAL CONFERENCE
ON
INNOVATIONS IN PHARMACEUTICAL SCIENCES
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ABSTRACT BOOK

Organized By



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PHARMACEUTICS

SOLID SELF NANO EMULSIFYING DRUG DELIVERY SYSTEM (SNEDDS): A POTENTIAL DOSAGE FORM TO ENHANCE SOLUBILITY OF RAMIPRIL

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ABSTRACT

The primary goal of the present work was to prepare solid self nano emulsifying drug delivery systems (S-SNEDDS) of Ramipril for improving solubility. SNEDDS are isotropic mixtures containing oils, surfactants, co-surfactants including drug and have the ability to self-emulsify when introduced to aqueous medium upon gentle agitation. Ramipril is highly lipophilic anti hypertensive drug with low bioavailability of 28%. Reason to choose SNEDDS formulation for ramipril is that lipid based formulations may enhance solubility of lipophilic drugs that may further enhance dissolution rate and absorption. After screening several vehicles, Capmul PG8 NF, Gelucire 44/14 and Transcutol P were selected as oil, surfactant and co-surfactant respectively as they showed higher solubility for drug. Nine different liquid SNEDDS formulations were prepared containing various ratios of oil: surfactant: co-surfactant. Formulation containing 16.5 % of Capmul PG8 NF, 68.75% of Gelucire 44/14 and 13.75% of Transcutol P was optimized as it showed least globule size (22.56 nm) and also stable towards phase separation and drug precipitation after undergoing several evaluation tests. The optimized formulation was loaded on to inert carrier (Sylysia FCP 350) to obtain solid SNEDDS (S-SNEDDS). Solid state characterization such as PXRD, DSC and SEM results confirmed the transformation of native crystalline nature of drug to amorphous state. FTIR studies also confirm no drug excipient interaction. Finally, dissolution study was performed and improved *in vitro* dissolution behavior of ramipril from S-SNEDDS over pure drug was observed.

Keywords: Liquid self nano emulsifying drug delivery system (L-SNEDDS), Solid self nano emulsifying drug delivery system(S-SNEDDS), Ramipril, Emulsification, Sylysia FCP 350.

**ANTIANGIOGENIC SURFACE ENGINEERED DENDRIMERS FOR TARGETED DELIVERY OF ANTICANCER DRUG:
THREE PRONGED ATTACK ON CANCER**

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ABSTRACT

In this study, we report folate conjugated poly-L-lysine dendrimers (FPLL) as an efficient carrier for model anticancer drug, doxorubicin hydrochloride (Dox); for pH sensitive drug release, selective targeting to cancer cells, superior anticancer and antiangiogenic activity. This nanoconjugate of Dox showed initial rapid *in vitro* release followed by gradual slow release, and the drug release was found to be pH sensitive with greater release at acidic pH. In the CAM assay and tubule formation assay with HUVEC, Dox-FPLL formulation showed the significant antiangiogenic activity. The *ex vivo* investigations with MCF-7 cell lines showed enhanced cytotoxicity of Dox-FPLL with significantly enhanced intracellular uptake ($p < 0.001$).

FORMULATION AND EVALUATION OF NANOFORMULATION FOR CANCER THERAPY

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ABSTARCT

The aim of present work was to formulate and to evaluate quercetin loaded PLGA nanoparticles which can passively target in tumor tissue by enhanced permeation and retention (EPR) effect for cancer treatment. Nanoparticles are prepared by modified solvent emulsification diffusion technique, Box-Behnken design was applied for optimization of various processing parameters by using 15 runs. DSC and FTIR study performed by differential scanning calorimeter and infrared spectroscopy along with % yield, and % entrapment efficiency. Particle size, zeta potential analysed by Zetatrac particle size analyzer. *In vitro* release study was performed by dialysis bag membrane method. SEM study was done by scanning electron microscopy. By box-behnken experimental design, it was found that drug: polymer ratio and surfactant concentration influence on particle size. Where, stirring speed impacts on particle size. DSC & FTIR study showed that no interaction between drug and excipients. Particle size and % EE were found to be in range between 157.5-473 nm and 70.14-86.89% respectively. From SEM study, particles were found spherical in shape and having uniform size distribution. Zeta potential shows good stability of NPs. Nanoparticles prepared by Solvent emulsification diffusion technique provide desirable size for passive targeting in tumor tissue. This delivery platform opens up a wide range of treatment application of various cancer by nanoparticulate drug delivery system.

Keywords: Quercetin, Nanoparticles, Box-Behnken design, EPR Effect, Solvent emulsification diffusion technique.

ENHANCE SOLUBILITY OF ALBENDAZOLE DRUG BY MESOPOROUS MATERIAL

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ABSTRACT

In present Scenario with advancement in control drug delivery sytem. Multiple drugs are present in market 40 % are poorly water soluble whose bioavailability is low.

Recently, focus for oral drug delivery systems are the inorganic drug carriers, especially the porous carriers, "These are low density solids with open or closed pore structure and they provide large exposed surface area for drug loading. Mesoporous material with regular geometries is generating a lot of attention owing to their great potential in practical application such as catalyzing, absorption, sensing, medical usage and nanotechnology. Various mesoporous silica structure incorporation of heteroatoms such as Cu, Zn, Al and Fe etc. into mesoporous silica framework has been investigated

Keywords: Mesoporous material, Bioavailability, Cu. Zn. Al.

DESIGN AND CHARACTERIZATION OF MULTIPARTICULATE GASTRORETENTIVE FLOATING DRUG DELIVERY SYSTEM

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ABSTRACT

The purpose of this research was to prepare floating microballoons consisting of calcium silicate as porous carrier, propranolol hydrochloride, an oral anti-hypertensive agent and Eudragit S as polymer, by solvent evaporation method and to evaluate their gastro-retentive and controlled release properties. The effect of various formulation and process variables on the particle morphology, micromeritic properties, *in-vitro* floating behavior, percentage drug entrapment and *in-vitro* drug release was studied. The gamma scintigraphy of the optimized formulation was performed in albino rabbits to monitor the transit of floating microballoons in the gastrointestinal tract. The microballoons were found to be regular in shape and highly porous.

DETERMINATION OF PERMEABILITY OF DRUGS USING A MODIFIED PERMEABILITY APPARATUS

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ABSTRACT

There are many methods available to determine the permeability of drugs out of which one model is recently standardized i.e. the everted rat intestine apparatus. With some modification in the apparatus the permeability of some drugs was determined. Six samples in triplicate were taken and analyzed using UV spectrophotometer. After analysis and calculation of data obtained from permeability apparatus and UV spectrophotometer the apparent permeability of drug was determined.

DEVELOPMENT AND CHARACTERIZATION OF SPRAYABLE *IN SITU* GEL OF ALLANTOIN

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ABSTRACT

Development of thermo reversible allantoin *in situ* gel was aimed to improve absorption of drug and give patient compliance. In the present research work, pluronic F-127 (Ploxamer 407) was used to confer temperature-sensitive gelation property. To modulate the gel strength and bioadhesive force for allantoin *in situ* gel, bioadhesive polymers such as Carbopol 934 P, xanthan gum were investigated.

Keywords: Topical, Allantoin, *In situ* gel, Pluronic

RENEWED ROLE AND RESPONSIBILITIES OF PHARMACISTS IN PHARMACY PRACTICE

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ABSTRACT

Pharmacy practice is nowadays very popular word in clinical community as well as in hospital settings. The conventional role of pharmacist has transformed from custodian of prescription medicines into an active health care provider. The renewed role of pharmacist has emerged due to demand from co-healthcare workers, doctors and mainly from patients. Pharmacist is just like a messenger or mediator between doctor and patients. Pharmacy technicians actually communicate and explain clearly the prescription and dose regimen dictated by the doctors to patients. The emergence of information technology in health sciences has put forth the challenge of integrating basic health sciences with applied pharmaceutical sciences in the direction to offer optimized and best healthcare delivery to the patients. Healthcare delivery is no more a domain or responsibility of individual professionals but team work of allied healthcare providers like doctors who diagnose, pharmacists who scrutinize prescriptions and educate patients while nurses are those who render the nursing services to patients. In this modern society, the cost of the treatment and crisis on human resources for healthcare has made it difficult to deliver quality care to all the patients. The emergence of trained pharmacists have been increasing due to explosion of knowledge in healthcare sciences but it is very unfortunate usually a fraction of knowledge gets applied in clinical practice despite of availability of technology and skills. Pharmacists role is dedicated to the preservation and advancement of public health and it is a challenge to all pharmacy technicians.

FORMULATION AND EVALUATION OF SUSTAINED RELEASE PELLETS OF MESALAMINE

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ABSTRACT

The main aim of this research work was to develop an efficient delivery of therapeutic agents for management of IBD. Enteric coated SR Pellets of Mesalamine will be prepared and when they were administered will release Mesalamine in colon to provide relief against IBD by lowering down inflammation which is also thought to alleviate the IBD. Hence the patient can get marked relief after the administration of the developed Pellets system.

Mesalamine was arranged as a gift sample Ipca Laboratories, Ratlam and MCC, HPMC 15cps, and Eudragit NE D35 was provided from Unijules life science, Nagpur. Pellets were formed by Wet Granulation method followed by Extrudation, Spheronization and Pan coating process. Characterization of pellets was done through evaluating Particle size, Yield, Drug content, Drug release, Flow properties etc. Results show the acquired data was from experimental data are comparable. Drug release gives highly acceptable values. The variation being observed in data was due to volumetric, manual and instrumental error. Conclusively this paper shows that SR pellets is highly acceptable by providing max drug release value in CTDDs.

Keywords: IBD, High drug release, Coating polymer, Sachets packing.

FORMULATION AND DEVELOPMENT OF HOLLOW MICROSPHERES OF LOSARTAN POTASSIUM AGAINST HYPERTENSION

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ABSTRACT

Objective of the present investigation was to formulate and develop hollow microspheres of Losartan potassium. Hypertension, also referred to as high blood pressure, is a condition in which the arteries have persistently elevated blood pressure. There is emerging need to develop formulations that would not only lead to control of hypertension but also maintain the therapeutic effect for longer period of time. Losartan potassium belongs to the class III of BCS (Biopharmaceutical classification of system), exhibiting high solubility and low permeability. Hence, enhanced gastric retention time of Losartan potassium controlled release dosage form will increase its absorption. In the present research work the combination of cost-effective and biocompatible polymers Eudragit® RS100 has been used to formulate floating microspheres through emulsion-solvent diffusion method. The formulation was found to be efficient with good recovery yield and percent drug entrapment which sustained the drug release i.e. 75.37 ± 0.76 % drug release at the end of 12 h. The hollow microspheres can act as potential tool in the form of novel drug delivery system (NDDS) against hypertension.

Keywords: Losartan potassium, Emulsion-solvent diffusion technique, Hollow microspheres, Angiotension II receptor blockers, Novel drug delivery system.

DEVELOPMENT, CHARACTERIZATION AND OPTIMIZATION OF FAST DISSOLVING TABLETS OF DOMPERIDONE

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ABSTRACT

The fast dissolving tablets of domperidone were prepared by direct compression technique, using 3^2 full factorial designs. This research work aimed to study and to develop a unique drug delivery system for immediate release of drugs which can dissolve readily when placed in the oral cavity. The superdisintegrants (Ac-Di-Sol, sodium starch glycolate and Crospovidone) in varying concentration (2-4% w/w) were used to develop the tablets. Total 12 formulations were prepared and evaluated for pre-compression and post compression characteristics. The optimization of the batches was carried out using 3^2 full factorial design and results of polynomial equation were analysed using ANOVA and regression analysis. Then another batches using effervescent technology were prepared. By the use of desirability approach final optimized formulation was prepared.

FORMULATION AND EVALUATION OF LOZENGES FOR ORAL BACTERIAL INFECTION

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ABSTRACT

Oral drug delivery is the most preferred and simplest means as the oral route provides maximum active surface area among all drug delivery system for administration of various drugs. The lozenges are solid medicated, flavored and sweetened base dosage forms intended to be sucked and hold in the mouth/pharynx to treat local irritation, mouth or pharynx infection. Lozenges are one of the very popular and better innovative dosage form and oral confectionary products.

In present research work, Roxithromycin lozenges were formulated and Evaluated for oral bacterial infection. Roxithromycin complexed with β Cyclodextrin for taste masking and solubility enhancement. The developed formulation proves to be were beneficial for pediatrics and geriatrics patients and those who can't swallow the drug.

Roxithromycin lozenges were formulated by wet granulation technique with excipients like sucrose, lactose, citric acid, flavor and color. Formulated Compressed tablet lozenges of Roxithromycin (C_6) were characterized for diameter, thickness, weight variation, hardness, friability, mouth dissolving time, % drug content and disintegration time

Keywords: Lozenges, Roxithromycin, β Cyclodextrin.

DEVELOPMENT OF STABLE LYOPHILIZED NANOSUSPENSION OF FELODIPINE BY USING LATEX OF *JATROPA CURCAS* AS STABILIZER

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ABSTRACT

Objective: Stability issue of nanosuspension is major problem which can be solved by using a natural stabilizer like *Jatropha curcas*. So in this present investigation latex of *Jatropha curcas* is used to formulate nanosuspension for enhancing the oral bioavailability of felodipine by improving its solubility, dissolution rate, bioavailability and stability at room temperature.

Methods: The nanosuspension of felodipine were prepared by media milling technique using *Jatropha curcas* as a stabilizer followed by lyophilization using mannitol as a cryoprotectant. In order to achieve desirable size and saturation solubility various formulation as well as process parameters were optimized. The prepared nanosuspension was characterized with respect to particle size, zeta potential, saturation solubility, dissolution rate, morphology study (TEM), in-vitro and ex vivo drug diffusion study. Evaluation of the crystalline state before and after particle size reduction was done by differential scanning calorimetry (DSC) and powder X-ray diffraction (PXRD).

Results: The results indicate that *Jatropha curcas* successfully stabilized the nanosuspension as compared to SLS. It also shows that initial crystalline state of drug is preserved following particle size reduction and that the saturation solubility, dissolution velocity and diffusion rate of the drug from the nanosuspension is significantly higher than that of the plain drug suspension as well as from the marketed tablet formulation.

Conclusion: *Jatropha curcas* seems to stabilize nanosuspension efficiently as compared to Sodium lauryl sulphate and HPMC. *Jatropha curcas* is easily available and is cost efficient. As it is herbal it has low toxicity as compared to synthetic one, so one can go for *Jatropha* latex as a stabilizer to prepare many formulations with minimized toxicity. Nanosuspension is a promising approach for enhancement of bioavailability because of the simple method of its preparation and its universal applicability.

Keywords: *Jatropha curcas*, Bioavailability, dissolution, nanosuspension, solubility.

EFFECT OF PEG CHAIN LENGTH ON PEGYLATION OF DENDRIMERS

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ABSTRACT

In present work we have used different chain length of PEG for PEGylation of dendrimers to check which PEG chain is most suitable for PEGylation of dendrimers. In present work different PEGylated polyamidoamine (PAMAM) dendrimers using six different PEG chains i.e. PEG-200,300,400,600, 2000 and 6000 was synthesized. Then it was evaluated for color reaction, Ultra violet Spectrophotometry, Infra red Studies and NMR spectra studies and compared with standard data. The results revealed that PEGylation with PEG 400 and 600 gives considerable amount of PEGylation hence it could be better used for PEGylation of dendrimers.

DEVELOPMENT AND EVALUATION OF MULTI UNIT PARTICULATE SYSTEM(MUPS) FOR PARACETAMOL AND RIZATRIPTAN BENZOATE

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ABSTRACT

In the present work multi-unit particulate system (MUPS) of Rizatriptan benzoate and Acetaminophen were formulated using matrix forming polymer. Pellet system was designed so as to release one active agent immediately where as the other therapeutic agent was released in a sustained manner. This in turn was lead to effective treatment of migraine by reducing dose size, dosing frequency and enhance patient compliance. MUPS/pellets system was formulated using pelletization technique (Extrusion/Spheronization). The objective of research was to formulate an effective and applicable treatment for migraine through formulation of MUPS (pellets) by extrusion/spheronization technique of pelletization. this type of research formulation (pellets)of paracetamol and rizatriptan provide and long time migrainic pain management

Keywords: Multi particulate drug delivery system, Rizatriptan benzoate and Paracetamol pellets, Pelletization techniques

UTILIZATION OF LAYER BY LAYER TABLET TECHNOLOGY FOR FORMULATION OF ALLOPURINOL OF LOADED TABLETS

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ABSTRACT

There are many ways to deliver drugs into the body, viz oral (through swallowing), sub mucosal (through buccal and sublingual mucosa), parenteral (through injection), transdermal (through skin), pulmonary (through inhalation) etc. Despite disadvantages, oral drug delivery remains the preferred route of drug delivery. Novel technologies with improved performance, patient compliance and enhanced quality have emerged in the recent past. Multilayer tableting is getting increasing attention from a variety of industries for a variety of reasons: patent extension, therapeutic, marketing to name a few. To reduce capital investment, quite often existing but modified tablet presses are used to develop and produce such tablets.

Keywords: Layer by layer tablets, GMP requirements, Tablet press.

GEL LOADED DENTAL IMPLANT: A DEMIURGIC DRUG DELIVERY SYSTEM FOR TREATMENT OF GINGIVITIS

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ABSTRACT

Pharmaceutical technologists today are able to provide drug delivery systems with very precise control over drug release for a prolonged period of time, dominating the need for a frequent dosing and minimizing side effects thereby increasing patient compliance and comfort. In conventional mode of administration, many drugs do not reach the target area in the body in sufficient concentration because many are prematurely inactivated and excreted. This problem can be overcome by administering the drugs directly into the intended site of action with lesser dose.

Keywords: Dental Implant, Dental diseases, Local delivery system, Advantages.

FORMULATION AND CHARACTERIZATION OF SELF EMULSIFYING DRUG DELIVERY SYSTEM OF SPIRONOLACTONE

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ABSTRACT

Spirolactone is aldosterone antagonist drug belonging to the category of potassium sparing diuretics administered orally that has absolute bioavailability of only 68% due to the poor aqueous solubility. The main aim of the present work was to develop a self emulsifying drug delivery system (SEDDS) to enhance the oral absorption of spironolactone. The solubility of spironolactone in various oils, surfactants, and co surfactants was determined. Pseudo ternary phase diagrams were constructed using castor oil, Tween 80, and polyethylene glycol 400, and distilled water to identify the efficient self-micro emulsion region. Prepared self emulsifying drug delivery system was further evaluated for its emulsification time, drug content, optical clarity, droplet size, zeta potential, *in vitro* drug release. The results showed that 96.16% drug was released from the SEDDS formulation in 3 h. This demonstrated an enhancement in the drug release and thereby, absorption of the drug through the membrane, this was significantly higher than that of the plain drug suspension. Thus, the above findings support that the utility of SEDDS to enhance solubility and dissolution of poorly water soluble compounds which may result in improved Therapeutic performance.

Keywords: Spirolactone, Bioavailability, Solubility, SEDD.

FORMULATION, DEVELOPMENT AND EVALUATION OF ORODISPERSIBLE TABLETS OF PALONOSETRON HCL

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ABSTRACT

Oral drug delivery remains the most preferred route for administration of various therapeutic agents. Recent advances in technology prompted researchers and scientists to develop oral dispersible tablets (ODTs) with improved patient compliance. ODTs are solid unit dosage form which dissolve or disintegrate rapidly or instantly in the oral cavity without water. In such cases bioavailability of the drug observed is greater than the conventional tablet dosage form. This is because the drug is absorbed from mouth, pharynx as the saliva passes down to the stomach. Various techniques employed to prepare ODTs include direct compression method, freeze drying, spray drying, tablet moulding, sublimation and mass extrusion. Orodispersible tablets of palonosetron HCl were prepared using, sodium starch glycollate, croscarmellose sodium, mannitol, sodium saccharin, talc, magnesium stearate and manufactured by wet granulation technique. The basic approach in the formulation of ODTs tablets are to increase porosity of tablet and incorporate superdisintegrants in optimum concentration to achieve rapid disintegration and instantaneous dissolution of tablet *al. ong* with good taste masking properties and excellent mechanical strength. Tablets containing sodium starch glycolate and croscarmellose sodium shows optimum results with dispersion time less than 30 sec. Thus ODT has tremendous scope for being the delivery system for most of the drugs in near future.

Keywords: Orodispesible tablets (ODTs), Fastdisintegrating tablets (FDTs), Superdisintegrants.

“SOLID AS SOLVENT” NOVEL SPECTROPHOTOMETRIC ANALYTICAL METHOD TO ANALYZE METRONIDAZOLE TABLETS USING SOLIDS AS SOLUBILIZING AGENTS (MIXED SOLVENCY CONCEPT)

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ABSTRACT

The toxicity of organic solvents causes major drawback in analysis of various drug formulations. Insolubility is an important aspect of analysis of various drug formulations to overcome this problem we introduce a novel concept which is solid as solvent. In this experiment we describe solvent character of eutectic mixture of phenol and Lignocaine Hydrochloride in 4:1 ratio (PL-41) on weight basis for spectrophotometric estimation of Metronidazole tablets. The solubility of Metronidazole tablets at room temperature in distilled water was found to be 7.28 mg/ml instead of this in PL-41, it increases upto more than 160 mg/ml which is about 22 times more. This proposed analytical method represents novelty, rapidity, accuracy, non hazardous characteristic, reproducibility. Recovery studies and statistical data are those parameters which proves accuracy, precision and reproducibility for the proposed method. The occurrence of tablet excipients, phenol and Lignocaine hydrochloride did not interfere in spectrophotometric estimation at 320 nm. Phenol does not causes any interference above 300 nm in spectrophotometric analysis. In future, it may introduce new pathways for drug analysis, extractions of active constituents from herbal sources and organic synthesis by using solids especially melted solids, eutectic liquids etc.

FORMULATION DEVELOPMENT AND OPTIMIZATION OF DORZOLAMIDE PH TRIGGERED OPHTHALMIC *IN SITU* GELLING SYSTEM

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ABSTRACT

A novel ophthalmic sustained release pH triggered dorzolamide *in situ* gel was prepared using carbopol 974 P and HPMC K4M. 3²factorial design was applied to study the effect of independent variables viz. Concentrations of carbopol 974 P and HPMC K4M, on dependent variables like *in vitro* drug release, viscosity at physiological pH. The optimized formulation showed 89.86 % cumulative drug release after 8 h, optimum viscosity 8700 cps was observed at physiological pH. The optimized formulation further evaluated for zeta potential study, texture analysis, sterility and preservative efficacy testing as per I. P.2010, *ex vivo* study and histological study. These data demonstrate that dorzolamide pH triggered *in situ* gel is potentially useful as ocular drug delivery and addition of HPMC K 4M into carbopol 974 P can be considered as useful polymeric platforms for sustained drug delivery.

DUAL TARGETED DELIVERY OF PACLITAXEL TO GLIOMA CELLS USING FOLATE AND PEPTIDE DECORATED HYBRID NANOPARTICLES

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ABSTRACT

Glioblastoma multiform (GBM), the most hostile form of brain tumors characterized by high proliferation rate, migration, invasion as well as secretion of angiogenic factors. Effective chemotherapy for glioblastoma requires a smart nanocarrier that can penetrate the blood brain barrier (BBB) and subsequently target the glioma cells. Dual-targeting paclitaxel (Ptx) polymer lipid hybrid nanoparticles (PLNs) were produced by conjugating with both folate (F) and cRGDfK, for the effective penetrating across BBB and targeting glioma, respectively. PLNs were prepared by nanoprecipitation technique combined with self-assembly. The NPs was characterized by particle size, shape, zeta potential, entrapment efficiency, *in vitro* release profile, cytotoxicity, hemolysis study, cell uptake and apoptosis study in T98G glioma cells, *in vitro* trans-endothelial transport in brain endothelial cell lines. The *in vivo* biodistribution in brain tumor and survival was also assessed. The results indicated that dual-targeting NPs are a promising potential carrier for glioma chemotherapy.

INTERNATIONAL CONFERENCE: FORMULATION AND EVALUATION OF NICORANDIL MOUTH DISSOLVING TABLETS

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ABSTRACT

The study aims to explore the potential of mouth dissolving tablets in improving the oral delivery of Nicorandil by use of superdisintegrants. Mouth dissolving tablets have received ever-increasing demand during the last decade, and the field has become a rapidly growing area in the pharmaceutical area. Tablets were prepared by direct compression technique using sodium starch glycolate, croscarmellose sodium and crospovidone as superdisintegrants in various concentrations. Optimized batch were characterised for hardness, friability, in-vitro disintegration, dissolution, stability studies etc and was found satisfactory. The optimized formulation was found to be faster in drug release profile as well as disintegration time compared to that of marketed immediate-release formulation. The tablets were found to be stable in 6 mo stability studies in different packing.

Keywords: Nicorandil, Superdisintegrants, *In vitro* disintegration time, *In vitro* dissolution test

FORMULATION AND EVALUATION OF LIQUISOLID COMPACT FOR ENHANCEMENT OF SOLUBILITY AND DISSOLUTION RATE OF CILNIDIPINE

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ABSTRACT

Development of liquisolid compacts is one of the new pharmaceutical formulation technologies to improve the dissolution rate of poorly soluble drugs. Cilnidipine is an antihypertensive agent which belongs to the class of angiotensin II receptor antagonists. Cilnidipine is insoluble in water, which results in poor dissolution and poor bioavailability of the drug. Thus increasing the aqueous solubility and dissolution of cilnidipine is of therapeutic importance. The intent of present investigation was to enhance the solubility and dissolution of cilnidipine by two techniques namely liquisolid compact and solid dispersion. Liquisolid compact, saturation solubility study of cilnidipine was carried out in various non-volatile solvents. Liquisolid compacts were developed using polyéthylène glycol 400 (PEG 400) as solvent, Avicel PH102 as the carrier powder and Aerosil 200 as the coating material. The crystallinity of the newly formulated drug and the interaction between excipients was examined by differential scanning calorimetry. The dissolution studies for the liquisolid formulation and the marketed product were carried out to determine the improvement in dissolution rate and finally the best formulation was subjected to stability studies to assess the drug stability in the formulation. Liquisolid compact shows the highest drug release 100% was achieved by within the 45 min. while compared to solid dispersion have 71.23% in 45 min marketed preparation 44.94% and conventional 46.78% respectively. The dissolution rate was also found to be significantly increased compared to the conventional tablet. In conclusion, the liquisolid technique was considered as a promising approach to improve the solubility of poorly soluble drugs like cilnidipine.

Keywords: Cilnidipine, Liquisolid compact, Solid dispersion, Dissolution.

FORMULATION AND CHARACTERIZATION OF MOUTH DISSOLVING FILMS CONTAINING RIZATRIPTAN

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ABSTRACT

In present research work mouth dissolving film formulations containing Rizatriptan were prepared using different concentrations of HPMC E5 and xanthan gum by solvent casting method. Total nine formulations were prepared. All formulations were evaluated for various parameters like thickness, surface pH, folding endurance, weight variation, % drug content, disintegration time, and *in vitro* dissolution study. A 3² factorial design was used to study the effect of HPMC E5 and xanthan gum (Independent variables) on disintegration time & percentage cumulative drug release (dependent variables). The response was analyzed using ANOVA & polynomial equation. It was concluded that independent variables were significantly affected all the response parameters. After optimization F₈ was considered as a best formulation having disintegration time of 25±0.5 sec. & percentage cumulative drug release at 30 min. of 98±0.3%. F₈ is further evaluated for, *Ex-vivo* permeation studies and compared with marketed formulation of Rizatriptan.

PREPARATION AND EVALUATION OF pH SENSITIVE GASTRORETENTIVE MICROSPHERES OF AMOXYCILLIN

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ABSTRACT

The objective of the present investigation is to prepare pH stimuli gastroretentive Amoxicillin sensitive microspheres of amoxicillin on the principle of cation induced gelification. The sodium alginate and chitosan blend were cross linked with calcium chloride. Mucoadhesive microspheres containing chitosan as mucoadhesive polymer were prepared with regard to drug targeting specificity in the gastric mucosa. The microspheres were found to be discrete, spherical, free flowing. The prepared microspheres were subjected to evaluation for various flow properties.

PREPARATION AND DEVELOPMENT OF DRUG LOADED MUCOADHESIVE MICROSPHERES AGAINST *H. PYLORI* INFECTION

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ABSTRACT

The ethyl cellulose microspheres of amoxicillin were successfully prepared by emulsification solvent evaporation technique and confirmed that it is a best method for preparing microspheres from its size uniformity and spherical shape. Mucoadhesive microspheres were prepared using various polymers in different concentration. Total 9 batches were prepared using various polymers like carbopol, CMC and HPMC in different concentrations. The best batch exhibited a high drug entrapment efficiency of 89%; mucoadhesion percentage after 12 h was 89%, drug release 87.92%, and the particle size was 116.21 μ m.

Keywords: Amoxicillin, Mucoadhesive microspheres, Oral drug delivery systems.

FLOATING PULSATILE DRUG DELIVERY SYSTEM: AN APPROACH FOR TIME CONTROLLED DRUG DELIVERY

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ABSTRACT

Chronotherapeutics is the discipline concerned with the delivery of drugs according to the intrinsic activities of a disease over a certain period of time because the biochemical, physiological and pathological variations over a 24h period in humans has been occurred. Chronotherapeutics is defined as the method in which drug availability is matched with the rhythms of the disease according to time structure which results in maximum therapeutic effects and less adverse effects. Chronotropic system are designed over the concept of chronopharmaceutics in which there is a specificity in delivering higher amount of drug in a burst at circadian timings correlated with specific pathological disorder to achieve maximum drug effect. In these systems there is a transient release of certain amount of drug within a short period of time immediately after a predetermined off-release period. Floating pulsatile drug delivery systems (FPDDS) are designed to elicit programmable lag phases preceding a quick and quantitative release of drug. FPDDS concept was applied to increase the gastric residence of dosage form having a lag phase followed by burst and rapid release. Diseases wherein FPDDS are promising include asthma, peptic ulcer, cardio-vascular diseases, arthritis. To overcome limitations of various approaches imparting buoyancy and lag controlling were prepared by floating pulsatile drug delivery systems, for which time controlling system like swelling and rupturable membranes, soluble or erodible coating, capsule shaped system and the multi particulate system are primarily involve in the control of release. FPDDS showed excellent lag phase followed by burst release in distal part of small intestine which give site and time specific release of drugs acting as per chronotherapy of diseases.

Keywords: Chronopharmaceutics, Chronotropic system, Floating Pulsatile Drug Delivery System, Chronotherapy, Lag Phase.

**INTERNATIONAL CONFERENCE: FABRICATION AND EVALUATION OF EFFERVESCENT FLOATING MATRIX
TABLET OF FAMOTIDINE WITH KOLLIDON® SR**

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ABSTRACT

Floating Kollidon SR (KSR) matrix tablets containing famotidine was developed to increase gastric residence time and bioavailability after oral administration. Total six formulations were formulated by direct compression technique using varying concentrations of Kollidon SR (floating agent). The formulations were evaluated for their drug content, hardness, friability, buoyancy lag time, total floating time, swelling index and in-vitro drug release. All formulations possessed good floating properties with total floating time > 12 h.

APPLICATION OF SIX SIGMA TECHNIQUE FOR IMPROVING VIALS WASHING PROCESS

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ABSTRACT

Six sigma is a statistical concept which helps us to define the problem systematically, provides tools to measure and analyze the influential factors, identifies the improvements that can be implemented easily and ensure that the changes which have been made, are kept alive through a control process and maintains the gains over the time. It is a known fact that in a process with six sigma capability, process variation is not reduces more than 3.4 defects per million opportunities. There are two six-sigma sub methods namely DMAIC and DMADV. Globalization, advanced technology, and increased sophisticated customer demands change the way of conducting business. Higher Productivity achievement is very crucial factor for the field of production. With the High productivity various other factors must be taken in to consideration in manufacturing industries such as global competitors, diversity in product range, lead time and customer demand in terms of quality and quantity. A new benchmark called Six Sigma has been invented for dealing with all the needs. Six Sigma is a quality initiative which reduces variations in a process and helps to lower the cost of product as well as process. This research work has been carried out on a vials washing machine to improve the washing process by using Six-sigma technology. Before the implication of six sigma technology the process works on 4.5 sigma scale and after implication of six sigma technology process works on 4.9 sigma scale. It is concluded from this work that overall process of vials washing was improved by applying Six Sigma Technology.

Keywords: Six Sigma, DMAIC, DMADV, Statistical approach, Tools and Techniques, Vials washing.

DRUG PRICE COMPETITION AND PATENT TERM RESTORATION ACT AMBIGUITIES

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ABSTRACT

The patent system is the driving force behind pharmaceutical innovations¹. It provides the innovators 20 y of royalty to recover their investments done in research and development of the new product. It also ensures the company's ability to further profit from its innovations before generic drug manufacturers can copy and market the drug at a greatly reduced cost². During this period no one can prepare, sell and copy innovator's product without his permission. These patented products are costly and are not affordable to all consumers. With a view of making available, the effective treatment option to common public, the patent term restoration act 1984, also known as "Hatch Waxman act", was passed. It provides an opportunity to generic participants to enter in the market without affecting the innovator royalty. To capture maximum market shares and to maintain their monopoly in the market, even after patent expiry, innovator companies utilize different loopholes of the act such as thirty-month stay, authorized generic, citizen petition, reverse payment settlement, patent evergreening, etc., to restrict the generic participants to enter in the market. Here we have discussed about the above ambiguities which are utilized by innovator companies to restrict generic entry in the market.

INTERNATIONAL CONFERENCE: FORMULATION OF CONTROLLED RELEASE MATRIX TABLET OF DICLOFENAC SODIUM USING CROSS LINKED STARCH UREA

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ABSTRACT

The present work aims to develop controlled release matrix tablet of diclofenac sodium with modified starch crosslinked starch urea as a sustained release polymer and to evaluate the prepared dosage form for physical parameters like weight variation, hardness, friability and drug content. Cross linked starch urea is modified starch introducing desirable alterations in the starch structure so that its behavior is predictable and controllable. In the present study, the influence of different concentration of polymer on erosion of matrix system was studied, with a view to develop controlled release formulation diclofenac sodium. The Diclofenac sodium tablet prepared by wet granulation method. The result from *in vitro* drug release study indicated that formulation F1 to F6 with different polymer concentration and F5 were found to release the drug at a steady state over an extended period of time up to 24 h.

Keywords: Modified starch, Matrix tablets, Control release, Diclofenac sodium, cross linked starch urea.

AN APPROACH FOR TREATMENT OF DANDRUFF AND ITS ASSOCIATED ALOPECIA

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ABSTRACT

Topical dosage form were used since human origin. In humans, hair, with its variety of colors, agencements, shape, length, density, and other qualities, adds to individual uniqueness and provides an aesthetic quality for others to see and appreciate. Androgenetic alopecia are common hair disorders of the hair follicle which may heavily influence self esteem and self image. Antifungal treatment have proposed to treat to Alopecia. A limited number of antifungal drugs are used topically. Among them Ketoconazole is used widely for topical eradication of dandruff. Dandruff scalp give rise to increased hair fall as compared to normal scalp, which is treated by topical Minoxidil formulation. Minoxidil along ketoconazole aid hair growth and mangament of alopecia. Aim of present work is to develop a topical formulation containing both ketoconazole and minoxidil so that dandruff and associated diffused alopecia can be treated simultaneously. Formulation was prepared by incorporating both the drug in emulgel at a particular step. Emulsion in gel have emerged as one of the most interesting topical drug delivery system as both hydrophilic and lipophilic drugs can be incorporated in it with dual controlled release system i.e. emulsion and gel. Also the stability of emulsion is increased when it is incorporated in gel. Emulgel was prepared by using carbopol 934 as gelling agent. The influence of concentration of gelling agent and emulsifying agent on the drug release from the prepared emulgel was investigated using a 2×2^2 factorial design. The prepared emulgel were evaluated for their physical appearance, viscosity, pH, spreadability, drug content and drug release. All the prepared emulgel showed acceptable physical properties concerning color, homogeneity, consistency, spreadability and pH value. The highest release was observed with Formulation F8 (92.65 ± 0.08 % for Ketoconazole and 97.63 ± 0.27 % for Minoxidil) and lowest with Formulation F1 (31.39 ± 0.28 % for Ketoconazole and 40.66 ± 0.19 % for Minoxidil). Since we need lowest Ketoconazole release in circulation and highest deposition in skin for dandruff eradication, hence Formulation F1 was further evaluated for drug deposition in rat skin via indirect method and 41.62 % of Ketoconazole and 15.83 % of minoxidil was observed. Thus this formulation can be used for simultaneous treatment of dandruff and associated diffused alopecia for better patient compliance.

EVALUATION OF SURFACE ENGINEERED NANOCONSTRUCTS FOR EFFECTIVE MUCOSAL IMMUNIZATION

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ABSTRACT

The objective of the present study is to encapsulate Immunogens (HBsAg) in PCL (A nanosize polymeric carrier) and then to attach Con A on the surface of antigen loaded nanoconstructs using polyethylene glycol (PEG, a biocompatible polymer) as spacer and to target carbohydrate specific receptor that expressed by epithelial mucosal cells (M cells). The developed system was characterized for shape, size and loading efficiency. The *in vitro* release and antigen integrity were also evaluated. Particles were prepared by a double emulsion solvent evaporation method. The Con A decorated PCL nanoparticles of average size 186.16 ± 2.61 nm with a narrow size distribution (PDI: 0.184 ± 0.040). HBsAg antigen was efficiently entrapped in PCL-PEG-Con A (PPC) nanoparticles (entrapment efficiency $40.70 \pm 2.53\%$, loading capacity $16 \pm 2\%$ (w/w)). After oral immunization mucosal immunity induction was assessed by measuring cytokine (IL-2 and IFN- γ) levels in the spleen homogenates. The results suggested that PPC nanoparticles elicited strong mucosal, cellular and humoral immune responses and hence could be a competent carrier-adjuvant delivery system for mucosal immunization against Hepatitis B.

Keywords; Oral immunization, HBsAg, Vaccine targeting; Nanoparticles, Con A.

EXPERIMENTAL DESIGN BASED OPTIMIZATION OF INSITU GELLING MICROEMULSION FOR CNS TARGETING: EX VIVO RELEASE AND PHARMACODYNAMICS STUDIES

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ABSTRACT

Lorazepam *in situ* gelling microemulsion (MEG) for intranasal delivery is a novel approach involving interactions between surfactant and polymer was used to investigate enhanced drug release and achieve less mucociliary clearance. Microemulsions formulated using preliminary solubility study and pseudo ternary phase diagrams showed the presence of 54.31 ± 6.07 nm droplets with significantly improved solubilisation capacity of Lorazepam. Effect of oil to surfactant/cosurfactant ratio and gellan gum on the drug release and viscosity of MEG was evaluated using a 32 full factorial design. The formulation was evaluated for rheological behaviour, ex vivo diffusion on nasal mucosa and pharmacodynamic activity in mice and compared with the commercial product. The gel of optimized formulation (MEG1) showed a drug release up to 6 h of $97.32 \pm 1.35\%$. The change in shear-dependent viscosity for different formulations on interaction with SNF depicts crucial role of surfactant-polymer interactions on the gelation properties along with calcium ions binding on the polymer chains. It is proposed that the surfactant-polymer interactions in the form of a stoichiometric hydrogen bonding between oxyethylene and carboxylic groups of the polymers used, provides exceptional ME stability and adhesion properties. On application with goat nasal mucosa, the MEG formulation does not generate any observable toxicity within a 6 h treatment. The pharmacodynamic profile for the MEG showed significant advantages compared to that with the commercial product. To facilitate the translation of MEG strategy for clinical test, we integrate MEG technology for more effective and sustained nasal drug delivery.

DEVELOPMENT AND CHARACTERIZATION OF CARVEDILOL LOADED CHITOSAN NANOPARTICLES BY SOLVENT EVAPORATION METHOD

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ABSTRACT

Carvedilol, a beta-blocker, has been a gold standard for the treatment of hypertension and cardiovascular diseases; but has drawbacks like poor solubility and bioavailability requiring frequent dosing. The present study attempts to overcome these issues through formulating mucoadhesive nanoparticulate delivery system using widely used biodegradable carrier Chitosan(CS). Chitosan based Nanoparticles have attracted a lot attention upon their biological properties such as biodegradability, biocompatibility and bioadhesivity. The chitosan nanoparticles were prepared by solvent evaporation method using chitosan as coating material and carvedilol used as core material. Results show that the impact of formulation and process variables on particle size and entrapment efficiency was studied to optimize the formulation. The physico-chemical characterization confirmed the particle size in nano range with smooth and spherical morphology. Further, DSC studies show the evidence of Nanoparticle formation without any significant interaction between Carvedilol and Chitosan. The *in vitro* drug release study of the prepared nanoparticles showed prolongation of drug release with reduced burst release in comparison with pure drug powder.

Hence, prepared nanoparticles proved to be promising dosage form for sustained drug delivery of Carvedilol reducing dosing frequency, thus increasing the patient compliance.

DYNAMICS OF SURFACTANTS IN RELATION TO REDUCTION OF SILVER IONS AND GROWTH OF NANOPARTICLES

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ABSTRACT

Silver nanoparticles are useful for medical applications due to their strong antibacterial activity. Range of surfactants were employed to control the size of growing silver nuclei during the synthesis process involving tri-sodium citrate as reducing agent and SDS as stabilizer. Nonionics were less effective in controlling the size, while 35 mM aqueous sodium dodecyl sulphate (SDS) in presence of 2% citrate showed lowest size of Ag nanoparticle (AgNPs) with low polydispersity. The results were analysed in terms of the dynamic properties of surfactants and mechanism illustrating the accumulation of silver ions around mixed aggregates of SDS and citrate. We assume that the decreases in numbers of submicellar fragments with increase in the concentration of SDS must control the size of growing nuclei. It is confirmed that size control was optimum only at peculiar 1:2 ratio of SDS to citrate. The size of formed nanoparticles was measured by the dynamic light scattering (DLS) and AFM, which is in good agreement with absorption profile obtained from UV-Vis spectra. The molecular interactions between the species in the reaction mixture are monitored by NMR.

APPLICATION OF SIX SIGMA TECHNIQUE FOR IMPROVING AMPOULES SEALING AND FILLING PROCESS

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ABSTRACT

Six Sigma can be defined as many things, and to different people it may have different meanings. Six Sigma as a methodology that aims to produce near perfect production process. Six Sigma aims for a performance target of only 3.4 defects for every million activities. Six Sigma is as change in organizational culture with the outcome to enhance the position a company, with the goal to achieve greater customer satisfaction, profitability, and competitiveness. While Six Sigma is not statistical system, it does use statistics as a major tool for the use and interpretation of the data. Six Sigma has been used by some of the world's most successful companies in a variety of different industries as a means to increase their operational efficiency and improve quality while still facilitating compliance, and providing significant benefits to the customer. The focus of Six Sigma is to enhance customer satisfaction and reduce cost by using facts and statistical analysis to minimize the non-desirable variation in the business processes. to eliminate delays between process steps lining up these processes so that there is virtually no interruption. Six sigma is divided in two sub methods DMAIC (Define, Measure, Analyze, Improve and Control) is improvement system for existing processes. DMADV (Define, Measure, Analyze, Design, Verify) is used to develop new processes at six sigma level. This research work has been carried out on ampoules washing and sealing machine to show how to improve its productivity and quality by using six sigma.

Keywords: Six Sigma, Approaches of Six Sigma, DMAIC, Pharmaceutical Industry, Clinical trials.

FORMULATION DEVELOPMENT OF SMART GEL PERIODONTAL DRUG DELIVERY SYSTEM FOR LOCAL DELIVERY OF ANTIMICROBIAL AGENT WITH APPLICATION OF EXPERIMENTAL DESIGN

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ABSTRACT

The aim of the present study was to increase the solubility of an anti-bacterial drug azithromycin by making its inclusion complex with hydroxy propyl β -cyclodextrin and to develop its biodegradable in situ gel so as to overcome first-pass effect and consequently enhance its bioavailability. Periodontitis is an inflammatory condition affecting teeth resulting in progressive destruction of periodontal ligaments, resorption of alveolar bone and loss of teeth. Treatment of periodontitis includes surgical and non surgical management. Systemic antibiotics are also used for the treatment of periodontitis. Azithromycin dihydrate, used systemically in the treatment of periodontitis, was formulated into in situ gel using biodegradable, thermosensitive polymer Pluronic® F-127 (PF-127) and Hydroxy Ethyl Cellulose (HEC) as copolymer. The formulation was characterized in terms of *in vitro* gelling capacity, viscosity, rheology, content uniformity, *in vitro* drug release, and syringeability. The prepared smart gels were clear and transparent, sterile, thermoresponsive and injectable. Viscosity of gels increased with increase in concentration of polymer/co-polymer and also with temperature. They gelled in short response time below the body temperature. *In vitro* release studies showed controlled drug release which was influenced significantly by the properties and concentration of PF-127 and HEC. The developed azithromycin smart gel system with complex formation is a novel approach for the treatment of chronic periodontitis since it reduces the dose and side effects, and also providing continuous and prolonged release of active material.

METHOTREXATE LOADED EMULSOMES: A NEWER APPROACH FOR MANAGEMENT OF PSORIASIS

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ABSTRACT

The purpose of our investigation was to develop and evaluate an effective nanocarrier system for successful delivery of anti-psoriatic bioactive Methotrexate (MTX). MTX-loaded emulsomes were prepared by thin film casting method followed by Sonication. Prepared nanoformulation was characterized for shape by photomicrograph and transmission electron microscopy (TEM, Tecnai G2, Hillsboro Oregon, USA). The average particle size and zeta potential were determined by photon correlation spectroscopy. The entrapment efficiency (EE %) was determined. *In vitro* skin permeation studies were performed using locally fabricated franz diffusion cell. Skin irritation was performed on the hairless skin of the albino rats for the determination of toxicity. The size of emulsome was found to be 134.5 ± 1.1 nm, and zeta potential was -25 mV. Entrapment efficiency was found to be $75.7 \pm 4.94\%$. Cumulative amounts of MTX from plain drug solution and emulsomes at 24 h after dosing were 41.23 ± 4.29 $\mu\text{g}/\text{cm}^2$ and 13.45 ± 4.15 $\mu\text{g}/\text{cm}^2$ respectively. The primary irritation index (PII) was found to be 0.00 for emulsomes showing no irritation. With this study we can conclude that emulsomes have shown a good ability to increase drug accumulation in various skin layers.

SOLID STATE CHARACTERIZATION OF GLIBENCLAMIDE INCLUSION COMPLEX WITH BETA-CYCLODEXTRIN FOR IMPROVED BIOAVAILABILITY

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ABSTRACT

The objective of present study is to prepare and characterize cyclodextrin inclusion complex of glibenclamide to improve its aqueous solubility and oral bioavailability. According to the molar stoichiometry, the complex of GCM with β -cyclodextrin was prepared following the 1:1 ratio by coevaporation method. The interaction between GCM and β -CD was analyzed by Fourier-transform infrared spectroscopy and differential scanning calorimetry and was supported by X-ray powder diffractometry. The dissolution rate of GCM complex was faster than those from pure drug. The area under the plasma concentration-time curve after oral administration of the GCM- β -CD complex in rabbits was 1.24 times that of GCM alone. With overall studies, it can be concluded that the solubility of the pure GCM can be improved by forming Inclusion complex with β -cyclodextrin, which ultimately improves its overall bioavailability.

PHARMACEUTICAL INNOVATIONS-FUTURE TRENDS

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ABSTRACT

The pharmaceutical industry is essentially defined by innovation. However, innovation is a highly dynamic process. Alongside the necessary material resources, research and innovation are dependent on a framework that fosters innovation. In the twenty-first century a long and systematic process requiring steadfast commitment and meticulous work has taken the place of previous haphazard experimentation and serendipitous breakthroughs. The majority of new drugs have to complete strictly regulated process to reach the market. Let us look ahead to the fairly clear future trends that are likely to have a significant impact on the pharmaceutical industry.

FOLLICULAR UNIT GRAFTING IN ANDROGENETIC ALOPECIA

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ABSTRACT

Androgenetic alopecia (AGA) affects a wide population across the world (up to 70% of men and 40% of women). Its a unique kind of dermatological condition which although isn't a disease in the conservative sense but may lead to potentially adverse psychosocial sequels. It is an emotionally distressing and therapeutically frustrating disorder. Men typically present a distinctive alopecia pattern involving bitemporal recession of hair and balding vertex hairline recession. There are currently two drugs which have been licensed for the treatment of male AGA: oral finasteride (FNS) and topical minoxidil (MXL) solution which are effective to some extent. Furthermore, upon discontinuing treatment, any gain that has been achieved is quickly lost. Moreover, due to the progressive nature of hair loss, this treatment needs to be started as early as possible and to be continued for an indefinite period of time.

POLYMERIC NANOPARTICLES-MEDIATED DELIVERY SYSTEM FOR ANTI-BACTERIAL PEPTIDES

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ABSTRACT

Most of the bacterial infections are difficult to treat with conventional antibiotics due to tolerance generated by the bacterial strain. Drug resistance leads to higher administration of dose which further contributes to drug toxicity. Fabricating novel drug delivery systems to administer potent antimicrobial peptides (AMPs) in combination with antibiotics concurrently might be a promising approach to deal with such infections. In this work, vancomycin (VNCO), a broad spectrum antibiotic was encapsulated into polycaprolactone (PCL) nanoparticles (NPs) through nano-precipitation method. Novel Antimicrobial lipopeptide SL-036092 has been conjugated on the surface of NPs using EDC-NHS cross-linking technique. The NPs size ranging from 562 nm-782 nm displayed spherical morphology with high drug encapsulation efficiency (64%) and drug loading capacity of (21%). FTIR and XRD analysis revealed the successful conjugation of respective peptide. Drug release depicts the initial burst release of 55% followed by the sustained release of drug up to 21 d. By employing drug release kinetic modelling, formulations were found to have Fickian drug release mechanism. Peptide conjugated NPs showed better anti-microbial activity against gram+ve and gram-ve bacteria which was further confirmed by biofilm inhibition assay. Overall, peptide conjugated-NPs appear to be a viable strategy to improve the drug efficacy against bacterial stains.

Keywords: Polymeric nanoparticles, Antimicrobial lipopeptide, Surface conjugation, Controlled drug release.

DEVELOPMENT AND CHARACTERIZATION OF OPHTHALMIC NANOSUSPENSION OF FLUCONAZOLE

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ABSTRACT

To overcome the limitations in the management of fungal infections including the inability to provide long-term extraocular drug delivery without compromising intraocular structures and/or systemic drug exposure nanosuspensions can be used. The aim of present study, was to investigate the potential of Eudragit S 100 nanoparticles (NPs) as a new vehicle for improvement of the delivery of drug to the ocular mucosa. Fluconazole, a synthetic triazole antifungal was chosen as a model compound. A solvent displacement technique was used to produce fluconazole loaded Eudragit NPs. These NPs had a mean size range of 130-300 nm and a zeta potential of 20-40 mV. After 2 mo of stability study, results were unchanged, indicating good potential for ocular delivery. A fast release characteristic of Fluconazole, independent of the processing conditions with most of Fluconazole release from particles starting within 30 min was observed. Drug was released at a slower rate from RS than RL nanosuspension and this may be due to the greater water permeability of Eudragit® RL polymer. The release rate was related to the drug: polymer ratio. *In vitro* release studies exposed that a highest amount of drug was released within 24 h (60%). The results obtained from ocular tolerability test show that the eye drops of the NPs tested produce negligible irritation to rabbit eyes. The means were significantly different when comparing data of irritation value, degree of flare and degree of swelling of 24, 48 and 72 h for the test solution. It suggests that irritation symptoms on eye changed with time. On instillation of prepared fluconazole NPs for 5 d, keratitis disappeared as evident by reduction in conjunctival hyperemia and hypopyon when compared to normal. All data was found significant by one way ANOVA. The results of the study conclude that fluconazole NPs may represent an efficacious vehicle to deliver the drug into the eye.

FORMULATION OF SUSTAINED RELEASE METFORMIN HYDROCHLORIDE MATRIX TABLETS THROUGH OPTIMIZATION AND THEIR EVALUATION

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ABSTRACT

The object of the present study was to prepare and evaluate sustained release metformin hydrochloride matrix tablets. Metformin HCL, the only available biguanide, for patients with Type 2 diabetes mellitus. It has relatively short plasma half life, low absolute bioavailability. The need for the administration two to three times a day when larger doses are required can decrease patient compliance. Sustained release matrix tablets were prepared using combination of hydrophilic polymer HPMC K15M and hydrophobic polymer ethyl cellulose as rate controlling factor. Optimization techniques using factorial design for two factors at three levels (3^2) was selected to optimize varied response variables viz. release rate exponent (n), k, amount of drug released in 12h (Rel12h) and mean dissolution time MDT. The sustained-release matrix tablets could provide quite regulated release of metformin hydrochloride over an extended period of time 12 h leading to improve efficacy and better patient compliance.

L-VALINE APPENDED PLGA NANOPARTICLES FOR ORAL INSULIN DELIVERY

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ABSTRACT

Oral insulin delivery has been the major research issue, since many decades, due to several obvious advantages over other routes. However, this route poses several constraints for the delivery of peptides and proteins which are to be worked upon. L-valine-conjugated PLGA-nanoparticles were prepared using Double Emulsion Solvent Evaporation Method. The NPs and conjugated NPs were characterized for their size, drug entrapment efficiency, zeta potential, polydispersity index, *in vitro* insulin release. *Ex-vivo* studies and *In-vivo* studies. It is concluded that the L-valine conjugated NPs bearing insulin are the promising carrier for the transportation of insulin across the intestine on oral administration.

FORMULATION AND EVALUATION OF FLOATING BIOADHESIVE TABLET OF GLIPIZIDE

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ABSTRACT

The current study entail successful formulation and evaluation of floating Bioadhesive tablet of Glipizide for prolongation of gastric residence time using the floating-Bioadhesive potential of natural gum and effervescent agent. Floating Bioadhesive tablet were formulated with various material at varying concentrations were used for release controlling properties. The tablets were prepared by Direct Compression Technique and the prepared tablets remained buoyant for more than 12 h in the release medium and showed good bioadhesion strength. The variant concentration of Xantan gum, Guar gum and Chiotsan showed significant difference in the release rate, buoyancy, Bioadhesive strength and lag of tablet. The prepared floating Bioadhesive tablets were evaluated for their physiochemical properties such as Physical appearance, hardness, weight variation, friability, floating lag time, total floating time, swelling index drug content. *In vitro* dissolution studies were carried out by using dissolution apparatus USP (basket type) by using phosphate buffer pH 6.8 as dissolution media. On increasing the hardness of the tablets results in increased floating lag time. On the basis of combined result of *in vitro* dissolution, drug content and *ex vivo* bioadhesion, weight variation, hardness, swelling index, buoyancy lag time, total floating time. The formulation F1 is the best among all nine formulations resulted $95.53 \pm 0.98\%$ drug release spread over 15 h.

Keywords: Floating bioadhesive tablet, Natural gum, Floating lag time, Total floating time.

INTERNATIONAL CONFERENCE: FORMULATION AND EVALUATION OF EFFERVESCENT GRANULES OF HERBAL ANALGESICS

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ABSTRACT

Effervescent Granules of herbal analgesics were prepared for producing analgesic effect. Herbal drugs were selected because of less toxic effect. Granules were prepared using 3 different herbs, Withania somnifera, Sida cordifolia, Boswellia serrata. From these 3 drugs two combinations were selected and prepared that are Formula I: Withania somnifera+Sida cordifolia and Formula II: Withania somnifera+Boswellia serrata. Combinations were selected for the Synergistic effect of analgesia (rapid release, Fast pain relief) as both are analgesic so they are selected in combination. Excipients are used for creating effervescence are Citric acid, Tartaric acid and Sodium bicarbonate. The granules were prepared & evaluated as per the official method. On the basis of evaluation parameters, both combinations show promising results. It was found to be successful method for preparation of effervescent granules of herbal drugs. The formulation aims to show the dual action (Pain relief as well as antacid). Key words: Effervescent Granules, herbal drugs, withania somnifera, sida cordifolia, boswellia serrata, evaluation.

COMPARATIVE STUDY OF DIFFERENT MARKETED PARACETAMOL PEDIATRIC ORAL SUSPENSION

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ABSTRACT

Paracetamol (or acetaminophen) is a common analgesic, a drug that is used to relieve pain. It can also be used to reduce fever, and some kinds of headache. This make it an antipyretic, something that reduces fevers. It is used in many drugs that treat flue and colds. The assay is based on the ultraviolet UV absorbance maxima at about 256 nm wavelength of paracetamol using 0.1N Sodium hydroxide as solvent. The suspensions were dissolved in 0.1N Naoh solution to produce solution containing paracetamol. The absorbance of sample preparation was measured at 256 nm against the solvent blank and the assay was determined by comparing with the absorbance of available brand. Our results reveals that among all the five brands of paracetamol oral suspension (crocin, sumol, T-98, lanol, PCM). T-98 and Crocin shows highest percentage assay 99.81% and 99.72%. PCM shows lowest value for percentage assay 97.34%.

DEVELOPMENT AND OPTIMIZATION OF GASTRORETENTIVE DRUG DELIVERY SYSTEM USING 3³ FACTORIAL DESIGN

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ABSTRACT

The object of this research was to formulate and optimize mucoadhesive microspheres of amoxicillin for the use in the treatment of gastric and duodenal ulcers, which were associated with *Helicobacter pylori*. The mucoadhesive microspheres containing carbopol-934P as mucoadhesive polymer and ethyl cellulose as carrier polymer were prepared by an emulsion-solvent evaporation technique and were optimized using 3³ factorial design. Initially Twenty seven formulations were prepared. Results of preliminary trials indicate that polymer ratio, quantity of emulsifying agent and speed of rotation affected the characteristics of microspheres. Microspheres were discrete, spherical, free flowing and showed a good percentage of drug entrapment efficiency. An *in vitro* mucoadhesive test showed that amoxicillin mucoadhesive microspheres adhered more strongly to the gastric mucous layer and could retain in the gastrointestinal tract for an extended period of time. A 3³full factorial design was employed to study the effect of independent variables, polymer ratio (X1), Quantity of emulsifying agent (X2) and stirring speed (X3) on dependent variables, drug entrapment (Y1) and particle size (Y2). The best batch exhibited a high drug entrapment efficiency of 66%; mucoadhesion percentage after 1 h was 79% and the particle size was 61 µm. A sustained drug release was obtained for more than 10 h. The polymer ratio had a more significant effect on the dependent variables. The morphological characteristics of the mucoadhesive microspheres were studied under a scanning electron microscope. *In vitro* release test showed that amoxicillin released slightly faster in pH 1.2. The results showed that amoxicillin mucoadhesive microspheres had a better clearance. In conclusion, the prolonged gastrointestinal residence time and enhanced amoxicillin stability resulting from the mucoadhesive microspheres of amoxicillin might make a contribution to *H. pylori* complete eradication.

Keywords: Mucoadhesive microspheres, Optimization, Factorial design, *H. pylori*.

TRANSDERMAL DELIVERY OF ANTI-HIV DRUG VIA ETHOSOMAL FORMULATION TO THE SKIN

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ABSTRACT

The culling of a vehicle/ingredient can considerably impinge on drug delivery and subsequently efficacy of topical/transdermal preparations. Selecting the correct delivery medium is also of paramount importance. An assortment of vesicular carriers (some family)-ie; liposomes, niosomes, ethosomes, etc.—are commonly used as delivery systems in transdermal formulation. Ethosomes of Tenofovir (TFV) had prepared by sonication method by selecting vehicle which promotes permeation and enhances the bioavailability of drug. Vesicle sizes varied from 180.3 ± 5.3 to 522.5 ± 11.2 nm depending on the concentrations of phospholipids (soya phosphatidyl choline) and alcohol (ethanol) along with permeation enhancer. Entrapment of drug in vesicles increases with increase concentration of phospholipids and ethanol to certain extent and after that there is no significant increase. Ethanol and permeation enhancer play vital role in invitro drug release of formulation. Increasing ethanol concentration (20-40%) enhances the invitro release and further increase didnot show any significant increase. Selection of vehicles and its concentration are imperative stricture for any dosage form to be success in terms of bioavailability and release pattern.

**AGIOPEP-2 ANCHORED PEGYLATED PPI DENDRIMERS FOR TARGETED ANTICANCER DRUG DELIVERY TO
BRAIN GLIOMA**

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ABSTRACT

The present study was aimed at exploring the PEGylated Poly propyleneimine (PPI) dendrimers conjugated with multifunctional ligand (Angiopep-2) and loaded with Paclitaxel as a versatile targeting system for the treatment of glioblastoma multiforme (GBM). PPI dendrimer were synthesized and PEGylated with PEG-2000 and further conjugated with Angiopep-2. This carrier was loaded with paclitaxel and characterized for various parameters including size, shape, loading efficiency, *in vitro* drug release profile and cell line studies. Results of the above studies elaborated the potential of Agiopep-2 anchored PEGylated PPI dendrimers in the delivery of PTX to the brain glioma without interference with the immune system and improve its accumulation and effectiveness in the GBM bearing brain.

REQUIREMENT OF SPECIFIC REGULATORY GUIDELINE AND OFFICIAL TESTS FOR DEVELOPMENT AND EVALUATION OF NOVEL OPHTHALMIC DRUG PRODUCTS

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ABSTRACT

Conceptualization of a novel idea or discovery of a novel molecule for ocular drug delivery has to be followed by a methodological approach to ensure successful translation into a marketable product. Novel ophthalmic formulations are receiving increased attention due to several drawbacks of conventional ophthalmic formulations. FDA in 21 CFR parts 312 and 314 describes the general content and format for the submission of NDA or ANDA to the agency. FDA expects chemistry, manufacturing and control submissions to provide detail characterization of the drug substance and drug products and greater control over the raw material and manufacturing process. The pharmacopoeia requires ophthalmic drug product to be tested for sterility, isotonicity and effectiveness of antimicrobial preservative. Neither any official test nor any specific regulatory guidelines for the development and evaluation of NDDS based ophthalmic products and establishment of IVIVC is available to the formulator to develop a high quality ophthalmic products with better therapeutic effectiveness. In the absence of specific regulatory guidelines, the formulators face various challenges in the development of novel ophthalmic drug delivery systems.

The objective of this paper is to raise the need of specific regulatory guidelines and official test methods for development and evaluation of NDDS based ophthalmic products for enabling the formulators to develop the ophthalmic products possessing high quality standard and better therapeutic effectiveness. The present paper therefore, suggests the regulatory agencies to review the need of issuing specific guidelines and official methods for development and evaluation of novel ophthalmic drug products.

INTERNATIONAL CONFERENCE: FORMULATION AND DEVELOPMENT OF ACECLOFENAC LOADED MICRO EMULSION FOR TOPICAL USE

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ABSTRACT

A topical preparation containing aceclofenac was developed using an o/w microemulsion system. Oleic acid was chosen as the oil phase as it showed a good solubilising capacity. Pseudo-ternary phase diagrams were used to obtain the concentration ranges of the oil (oleic acid), surfactant (tween 80) and co-surfactant (ethanol) for microemulsion formation.

Microemulsion formulations were developed for aceclofenac with the aim to increase the effect, controlled permeation, increased drug solubilization capacity and to minimize oral side effects of drug. These results indicate that the microemulsion system studied is a promising tool for the topical delivery of aceclofenac.

Keywords: Aceclofenac, Topical microemulsion, Skin permeation, Phase diagram.

INTERNATIONAL CONFERENCE: FORMULATION, DEVELOPMENT AND EVALUATION OF MATRIX TABLETS OF LAMIVUDINE BY USING GUM ROSIN

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ABSTRACT

Rosin is a natural polymer was used as a hydrophobic matrix forming agent for sustained release. In this formulation lamivudine used as a hydrophilic nature. The present investigation aimed at formulation, development and evaluation of natural rosin gum based sustained release matrix tablets of lamivudine by direct compression method. Their are different formulation was prepared with drug and polymer-polymer ratio are as-Rosin [1:0.2,1:0.3,1:0.4] namely F1,F2,F3,andEthylcellulose [1:0.2,1:0.3,1:0.4] namely F4,F5,F6. The prepared matrix tablets were evaluated for their physicochemical properties such as Physical appearance, hardness, weight variation, friability, drug dissolution. *In vitro* drug release studies performed by Dissolution test apparatus IP (paddle type)using phosphate buffer PH-6.8 at 100 rpm for 24 h. Also studied kinetic release and stability study of tablets. In the study of kinetic F2 formulation was optimized and followed Higuchi model. In case of stability study of F2 formulation kept for 60 d than FTIR spectrum shows the bands are no interact with each other as compared drug polymer mixtures. It was found that the percent drug release decreased with increasing the concentration of natural gums. Rosin has a good potential as a pharmaceutical excipients.

DESIGN AND DEVELOPMENT OF GEL FORMING SOLUTION OF MOXIFLOXACIN HYDROCHLORIDE FOR TOPICAL OCULAR DRUG DELIVERY

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ABSTRACT

The objective of present research was to develop an ion-activated sol-gel phase transitional gel forming solution of moxifloxacin hydrochloride for prolonged ocular delivery. Gellan gum was selected as the gelling agent in combination with HPMC after screening various gelling agents for the gelation efficiency. The developed formulations were evaluated for different quality parameters, i.e., clarity, pH, drug content uniformity, and in-vitro drug release and microbiological activity. The optimized in-situ gel formulation capable of instant mucoadhesive gelation on interaction with Simulated Lacrymal Fluid (SLF) also exhibited a consistent drug release profile over a period of 8 hr with max. drug release of 89.7 % in SLF. Microbiological studies were carried out to ascertain the biological activity of ophthalmic in-situ gel formulation against microorganisms. The formulation confirmed their compatibility with RBC and isotonicity with lacrimal secretion. HET-CAM test, as an alternative to eye irritancy studies, was carried out to assess the ocular acceptability of the developed formulation and it was inferred that the developed in-situ gel forming solution of moxifloxacin is non-irritant to the eyes.

DALFAMPRIDINE SUSTAINED RELEASE TABLET FOR THE WALKING IMPROVEMENT IN MULTIPLE SCLEROSIS

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ABSTRACT

The present study was aimed towards formulation and evaluation of the twice daily sustained release tablet of dalfampridine. The tablets were formulated by direct compression method using high permeable Eudragit RLPO and low permeable Eudragit RSPO. Formulation was optimized for polymer concentration, Flow promoter & lubricant. Lubricated blend was characterised for parameters like bulk density, tapped density, angle of repose, Carrs index & Hausners ratio & found to be in range of official requirement indicating that optimized formulation has got acceptable compressibility and flow ability. Compressed tablets were characterized for Assay, Dissolution study (USP-II at 50 rpm using 6.8 phosphate buffer for 1,2,4,8,12 h), thickness, hardness, friability, weight variation. DSC studies were performed to observe the interaction between drug and polymer. Alcohol dose dumping study was carried out in accordance with draft guidance of USFDA & dose dumping was not found. Korsmeyer peppas model seemed as best fitting model & n value depicted drug release both by diffusion & swelling. Stability study was performed at 75% RH and room temperature. No significant drop was found in hardness, Assay & dissolution profile after 3 mo. Optimized formulation could prove as formulation of choice for walking improvement in multiple sclerosis.

Keywords: Dalfampridine, Eudragit RLPO, Eudragit RSPO, Co-shifting, Dose-Dumping.

FORMULATION AND CHARACTERIZATION OF INTRANASAL MUCOADHESIVE NANOPARTICULATE SYSTEM FOR THE TREATMENT OF PARKINSON'S DISEASE

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ABSTRACT

Parkinson's disease is a progressive degenerative disorder involves degeneration of neurons results deficiency of dopamine in the striatum. Presently levodopa is a drug of first choice for the treatment of parkinson's disease. But treatment requires the transportation of levodopa from peripheral circulation to CNS which becomes problematic because of impervious nature of Blood brain barrier. Therefore, several strategies have been developed to enable the transportation of these therapeutic agents to the CNS to overcome the barrier effect. These strategies includes both invasive and noninvasive approaches that could efficiently deliver the drugs into the CNS. Among all these approaches intranasal to brain drug delivery system is most prominent and noninvasive technique to deliver the drug to the brain. Prepared chitosan nanoparticles were characterized for particle size, polydispersity index, zeta potential, surface morphology, percent drug entrapment efficiency and *in vitro* drug release. In the present project intranasal mucoadhesive chitosan nanoparticles were prepared by the ionic gelation method using chitosan and tripolyphosphate. The prepared formulation was visualized under TEM and SEM for morphology of nanoparticles and the images revealed that spherical shape of formulation. Therefore on the basis of characterization and *in vitro* analysis of prepared formulations it can be concluded that the prepared chitosan nanoparticles will be good carrier for the delivery of levodopa to brain from nasal route.

FORMULATION AND CHARACTERIZATION OF CAPSAICIN LOADED LIPOSOMAL GEL FOR THE MANAGEMENT OF ALOPECIA

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ABSTRACT

Alopecia is a dermatological abnormality characterized by the reduction of visible hair. Presently various drug delivery systems are available for the treatment of alopecia, but these systems are associated with various limitations like barrier property of scalp stratum corneum, less contact time between drug and the skin, solubility of drug and half life of drug.

Therefore, with present project we envisaged to develop a liposomal gel were chosen as systems with the ability to incorporate and deliver the anti-alopecia drugs, into the dermis and hair follicles.

Prior to development of formulation different preformulation studies were done to analyze the drug. Different liposomal formulations were prepared using various phospholipid/cholesterol ratio (9:1, 8:2, 7:3, 6:4) and different drug concentrations (5, 10 & 15%) by mechanical method. P₃C₃D₂ was selected and characterized for the particle size and % drug entrapment. The formulation was incorporated in the gel system which showed 78.58±2.1% drug release up to 24 h in pH7.4 PBS.

Hence, the Capsaicin loaded liposomal gel were successfully prepared, optimized and evaluated and were found to be promising candidate for the treatment of alopecia as well as controlled drug delivery enhance its therapeutic utility and minimize the negative side effect of single dosage formulation.

PREPARATION AND CHARACTERIZATION OF TACROLIMUS BEARING ELASTIC VESICULAR SYSTEM FOR EFFECTIVE TREATMENT OF UVEITIS

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ABSTRACT

Uveitis is sight threatening inflammatory disorder of uvea, the pigmented layer that lies between the inner retina and the outer fibrous layer composed of the sclera and cornea. It requires urgent treatment to control this inflammation. Uveitis is typically treated with glucocorticoid steroids, either as topical eye drops (prednisolone acetate) or as oral therapy. But continuing these medication increase the prevalence of corneal ulceration and vision loss as a side effect. Tacrolimus is an drug that comes into focus for the treatment of Uveitis which act by suppressing the inflammatory process that has been involved in uveitis and also the compound must have effect on the progression of uveitis through reduction in inflammatory activity. Tacrolimus loaded surfactant based elastic nanovesicles (TSVs) for ocular delivery were prepared by ethanol injection method. Viscosity of Tacrolimus loaded surfactant based elastic nanovesicles was found to be 1.97 ± 7.1 cps. The average particle size, Polydispersivity index and zeta potential of TSVs were found to be 132 ± 4.7 nm, 0.26 and -35.14 mV respectively. Percentage drug entrapment of Tacrolimus loaded surfactant based elastic nanovesicles was found to be 74.8 ± 2.6 %. *In-vitro* drug release for Tacrolimus loaded surfactant based elastic nanovesicles showed sustained pattern i.e., 69.1 ± 2.3 % upto 24 h in tear fluid (pH 7.4). The antimicrobial study indicated that TSVs containing benzalkonium chloride retained upto 90 % i.e., microbial growth was not observed. From above study it can be concluded that Tacrolimus loaded surfactant based elastic nanovesicles has potential as alternative of glucocorticoid steroids to control ophthalmic emergency occur due to the Uveitis.

FORMULATION AND EVALUATION OF DICLOFENAC SODIUM COMPOSITE MICROPARTICLES

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ABSTRACT

The aim of this study is the evaluation of the effect of microencapsulated nanoparticles in composite microparticles on the release. Microparticles (simple and composite) and nanoparticles were prepared by using water-in-oil-in-water (W1/O/W2 double-emulsion solvent diffusion/evaporation method), using different drug/polymer ratios. For preparation of the composite microparticle, nanoparticle suspension was used as the internal phase. In this investigation, the microparticle, nanoparticle and composite microparticle formulations prepared were characterized by loading efficiency, yield, particle size, FTIR (Fourier Transform Infrared Spectroscopy), DSC (Differential Scanning Calorimetry) and drug release. The best drug of the polymer ratio in the microparticle and nanoparticle were F 3 (0.4:1) and NP 1 (0.1:1), which showed 26.89% and 9.07% of entrapment, loading efficiency 94.2 %, 99.44% and mean particle size 13.114 μ m and 756 nm, respectively. The drug loading microparticle, COM3 (nanosuspension with 0.2.:1 drug/polymer ratio), showed 28.56% of entrapment, loading efficiency 99.96% and mean particle size 13.013 μ m. The initial release was significantly lower with composite microparticles and may be explained by the slower diffusion of the drugs through the double polymeric wall formed by the nanoparticle matrix, followed by another diffusion step through the microparticle polymeric wall.

Keywords: Composite microparticle; Nanoparticle; Diclofenac sodium; Poly(ϵ -caprolactone).

BIOPRODUCTION OF L-DOPA BY IN VITRO TECHNIQUES

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ABSTRACT

Callus culture of *Mucuna pruriens* (Fabaceae) were initiated on explants (epicotyls, hypocotyls and cotyledons) obtained from aseptically germinated seedlings on MS media supplemented with NAA (1.0ppm)+BAP (1.0ppm), NAA (0.5ppm)+BAP (0.5ppm), BAP (0.5ppm), BAP (1.0ppm), 2,4-D (1.0ppm)+BAP(0.5ppm) and 2,4-D (2.0ppm)+BAP(1.0ppm). The comparative callus induction efficiency of various explants and hormone combination and concentration used was evaluated, callus cells grew anexically in the presence of various plant growth regulators in Murashige and Skoog's medium containing 3% w/v of sucrose. The best result was found with epicotyl explants on MS supplemented with NAA (1.0ppm)+BAP (1.0ppm). The highest callusing was observed with epicotyl explants. Cotyledon explants also showed satisfactory results, while hypocotyl explants has failed to induce callusing on any of explants. The Suspension culture was initiated from epicotyl and cotyledon calli (of NAA/BAP each 1.0ppm & NAA/BAP each 0.5ppm) were initiated and maintained successfully. The callus and cell suspension so obtained, synthesizes various normal constituents of plant out of which, L-DOPA was isolated, identified and estimated. The epicotyl explants showed highest callus induction efficiency i.e. 90%, and cotyledon shows 85%, viability (89% in callus and 74% cell suspension), growth index (3.37) and productivity of LDOPA (6.62% by Cell DW in callus and 6.58% by cell DW in cell suspension) and it was found higher than the intact *Mucuna pruriens* seeds (3.61% by cell DW).

Keywords: Plant tissue culture, *Mucuna Pruriens*, Murashige & skoog's medium, NAA, BAP, L-DOPA.

MEDICAL CHEMISTRY

PREDICTING BENZOTHAIAZOLE DERIVATIVES AS AN ANALGESIC AND ANTI-INFLAMMATORY ACTIVITIES USING 2D AND 3D QSAR ANALYSIS

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ABSTRACT

A series of 21 molecules of Benzothiazole derivatives were used for development of 2D and 3D QSAR models. The data set of 20 molecules were divided into training and test set in the ratio of 70:30, The biological activity was converted to logarithmic scale (pIC₅₀) in mathematical operation mode of the software. The statistically significant 2D-QSAR models for Analgesic activity are $r^2 = 0.8578$ and $q^2 = 0.7415$ and on Anti inflammatory giving $r^2 = 0.9457$ and $q^2 = 0.9476$. 3D QSAR results for internal ($q^2 = 0.9245$, $q^2 = 0.8170$) and external (predictive $r^2 = 0.6320$, $q^2 = 0.7773$) validation criteria. Thus, 3D QSAR models showed that electrostatic effects dominantly determine the binding affinities. 2D QSAR studies revealed that Saas CE Index descriptors were major contributing descriptor in case of analgesic activity and Xlog P in case of Anti inflammatory activity. By using kNN-MFA method. The results derived may be useful in further designing novel anti-cancer agents.

INTERNATIONAL CONFERENCE: RP-HPLC ASSAY METHOD DEVELOPMENT FOR PARACETAMOL AND LORNOXICAM IN COMBINATION AND CHARACTERIZATION OF OXIDATIVE DEGRADATION PRODUCTS OF LORNOXICAM

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ABSTRACT

A simple, specific, accurate and precise reverse phase high pressure liquid chromatographic method has been developed for the simultaneous determination of Paracetamol and Lornoxicam from tablets and to characterize degradation products of Lornoxicam by reverse phase C18 column (Inertsil ODS 3V C-18, 250 x 4.6 mm, 5 μ). The sample was analyzed using Buffer (0.02504 Molar): Methanol in the ratio of 45:55, as a mobile phase at a flow rate of 1.5 mL/min and detection at 290 nm. The retention time for Paracetamol and Lornoxicam was found to be 2.45 and 9.40 min respectively. The method can be used for estimation of combination of these drugs in tablets. The method was validated as per ICH guidelines. The linearity of developed method was achieved in the range of 249.09–747.29 μ g/ml ($r^2=0.9999$) for Paracetamol and 4.0125–12.0375 μ g/ml ($r^2=0.9999$) for Lornoxicam. Recoveries from tablets were between 98 and 102%. The method was validated with respect to linearity, accuracy, precision, robustness and forced degradation studies which further proved the stability-indicating power. During the forced degradation studies lornoxicam was observed to be labile to alkaline hydrolytic stress and oxidative stress (in the solution form). However, it was stable to the acid hydrolytic, photolytic and thermal stress (in both solid and solution form). The degraded products formed were investigated by electrospray ionization (ESI) time-of-flight mass spectrometry, NMR and IR spectroscopy. A possible degradation pathway was outlined based on the results. The method was found to be sensitive with a detection limit of 0.193 μ g/ml, 2.768 μ g/ml and a quantitation limit of 0.638 μ g/ml, 9.137 μ g/ml for lornoxicam and paracetamol, respectively. Due to these attributes, the proposed method could be used for routine quality control analysis of these drugs in combined dosage forms.

SIMULTANEOUS ESTIMATION OF METFORMIN HCL AND GLIMEPIRIDE IN COMBINE TABLET DOSAGE FORM BY RP-HPLC

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ABSTRACT

A force degradation profile of Metformin Hcl & Glimepiride in combine tablet dosage form on RP-HPLC was developed using Grace RP-C18 (4.6 x 150 mm, 5 μ m) in an gradient mode with mobile phase comprising of Acetonitrile: Dihydrogen Pott. Phosphate (pH 2.5 using 0.1% OPA) The flow rate was 0.7 mL/min and effluent was monitored at 242 nm. The retention times were found to be 2.06 min for MET and 5.80 min for GLIM. The assay shows a linear dynamic range of 250-1250 μ g/ml for MET and 1.0-5.0 μ g/ml for GLIM. The calibration curves were linear ($r^2 = 0.999$ for MET and $r^2 = 0.998$ for GLIM) over the entire linear range. Mean % recovery was found to be 99.80 % for MET and 98.93 % for GLIM with % RSD was NMT 2 for both estimations which fully agrees with system suitability which is in good agreement with labeled amount of formulation. The % RSD for Intra-Day & Inter-Day Precision was NMT than 2 for both the drugs. The developed method was validated as per ICH guidelines.

DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF PHENYLEPHRINE HYDROCHLORIDE, AMBROXOL HYDROCHLORIDE, PARACETAMOL AND LEVOCETIRIZINE DIHYDROCHLORIDE IN TABLET DOSAGE FORM

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ABSTRACT

A simple, rapid, precise and economical reverse-phase high performance liquid chromatography (RP-HPLC) method has been developed for the simultaneous estimation of Phenylephrine hydrochloride, Ambroxol hydrochloride, Paracetamol and Levocetirizine dihydrochloride in tablet dosage form. The method was carried out on C-18 column (25 cm x 4.6 i.d. x 5 μ m) with a mobile phase consisting of acetonitrile: 0.1 % triethylamine (adjusted to pH 3.5 with orthophosphoric acid) 55:45 v/v at a flow rate of 0.6 ml/min. Detection was carried out at 224 nm. The retention times of Phenylephrine hydrochloride, Ambroxol hydrochloride, Paracetamol and Levocetirizine dihydrochloride were 4.32, 5.0, 5.5 and 9.6 min respectively. All the validation parameters were in acceptable range. The proposed method can be used for the estimation of the four drugs in combination.

INTERNATIONAL CONFERENCE: SYNTHESIS AND GLUCOKINASE ACTIVATING PROPERTY OF SOME BENZAMIDE DERIVATIVES

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ABSTRACT

In the present study, sulfonamido benzamides (B1-B3) were synthesized and subjected to oral glucose challenge and Glucokinase (GK) activation assay. Oral administration of a single dose of synthesized sulfonamido benzamides caused a significant reduction in blood glucose in the wistar rat after oral glucose challenge. However, EC50 values obtained by conducting human GK activation assay suggest less-ability of these compounds to stimulate GK for the conversion of glucose to glucose-6-phosphate.

HIDDEN OR EXPLICIT? DATIVE BONDS BETWEEN LIGAND AND NITROGEN IN (NHC)-N-N-(NHC) SPECIES

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ABSTRACT

Systems with dative bonds as $\text{in} \rightarrow \text{N} \leftarrow \text{N} \leftarrow \text{L}$ have been reported in the recent past. In this work, we report the synthesis and crystal structure analysis of azines with the general structure $(\text{NHC}-\text{N}-\text{N}-(\text{NHC}))$, (NHC=N-heterocyclic carbene). The NHC-N interaction may be represented with a dative bond $\rightarrow \text{N}$, but the electronic structure analysis and the geometrical features only partially support this hypothesis. And hence azines can be considered as a class of molecule with hidden C-N dative bond. However, this hidden character gets explicit when these compounds (i) lose an electron, in the form of single electron oxidation to form radical cation, (ii) protonated in the presence of acid to form salt, (iii) form charge transfer complex with TCNQ and (iv) intramolecularly oxidized (in the presence of electron withdrawing group such as CF_3) due to movement of electrons within the molecule.

SYNTHESIS AND ANTIMICROBIAL EVALUATION OF SOME FLUOROQUINOLONE DERIVATIVES

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ABSTRACT

The present work has been attempted to synthesize the six novel oxime substitute fluoroquinolone (FQs) derivatives. Firstly, The compound 1-cyclopropyl-6-fluoro-8-methoxy-7-{3'-methyl-4-[2-(4-substituted phenyl)-2-oxoethyl]piperazin-1-yl}-4-oxo-1,4 dihydroquinoline-3-carboxylic acid III (a-c) were prepared from gatifloxacin (II) and substituted phenacyl bromide I (a-c) under scheme-I. Subsequently, The titled compounds 7-{4-[2-(substituted imino)-2-(4-substituted phenyl) ethyl]-3'-methylpiperazin-1-yl}-1-cyclopropyl-6-fluoro-8-methoxy-4-oxo-1,4 dihydroquinoline-3-carboxylic acid IV (a-f) were synthesized from III (a-c) thus six final derivatives were prepared by using microwave reactor. Their structure has been confirmed by FT-IR, ¹H-NMR, ¹³C-NMR and LC-MS. These confirmed compounds were subjected to In-vitro antibacterial screening against two gram positive and two gram negative organism. All the test compounds showed comparable activity against *B. subtilis* but less favoured towards the *S. aureus* if compared with FQs standards. But all the test compounds showed significantly active against both gram positive and gram negative bacterial strains against standard streptomycin. Surprisingly, all the test compounds are comparable and least active against both the gram negative species, if compared with standard FQs. Further, the four test compounds IV (a, b, c and f) showed sensitive towards *Mycobacterium tuberculosis* if compared with standards.

**PHARMACOPHORE MODELING STUDY OF B-KETOACYL-ACYL CARRIER PROTEIN SYNTHASE III (FABH)
INHIBITORS AS ANTIBACTERIAL AGENTS**

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ABSTRACT

Fatty acid biosynthesis (FAB) is an essential metabolic process for prokaryotic organisms and is required for cell viability and growth. β -Ketoacyl-acyl carrier protein (ACP) synthase III also known as FabH or KAS-III plays an essential and regulatory role in bacterial FAB.

β -ketoacyl-acyl carrier protein synthase III (FabH) is an emerging target for the development of novel antibacterial agent. FabH enzyme is the key to discovering inhibitors with broad-spectrum antibacterial activity. The discovery of FabH inhibitors is now of special interest in the treatment of bacterial infection. These FabH inhibitors demonstrated significant antibacterial activity and as such have the potential to be novel and potent antibacterial agents. Pharmacophore modeling was done to identify the pharmacophoric features required for FabH inhibitory activity required for FabH inhibitory activity.

PHARMACOPHORE STUDY OF SODIUM GLUCOSE CO-TRANSPORTER-2 (SGLT2) INHIBITOR FOR ANTIDIABETIC ACTIVITY

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ABSTRACT

Sodium glucose co-transporter-2 (SGLT2) inhibitor is a novel approach which is different from the available antidiabetic therapies. This class of drug targets insulin resistance and insulin deficiency, SGLT2 inhibitor work on urinary sugar excretory mechanism. The current study was done on novel C-aryl glucoside SGLT2 inhibitor containing thiophene moiety. The pharmacophore models were derived using GALAHAD module of SYBYL X 2.1.1 software and pharmacophoric features were obtained.

Keywords: Pharmacophore, SGLT2, Diabetics.

PHARMACOPHORE STUDY OF SOME DIPEPTIDYL PEPTIDASE IV (DPP-IV) INHIBITORS AS ANTIDIABETIC AGENTS

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ABSTRACT

Type II diabetes is establishing itself as an epidemic of the 21st century and is a severe and increasingly prevalent disease. The present study successfully applied pharmacophore mapping to characterize a set of synthesized DPP-IV inhibitors. The selected series of imidazoquinoline derivatives included 47 compounds out of which 38 compounds were put in training set and remaining 9 compound were put in test set on the basis of diversity using the SYBYL X 2.1.1 software. The pharmacophore models were derived using GALAHAD module of SYBYL X 2.1.1 software. The optimal pharmacophore model contains nine pharmacophore features. The models include four hydrophobes, three hydrogen bond acceptors and two positive nitrogen centres.

Keywords: Type II diabetes, DPP-IV inhibitors, SYBYL X 2.1.1 software, GALAHAD, Imidazoquinoline derivatives.

DOCKING STUDIES ON SOME BENZIMIDAZOLE AND TRIAZOLE ANALOGUES AS ANTIHYPERTENSIVE AGENTS

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ABSTRACT

The incidence rate of hypertension continues a phenomenal rise and so, there is a growing need to identify novel therapeutic agents with improved efficacy and reduced side effects. In these circumstances, drugs acting on multiple targets could offer superior efficacy profiles compared with single target drugs. Some molecules have been designed using rational drug design approach and evaluated by performing docking studies. Targets used were angiotensin-converting enzyme, angiotensin receptor, aldosterone receptor, renninenzyme, beta receptors(b1/b2). Surflex-docking studies were performed on a series of substituted benzimidazole fused triazole ring as antihypertensive activity. Docking studies revealed that the nitro group, fluoro group on benzimidazole, and nitro group of triazole were significant for binding to the all receptors, and some essential substituted group were also identified. Designed compounds were found to have binding affinity with multiple targets.

APPLICATION OF QSAR STATARGY FOR OPTIMIZATION OF ANTIOXIDANT ACTIVITY FOR NATURALLY OCCURING FLAVONOIDS

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ABSTRACT

In the present work, we have applied quantitative structure–activity relationships (QSAR) for exploring the relationship between the structures of a new emerging family of Flavonoid derivatives and their antioxidant activities. We have developed descriptive model, in order to aid in further optimization and development of newer antioxidant agents containing pharmacophore. QSAR was performed on VLife molecular design suite (MDS) 3.5 version software. The predictive power of the QSAR was checked through the cross validation technique and also by leaving some compounds as part of external test set.

SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL EVALUATION OF SOME NEW SUBSTITUTED NITRO AND FLURO CHALCONE DERIVATIVES

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ABSTRACT

A series of chalcone derivatives were synthesized by condensation reaction between substituted acetophenones and substituted aromatic aldehydes in the presence of aqueous solution of sodium hydroxide and ethanol at room temperature. The synthesized compounds were characterized by means of their IR, ¹H-NMR and Mass spectral analysis. All the compounds were evaluated for their anti-inflammatory activity; using formalin induced paw edema methods. Results of biological activity revealed significant anti-inflammatory potential of nitro and fluoro chalcones derivatives.

DEVELOPMENT AND VALIDATION OF HPLC METHOD FOR ESTIMATION OF BRIMONIDINE TARTRATE AS BULK DRUG AND IN OPHTHALMIC FORMULATION

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ABSTRACT

The optimized reverse phase high performance liquid chromatographic method was developed for estimation of Brimonidine Tartrate in bulk drug and pharmaceutical dosage form. Chromatography was performed on Kromasil C 18 (250 mm X 4.6 mm i.d., 5 μ m particle size) column with mobile phase citric acid monohydrate buffer: water: methanol (30:50:20 v/v/v) and pH 3 was maintained by using triethylamine. The flow rate was 1.0 ml/min. Elute was detected at 246 nm and it effectively separated at Retention Time of 5.96 min. The LOD and LOQ was 1.47 and 4.47 μ g/ml respectively. A linear response was observed over the concentration range 40-80 μ g/ml for Brimonidine Tartrate. Thus the proposed HPLC method was found accurate, specific, precise, robust and reproducible.

FREE ENERGY OF BINDING (ΔG) AS A TOOL FOR POTENTIAL LEAD IDENTIFICATION: AN *IN SILICO* APPROACH APPLIED TO B BLOCKERS

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ABSTRACT

Drug discovery is an incessantly evolving area, essential for mankind albeit a very expensive process. Hence, continuous efforts are ongoing to discover methods that aid in smooth transition through the drug discovery pipeline. *In silico* free energy calculations aid in illustrating the energy factors responsible for binding affinity, which is a prerequisite for biological activity. This work describes the application of Molecular Mechanics-Generalized Born Surface Area (MM/GBSA) to calculate the free energy of binding (ΔG) of β blockers; which in turn has been used to derive a correlation that can be used to predict the ΔG of newly designed molecules in order to assess their potential as future leads.

DESIGN, SYNTHESIS AND BIOLOGICAL EVALUATION OF NEW HETEROCYCLIC DERIVATIVES OF SUBSTITUTED CHALCONES

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ABSTRACT

In view of biological activity of heterocyclic derivatives of substituted chalcones their hypoglycemic potential was investigated. Some of the designed compounds were docked in the active site of PTP-1B (PDB ID 2QBP) using Python prescription (PyRx). Among the designed compounds, compound 4-C (2-(3-(4-methoxyphenyl)-1H-pyrazol-5-yl) phenol) demonstrated decent binding free energy (-8.4 KCal/Mol), thus this compound might possess the potential as a hit for development of PTP-1B inhibitors. To this end various substituted heterocyclic derivatives of substituted chalcone (A-E) were synthesized. The synthesized compounds were screened for their antihyperglycemic activities. Compound 4-C, (2-(3-(4-methoxyphenyl)-1H-pyrazol-5-yl) phenol) has shown the maximum % fall of blood glucose level than control group which was compared with the standard drug Glibenclamide.

Keywords: Chalcones, PTP-1B, Antihyperglycemic.

MOLECULAR MODELLING, DESIGN, SYNTHESIS AND *IN VITRO* GLUCOKINASE ACTIVATION ASSAY OF FEW 2-AMINOBENZAMIDE DERIVATIVES

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ABSTRACT

Glucokinase enzyme (*GK*) is involved in glucose utilization in liver and has also been implemented in Glucose-dependant release of insulin in the pancreatic β -cell. Activation of glucokinase enzyme therefore, has emerged as a strategy to increase glucose utilization. The world-wide endeavours to design compounds (*GKA*: Glucokinase activators) that would activate the glucokinase enzyme so as to develop suitable drugs to treat *Type 2 diabetes*, has culminated in library of numerous compounds; benzamide derivatives have been at mainstay amongst them. The ligand-protein interaction involves ARG63 and TYR215, which are submerged in a cleft between two domains. Albeit, binding of the ligands with amidine backbone of ARG63 is believed to be involved in activation of the enzyme; the hydrogen-bond interactions of ligands with TYR215 had been noticed to elicit mutagenic effects. Present work describes the design, docking of benzamide derivatives that bind with ARG63, much the way similar to the standard *GKA*, *RO-28-1675*, and simultaneously defer from TYR215. Molecular modeling studies involved, Molecular Design Suite (*VLife MDS 3.5*), simulated protein 11V4S, virtual structures of standard and newly designed benzamide derivatives. The structures were docked in the catalytic site of 1V4S to obtain respective docking score (in KJ/mol) and the amino acid residue involved in each interaction. Based on the study, few molecules were selected for synthesis and other molecules were outright rejected. The criteria for such selection, scheme of reactions to synthesize selected molecules, results of their *in vitro* binding with glucokinase enzyme are presented.

INSILICO MODELING AND STRUCTURAL INSIGHTS OF 2,3-DIARYL PYRAZOLO[1,5-B]PYRIDAZINES AS SELECTIVE COX-2 INHIBITION

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ABSTRACT

The present study attempts to explore the structural and physicochemical requirements of substituted 2,3-diaryl-pyrazolo[1,5-b]pyridazines and coxibs (celecoxib; rofecoxib; valdecoxib; and etoricoxib) for COX-2 inhibitory activity using quantitative structure-activity relationship (QSAR) and pharmacophore modelling. The 2D-QSAR models were developed using both physicochemical descriptors and electrotopological descriptors. Stepwise multiple linear regressions (MLR) was applied to correlate the activity with the descriptors. MLR led to the identification of five important descriptors AlogP, ssCH₂_Key, aaCH_Cnt, sCH₃_Sum and aasN_Sum for modeling the activity. The physicochemical descriptor like partition coefficient (AlogP) was found negatively contributing to COX-2 inhibitory activity. On other hand, electrotopological descriptors such as ssCH₂_Key, aasN_Sum, aaCH_Cnt and sCH₃_Sum were found positively contributing to COX-2 inhibitory activity. Furthermore, the pharmacophore search ultimately identified a set of chemical features comprising of three hydrogen bond acceptors and two aromatic rings "AAARR" as key structural features governing the selective COX-2 inhibitory activity of these analogues.

QSAR STUDIES OF SUBSTITUTED INDOLE DERIVATIVES AS ANTICANCER ACTIVITY USING MULTIPLE REGRESSION ANALYSIS

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ABSTRACT

Cancer is the worldwide health problem and the most frightening disease of human. In the current research, regression analysis based QSAR scrutiny was executed via a dataset of 2-phenylindole molecules using MDS module of the VLife Sciences software. There has been a growing interest of pharmacophore moiety that may acts on multiple targets and shows synergetic action in anticancer drug discovery. Phenylindole nucleus is amongst the most important ones. Two-dimensional quantitative structure–activity relationship (QSAR) studies of 2-phenylindole derivatives with anticancer activity against human breast cancer cell line MDA-MB 231 have been carried out. The best model was selected by analyzing the highest value of R^2 (0.8361), Q^2 (0.7492) and lowest SD value (0.239). The model engendered for different properties helped to understand the pattern of variation in biological activity with structural changes in molecules at appropriate sites. Therefore, the information generated from it provided beneficial guidance for the designing of potent anticancer activity which could be promoted for investigation as contemporary therapeutics for various cancer disease conditions.

MOLECULAR MODELING STUDIES OF CORONOPILIN ANALOGUES AS ANTI-BREAST CANCER AGENTS USING 3D-QSAR, PHARMACOPHORE MAPPING AND MOLECULAR DOCKING

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ABSTRACT

Breast cancer is one of the most dreadful disease as a leading cause of death in most of the developed countries. In this work, 19 coronopilin analogues were studied using a combination of three-dimensional quantitative structure–activity relationship (3D-QSAR), pharmacophore mapping and molecular docking. The results show that the best CoMFA (comparative molecular field analysis) model has $q^2 = 0.455$ and $r^2 = 0.960$, and the best CoMSIA (comparative molecular similarity indices analysis) model has $q^2 = 0.434$ and $r^2 = 0.904$. Pharmacophore mapping revealed 9 bioactive regions of ligand. Molecular docking explored the binding relationship of the ligand with the active amino acids of receptor protein.

DESIGNING AND MOLECULAR DOCKING STUDY OF SOME 5-(P-TOLUENESULFONYLAMINO) PHTHALIMIDE DERIVATIVES AS ALPHA-GLUCOSIDASE INHIBITORS

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ABSTRACT

in this research work 5-(p-toluenesulfonylamino) phthalimide derivatives were designed and docked on the homology modeled alpha gluosidase enzyme. compound 04 substituted with 4-hydroxy phenyl group and methyl group at R₁ and R₂ position respectively was found to be the potent inhibitor of enzyme α -glucosidase.

MOLECULAR MODELLING STUDIES OF SOME 3-AMINO-N-(4-ARYL-SUBSTITUTED) BUTANAMIDES AS DPP-IV INHIBITORS

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ABSTRACT

Three dimensional quantitative structure activity relationship (3D-QSAR) analysis using k nearest neighbor (kNN) molecular field analysis and pharmacophore studies were performed on forty eight compounds belonging to 3-Amino-N-(4-aryl-substituted) butanamides to explore the structural requirements for dipeptidyl peptidase-IV (DPP-IV) inhibitory activity. The variable selection methods applied were stepwise forward backward, genetic algorithm and simulated annealing and the models were subjected to both internal and external validation in order to prove their statistical significance and predictive ability. The most significant model was obtained by genetic algorithm variable selection method ($q^2 = 0.6561$, $\text{pred}_r^2 = 0.7342$). The QSAR model predicts the need of more bulky and negatively ionizable group at R_3 whereas the pharmacophore model portrays aromatic, hydrogen bond donor and Positive carbon center as common pharmacophore features. Information rendered by the present 3D-QSAR and pharmacophore approaches may lead to a better understanding of structural requirements of these DPP-IV inhibitors which may result in promising new leads.

COMFA AND DOCKING STUDIES ON PYRIDO 1, 2A BENZIMIDAZOLES DERIVATIVES AS POTENTIAL ANTI-MALARIAL AGENTS

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ABSTRACT

Several years of persistent efforts, malaria is still one of the most infectious diseases in the world. A major contributor to malarial morbidity and mortality is almost certainly the increasing resistance of malaria parasites to available drugs. Due to drug resistance to existing drugs, it is very necessary to develop novel anti-malarial agents. To achieve the objectives of the study CoMFA and Docking studies were performed by using Sybyl X 2.1.1 on forty one pyrido 1,2a benzimidazoles derivatives consisting of 31 and 10 compounds in training and test sets respectively.

MOLECULAR DOCKING STUDY OF 2-AMINOBENZOTHAZOLE DERIVATIVES AS DPP IV INHIBITORS

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ABSTRACT

Type 2 diabetes (T2D) is a disease which influencing millions of people worldwide. Many treatments of T2D are available and now the inhibition of enzyme dipeptidyl peptidase-IV (DPP-IV) has appeared as a hopeful treatment of T2D. In this research work we designed fifteen derivatives fused with pyrrolidine ring and subjected for molecular docking. Amongst all the designed derivatives, compound **06** and **09** showed good binding affinities in the active site of the enzyme DPP-IV.

SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL EVALUATION OF SOME NEW QUINOXALINE DERIVATIVES AS ANTI-INFLAMMATORY AGENTS

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ABSTRACT

Quinoxaline derivatives have been explored extensively by various researchers in past years and investigations supported their therapeutics importance as anti-inflammatory agents also; keeping in view the diverse therapeutic activities of quinoxaline for the preparation of bioactive heterocycles, it was contemplated to synthesize a novel series of quinoxaline. Attention has been focused on the modification of the quinoxaline moiety to achieve a new anti-inflammatory profile.

All synthesized compounds (Q1-Q5) were subjected to *invitro* anti-inflammatory activity by using HRBC membrane stabilization method. Among which compound Q3 found to be more potent when compare with standard.

PROTEIN-PROTEIN INTERACTIONS AS EMERGING TARGETS FOR ANTIRETROVIRAL AGENTS: A NOVEL APPROACH TO COMBAT HIV/AIDS

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ABSTRACT

Resistance of HIV-1 against available antiretroviral drugs and their toxicities have made the antiretroviral therapy very challenging. To combat HIV/AIDS, scientific community is now looking beyond the available targets. Nowadays, virus-host interactions are being more emphasized for blocking HIV-1 replication. As human genes mutate less frequently, compared to viral genes, targeting host-proteins rather than viral-proteins, can limit the occurrence of drug resistance. The present study describes protein-protein interaction screening techniques to discover novel antiretroviral targets, and importance of host-virus interactions and host restriction factors in discovery of novel antiretroviral agents.

DENSITOMETRIC DETERMINATION OF LUPEOL IN POLYHERBAL OIL CONTAINING *ALSTONIA SCHOLARIS*

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ABSTRACT

Lupeol (20(29)-Lupen-3 β -ol, 3 β -Hydroxy-20(29)-lupene) is a major therapeutically important constituent of the bark of *Alstonia scholaris*. A sensitive, simple, rapid, and efficient HPTLC method was developed and validated for the analysis of Lupeol in Ayurvedic oil formulation (*Kustharaksasa Taila*) containing *Alstonia scholaris* (Linn.) R. Br. (Family: *Apocynaceae*). Chromatography of methanolic extract of this ayurvedic oil formulation was performed on silica gel 60 F254 aluminium-backed TLC plates of 0.2 mm layer thickness. The plate was developed up to 85 mm with the ternary mobile phase toluene: chloroform: ethyl acetate: 0.1% glacial acetic acid (10: 2: 1: 0.03, v/v/v/v) and at 22 \pm 2 $^{\circ}$ C with 20 min of chamber saturation. The spot development with vanillin sulphuric acid reagent produced well resolved symmetric band for lupeol from its oil formulation at R_f 0.28 with sharp U. V absorbance peak at λ_{max} 254 nm. The limits of detection and quantitation values were 10 and 30 ng/spot, respectively. The linear regression analysis data for the calibration plot showed a good linear relationship with a correlation coefficient of 0.9993 in the concentration range of 50-300ng/spot for lupeol with respect to peak area. Repeatability of the method was 0.97% relative standard deviation. Recovery values from 98 to 102% indicate excellent accuracy of the method. The developed HPTLC method is accurate, precise, and cost-effective, and it can be successfully applied for the determination of lupeol in ayurvedic oil formulation (*Kustharaksasa Taila*) containing *Alstonia scholaris*.

STUDIES OF 4-AMINOQUINOLINES AS ANTI-MALARIAL AGENTS MOLECULAR MODELING

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ABSTRACT

A computational strategy based on (CoMFA) and (CoMSIA) studies were performed by using SYBYL 2.1.1 on series of chloroquine sensitive strain (3D7) of Plasmodium falciparum. The models using 20 compounds in training set predict r^2 0.991, F value 299.567 (CoMFA) and r^2 value 0.990, F value 214.66 (CoMSIA) respectively. 3D contour maps generated by CoMFA and CoMSIA were used to identify the key structural requirement responsible for biological activity.

SYNTHESIS AND BIOLOGICAL EVALUATION OF ACRIDINE DERIVATIVES AS A POTENT ANTI MALARIAL AGENTS

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ABSTRACT

A series of β -benzoylstyrene derivatives of acridine (NKQ1-15) have been synthesized and characterized using IR, ¹H NMR and Mass Spectroscopy. All the compounds were screened for intraerythrocytic *in vitro* antimalarial activity against Chloroquinesensitive (3D7) strains of Plasmodium falciparum using the SYBR Green I fluorescence assay. Compounds NK Q-4, NK Q-5, NK Q-11, NK Q-12 are most potent with IC₅₀ in the range of 0.12–0.44 μ M against the Chloroquine-sensitive 3D7 strain.

Keywords: β -Benzoylstyrene derivatives of acridine, Anti malaria evaluation

LIGAND BASED PHARMACOPHORE MODELING, 3D-QSAR STUDIES, SYNTHESIS AND ANTIMICROBIAL EVALUATION OF NEW ISONIAZID DERIVATIVES

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ABSTRACT

Ligand based pharmacophore model, 3D-QSAR studies was performed on the compounds reported in literature and pharmacophore model have been generated to correlate their molecular structure and antimicrobial activity. A five point pharmacophore hypothesis with two hydrogen bond acceptor (A), one hydrophobic group (H) and two aromatic rings (R) as a pharmacophoric feature were developed using PHASE module of Schrodinger suite. The pharmacophore hypotheses was characterised by good PLS Statistics (Survival score = 5.9, the best cross validated r^2 ($Q^2 = 0.58585$) regression coefficient $r^2 = 0.829$, Pearson $R = 0.9994$ and F value = 26.5). Model obtained allows reliable prediction and a series of new Isoniazid derivatives (APV1-APV13) were synthesized and screened for antimicrobial activity against Gram positive, Gram negative bacterial and antifungal strain by cup-plate method and froth dilution method. Compounds APV-02 and APV-12 showed promising antimicrobial activity compared to standard drugs Amoxicillin and Nystatin.

SYNTHESIS AND EVALUATION OF BIODEGRADABLE CONJUGATES OF FLUOROQUINOLONES

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ABSTRACT

Natural biodegradable polymers are widely used in pharmaceuticals as excipient and drug conjugates. In the present study fluoroquinolone (ciprofloxacin hydrochloride and gatifloxacin sesquihydrate) conjugates were prepared with chitosan (I), chitosan oligomer(II) and glucosamine(III) and synthesized conjugates were characterized by infrared spectroscopy, X-ray diffraction and differential scanning calorimetry. The synthesized drug conjugates were studied for the degree of substitution, stability (in different pH) and release in simulated, gastric and intestinal fluids. The present study shows that ciprofloxacin (CF) I,II, III and Gatifloxacin (GF) I, II and III shows very slow release in simulated gastric fluid and fast release in simulated intestinal fluid.

MOLECULAR MODELING STUDIES ON NOVEL IMIDAZO [4,5-B]PYRIDINE BENZOHYDRAZONES AS ANTIOXIDANT AGENT

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ABSTRACT

The 3D QSAR studies based on CoMFA and CoMSIA is performed using SYBYL 2.1.1 on the series of Imidazo[4,5-b]pyridine benzohydrazones for their *in vitro* antioxidant activity. CoMFA and CoMSIA models, using 21 compounds in training set, gave r^2 value 0.983, F value 135.931 and r^2 value 0.816, F value 84.051 respectively. These studies have been very useful in identifying the essential structural features required for enhancing biological activity of compounds.

DESIGN, SYNTHESIS, AND BIOLOGICAL EVALUATION OF NOVEL 2,N6-DISUBSTITUTED 1,2-DIHYDRO-1,3,5-TRIAZINE-4,6-DIAMINES AS POTENTIAL ANTI MALARIA AGENT

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ABSTRACT

Malaria is a mosquito borne protozoan disease and a major cause of concern to human health. Severe disease is largely caused by plasmodium falciparum. The DHFR domain of plasmodium falciparum (bifunctional dihydrofolate reductase-thymidylate synthase) is one of the few well defined targets of malaria chemotherapy. In this paper a series of novel 2, N 6-disubstitued 1,2 dihydro-1,3,5 triazine-4,6-diamines were prepared using microwave assisted organic synthesis and its potential as anti malarial agents was assessed. The compounds were evaluated *in vitro* by schizont inhibition method assay against cycloquanil-resistant FCK2 strain of plasmodium falciparam.

QSAR ANALYSIS OF 1-ACETYL-3,5-DIPHENYL-4,5-DIHYDRO-(1H)-PYRAZOLE DERIVATIVES AS ANTIBACTERIAL AGENTS

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ABSTRACT

Antibacterial are the class of drugs used to treat various infections caused by bacteria, they are also known as antibiotic. Antibacterial drugs can treat infection either by killing or inhibiting the growth of bacteria. The emergence of bacterial resistance to major classes of antibiotics poses a risk to health care, and novel therapeutics are needed with novel target so as to prevent this serious medical problem. 1-acetyl-3,5-diphenyl-4,5-dihydro-(1H)-pyrazole derivatives were reported to have antibacterial activity via FabH enzyme inhibition. The multivariate regression model was developed using sequential multiple linear regression (SEQMLR) technique, taking into account adjustable correlation coefficient (r^2_{adj}). The statistical quality of model was evaluated considering parameters like correlation coefficient (r), probable error of correlation (PE) and variance ratio (F). Orthogonality of the descriptors was established through variance inflation factor (VIF). Developed equations were internally validated by leave-one-out technique and further validated with test set and cross validated correlation coefficient (Q^2). The present work revealed that nucleophilicity and steric properties describes the antibacterial activity of 1-acetyl-3,5-diphenyl-4,5-dihydro-(1H)-pyrazole derivatives.

INTERNATIONAL CONFERENCE: SYNTHESIS AND ANTI-CONVULSANT ACTIVITY OF SOME THIOSEMICARBAZONE DERIVATIVES

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ABSTRACT

Thiosemicarbazones are found to possess high anticonvulsant activity. A series of substituted thio-semicarbazones have been synthesized and tested for their anticonvulsant activity. The anticonvulsant activity was established in two seizure models i.e. MES and scPTZ. Compound PM 04, PM 05 and PM 07 were found to be active in both the MES and SCPTZ test. Postulated structures of the newly synthesized compounds are in agreement with their IR, ¹H NMR and MS.

MOLECULAR DOCKING STUDY OF 4-THIAZOLIDINONE COMPOUNDS AS ANTIMICROBIAL AGENTS

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ABSTRACT

Wide spectrum of anti-microbial activities of 4-thiazolidinones is due to the binding of thiazolidine nucleus on murD ligase enzyme. A series of 4-thiazolidinones compounds are taken and molecular docking studies were performed using Molegro Virtual Docker on Pdb code-2Y66. Common amino acid bindings are observed in the most active compound of the series 4l shows similar amino acid binding as mentioned in pdb data base.

DOCKING STUDY OF 1,8-NAPHTHYRIDINE DERIVATIVES AS HISTAMINE N-METHYL TRANSFERASE INHIBITORS

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ABSTRACT

Histamine (β -imidazolethylamine I), is a decarboxylated product of the amino acid histidine. Histamine is stored in granules within mast cells and basophils. Histamine plays important physiological role in allergy. Histamine release triggers the release of cytokines and inflammatory mediator by some neighboring leukocytes. Antihistamines interact with histamine receptors, thereby preventing histamine from eliciting responses. Histamine N-methyltransferase (HMT, HNMT) is an enzyme that in humans is encoded by the HNMT gene. Histamine N-methyltransferase is one of two enzymes involved in the metabolism of histamine, the other being diamine oxidase. Histamine N-methyltransferase catalyzes the methylation of histamine in the presence of S-adenosylmethionine (SAM) forming N-methylhistamine. HMT is present in most body tissues but is not present in serum. In mammals, histamine is metabolized by two major pathways: N(τ)-methylation via histamine N-methyltransferase and oxidative deamination via diamine oxidase. This gene encodes the first enzyme which is found in the cytosol and uses S-adenosyl-L-methionine as the methyl donor. In the mammalian brain, the neurotransmitter activity of histamine is controlled by N(τ)-methylation as diamine oxidase is not found in the central nervous system. From exhaustive literature survey of 1,8-naphthridine it has been found to be a potent antiallergic agent in addition 1,8-naphthridine also possesses antiallergic, antiplatelet, PDE-5 inhibitory, anti-inflammatory, 5HT₃ antagonist, adenosine antagonistic activity. Therefore, it was considered of interest to manually design and predict the mode and extent of binding of novel 1,8-Naphthridine derivatives using molecular docking studies by AutoDock Vina software.

COMFA AND DOCKING STUDIES ON 3-METHYL-3,7-DIHYDRO-PURINE-2,6-DIONE AS DPP IV INHIBITORS

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ABSTRACT

Diabetes is one of metabolic diseases that are increasingly threatening the public health. According to the International Diabetes Federation, more than 382 million grown-ups have suffered from it as of 2013, and it is estimated that this population may reach 592 million by 2035 and India is going to world capital of diabetics.

The above findings motivated us to undertake the molecular modelling study. CoMFA and Docking studies were performed by using Sybyl X2.1.1 on twenty eight 3-methyl-3,7-dihydro-purine-2,6-dione derivatives for the optimization and design of novel compounds as potential DPP IV inhibitors.

**LIGAND BASED PHARMACOPHORE MAPPING OF SOME ISONICOTINOHYDRAZIDE DERIVATIVES AS
ANTIMICROBIAL AGENTS**

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ABSTRACT

Isoniazid is used as first line drug in treatment of tuberculosis as it inhibits mycolic acid and cell wall synthesis and thus produces bactericidal effect on organism. On basis of its mechanism and literature, it can be effectively used in treatment of other microbial diseases.

As lead optimization is one of the effective technique for designing of ligand with enhanced efficacy by computer aided drug designing approaches, In present work we have done ligand based pharmacophore mapping using Phase module of Schrödinger software on 18 isonicotinohydrazide derivatives (with significant antimicrobial activity) taken from literature. Pharmacophoric features such as hydrogen bond acceptor (A), hydrogen bond donor (D), hydrophobic group (H), negatively ionizable group (N), positively ionizable group (P), and aromatic ring (R) were selected for development of common pharmacophore hypothesis. Best hypothesis was selected on basis of survival score and validated using partial least square (PLS) analysis. The best hypothesis was found to be AHRRRR with $Q^2 = 0.58$, $R^2 = 0.829$, $F = 26.5$, which shows statistical significance of hypothesis. This may be helpful in design and development of more isonicotinoydrazide analogues with improved activity.

IDENTIFICATION OF PPAR γ AGONISTS AS NON-THIAZOLIDINEDIONE DERIVATIVES: A COMPUTATIONAL APPROACH

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ABSTRACT

Molecular docking and validation studies were carried out for 26 compounds on peroxisome proliferator activated receptor γ active site. The reliability of the docking results were acceptable with good root mean square deviation value (ranging from 0.96 to 2Å). This approach illustrated insights into the structure activity relationship of these compounds which may helps in the design and development of potent non-thiazolidinedione derivatives as PPAR γ agonists.

HPTLC METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS QUANTITATION OF THIOCOLCHICOSIDE AND DICLOFENAC IN BULK DRUG AND FORMULATION

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ABSTRACT

A simple, precise and accurate HPTLC method has been developed for the simultaneous estimation of thiocolchicoside (THIO) and diclofenac potassium (DICLO) as the bulk drug and in capsule dosage forms. Chromatographic separation was performed on silica gel 60 F₂₅₄ as the stationary phase and the mobile phase consisted of toluene: acetone: methanol: formic acid (5:2:2:0.01 v/v/v/v). Densitometric evaluation of the separated zones was performed at 280 nm. The two drugs were satisfactorily resolved with R_F values of 0.29±0.02 and 0.71±0.02 for THIO and DICLO, respectively. The accuracy and reliability of the method was assessed by evaluation of linearity (160-800 ng spot⁻¹ for THIO and 1000-5000 ng spot⁻¹ for DICLO), precision (repeatability RSD 0.658–0.788 % and intermediate RSD 0.579–1.012 % for THIO, and repeatability RSD 0.340–1.092 % and intermediate RSD 0.429–1.007 % for DICLO), accuracy (100.97±0.921 % for THIO and 99.22±0.022 % for DICLO) and specificity, in accordance with ICH guidelines.

Keywords: HPTLC, Densitometry, ICH guidelines, Thiocolchicoside, Diclofenac.

3D QSAR STUDY FOR THIAZOLIDINE-2,4-DIONE DERIVATIVES AS PIM-1 INHIBITORS

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ABSTRACT

The quantitative structure–activity relationship (QSAR) of thiazolidine-2,4-dione analogues were performed to find the structural requirements for PIM-1 inhibitory activity. The 3D-QSAR analysis provided a model with a q^2 value of 0.82 and $pred_r^2$ value of 0.89, in which the good correlation between the PIM-1 inhibitory activity (IC_{50}) and the steric and electrostatic molecular fields around the analogues were examined. Pharmacophore model showed lowest RMSD (0.10) value having, three hydrogen bond acceptors, one aromatic carbon center and one aliphatic group features. The distances between the pharmacophore sites were measured in order to confirm their significance to the activities. The most potent inhibitor docked into the binding pocket of PIM-1 kinase (PDB ID: 2XJ1) showed interaction at the active site of amino acid residues i.e. GLY 48, ARG 73, SER 189 and GLU 89. This study will help in identification of most potent anticancer compounds as PIM-1 kinase inhibitors.

PHARMACOLOGY

ESCULETIN ATTENUATES CYCLOPHOSPHAMIDE-INDUCED CARDIC DAMAGE IN RATS

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ABSTRACT

Cyclophosphamide (CP) exhibits acute dose-dependent cardiomyopathy restricting its usage as effective anticancer and immunosuppressive drug. In this study, we investigated the protective potential of esculetin on CP-induced cardiotoxicity. Male Wistar rats were pretreated with esculetin (50 mg/kg BW, p. o.) for 10 d and challenged with a single dose of CP (200 mg/kg, i. p.) on 11th day. After completion of experimental protocol, cardiotoxicity biomarkers and oxidative stress parameters as well as histopathological examination were done to observe cardiac damage. The results of the current study demonstrated that esculetin significantly ($p < 0.001$) restored CP-mediated increase in serum cardiotoxicity enzyme biomarkers such as creatine phosphokinase (CPK), lactate dehydrogenase (LDH), aspartate transaminase (AST), alanine transaminase (ALT). ESC pre-treatment also improved the CP-induced decrease in antioxidant enzymes such as superoxide dismutase (SOD) ($p < 0.05$), catalase (CAT) ($p < 0.01$), reduced glutathione (GSH) ($p < 0.01$) in cardiac tissues. Increased malondialdehyde (MDA) level, an index of lipid peroxidation, was prevented significantly ($p < 0.001$) by esculetin pre-treatment in CP challenged animals. Moreover, cardioprotection offered by esculetin also supported by histopathological examination that prevents CP-induced disruption of cellular integrity of cardiac tissues. The findings of this study supported the potential usefulness of esculetin in CP-induced cardiotoxicity.

A HERB DRUG INTERACTION STUDY OF THE EFFECT OF *SYZYGIUM CUMINI* ON THE PHARMACOKINETICS OF GLIMEPIRIDEIN RAT PLASMA

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ABSTRACT

Herbal medicines are widely used worldwide and are preferred due to lesser side effects. The combine use of herbs and drugs may influence the pharmacokinetic of the drugs. *Syzygium cumini* is commonly used herb for it's blood glucose lowering properties. It's concurrent administration with anti-diabetic drugs may influence the pharmacokinetics of latter drugs.

STINGING NETTLE EXTRACT MODULATES DEPRESSION MEDIATED COGNITIVE DYSFUNCTION IN CHRONICALLY STRESSED MICE: ROLE OF INSULIN SIGNALING

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ABSTRACT

Comorbidity of depression and diabetes is a serious risk factor worsening the complications such as cognitive dysfunction. Treatment under this condition is extremely complicated. Insulin signaling and autophagy pathways are involved in modulation of learning and memory. Stinging nettle (*Urtica dioica*, UD) ameliorate cognitive deficit associated with depression and insulin resistance. In the present study, we investigated the effect of UD against chronic unpredictable mild stress (CUMS) induced depression and its associated diabetes like state and behavioral dysfunctions. Adult male Swiss albino mice were exposed to CUMS alongside UD (50 mg/kg/day, p. o.) treatment for 21 d. Thereafter, animals were subjected to different behavioral studies to assess depressive like behavior and cognition. The effect of UD on insulin signaling, autophagy and apoptosis were evaluated in the hippocampus. CUMS resulted in depressive like behavior, and cognitive impairment associated with oxidative stress, impaired glucose tolerance and hypercorticotesteronemia. CUMS significantly impaired hippocampal insulin signaling, membrane translocation of glucose transporter type 4 (GLUT4) as well as decreased the expression of autophagy5, autophagy7, B-cell lymphoma 2 and apoptosis inhibitory protein 2. Further, CUMS upregulated the expression of TNF α in the hippocampus. UD significantly reduced depressive like behavior, postprandial blood glucose, hypercorticotesteronemia, inflammation and apoptosis in stressed mice. Moreover, UD treatment effectively improved hippocampal insulin signaling, GLUT4 membrane translocation and cognitive performance in depressed mice. UD administration might prove to be effective for neurological disorders associated with depressive like behavior and impaired glucose tolerance.

ADVERSE EFFECTS OF SOME DRUGS FOR THE TREATMENT OF CARDIOVASCULAR DISEASES

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ABSTRACT

The study is aim to assess the patient knowledge with the help of knowledge assessment questionnaire (KAQ) about the disease and detects the ADRs. This study was designed to compare adverse effects on cardiovascular drugs. Adverse drug reaction (ADRs) is a major cause of mortality worldwide. The objective of the present study were a) to find out the prevalence of adverse drug reaction (ADRs) in the hospitalized patient by active surveillance, b) to study the profile of ADRs detected and probable factors contributing to the same. This was a cross sectional study conducted at super specialty hospital Sri aurobindo medical college, Indore and high tech super specialty Indore, for four month study. Total number of patients taken for study was 50 in number. From many criteria's which was included firstly on the basis of gender were 25 males and 25 females. The patients were in age group more than 50 y was 25 and 35-50 were 14. drug used for their co morbidities to find out ADRs in which maximum ADRs found in chronic rheumatoid heart diseases, for this diseases patient took in two combination mainly Digoxin with Clopidogrel(47.36%) and another were with atorvastatin, spironolactone and warfarin (47.30 % ADRs) which was maximum in compare to other diseases. Adverse drug reactions on particular body system were mostly observed on CNS (32.14%ADRs). Also, Patient on combination therapy (Digoxin, furosemide, and spironolactone) had significantly more complaints regarding side effects than other category of drugs. The results obtained in some of previous studies in which digoxin and furosemide were well tolerated. The side effect experienced by spironolactone was swelling, hypotension, and systolic dysfunction. According to Naranjo naranjo causality assessment scale applied to this study illustrates that the maximum possible and probable adverse drug reaction were shown on Furosemide as well as for Digoxin and Spironolactone.

Keywords: Adverse drug reaction, Pharmacovigilance, Prospective, observational, Cardiovascular.

NEW THERAPEUTIC OPPORTUNITIES FOR TREATMENT OF OBSESSIVE COMPULSIVE DISORDER

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ABSTRACT

In the present work, a randomized, double-blind, placebo-controlled trial was performed to check the efficacy of agomelatine in treatment of anxiety disorder, prompting its therapeutic potential in treatment of obsessive compulsive disorder (OCD). The effect of acute and chronic administration of agomelatine on the marble burying behavior (MBB) of mice, which is reported to be an index of anticomulsive behavior, was performed. In addition, to rule out the role of enhanced serotonergic neurotransmission, studies were carried out in *p*-chlorophenylamine (PCPA). Results indicated a potent and dose dependent influence of agomelatine on MBB of mice. However, the higher doses were found to be locomotor depressant. In conclusion, agomelatine administration reduces the MBB in mice, which should be explored for its potential use in the treatment of OCD.

Keywords: Agomelatine, Obsessive compulsive disorder (OCD), Marble-burying behavior (MBB), Melatonin.

PHARMACOVIGILANCE STUDY OF SOME ANTIDIABETIC DRUGS

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ABSTRACT

Diabetes mellitus is one of the most prevalent chronic disorders. Treatment of diabetes mellitus is a lifelong one and is important in controlling and preventing complications. The prevalence of diabetes mellitus has been increasing dramatically, particularly in the past three to four decades, resulting in a worldwide epidemic such that about 382 million people in the world suffering with diabetes mellitus. Patients treated with antidiabetic drugs face adverse effects like hypoglycemia, diarrhea, dizziness, etc. knowledge about these aspects and complications related antidiabetic drugs is essential for any diabetic patient taking antidiabetic drugs. In order to improve the rationale to the drug treatment it becomes required to focus on the adverse drug reactions (ADRs) intentionally so that possible interventions could be made to improve the patient and drug compliance. Reports on monitoring of ADRs in India are inadequate and are globally significant for greater human diversity with respect to Pharmacovigilance in India. Pharmacovigilance is contributing to acknowledge serious lacunae persisting in the current drug therapy. Present study is therefore planned to detect the prevalence, causality and severity of these adverse effects in patients on antidiabetic drugs therapy. This study is a questionnaire based retro-prospective observational pharmacovigilance study. It was carried out in the medicine wards on SAIMS hospital, Indore, Madhya Pradesh approved by Institutional Ethics Committee (IEC approved letter no. 14/03/23). About 50 patients were studied irrespective of age, sex, social habits with recognized diabetes mellitus were interviewed during the study. Patient selection is based on inclusion and exclusion criteria. The patients were interviewed and data was collected by self administered, structured questionnaires. Among the individual drugs, Insulin was associated with maximum ADRs (21%) followed by Metformin (17%), Voglibose (6%), Pioglitazone (5%), and Glimepride (3%) (table 3). Adverse effects like hypoglycemia, dizziness, insomnia, anxiety, headache, vertigo and allergic reactions were commonly found ADRs due to Insulin. The results were in coherence with previous studies which also reported that the occurrence of ADRs is more common in women [3].

ADVERSE DRUG EVENTS STUDY OF SOME ANTIHYPERTENSIVE AGENTS

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ABSTRACT

The study entitled “Adverse Drug Events Study of Some Antihypertensive Agents” performed at a medicine wards of SAIMS Hospital, Indore (M. P.). The present study aims at monitoring of ADRs in support to widen the area of pharmacovigilance to monitor the risk benefit profile of antihypertensive agents. A total of 50 subjects were enrolled for the study with different sex, age groups, different eating & social habits and their disease status either chronic or acute. Hypertension, commonly called high blood pressure, is a condition in which the blood vessels have insistently increase pressure; if increment of pressure in blood vessels left uncontrolled then high blood pressure can lead to a heart attack, enlargement of the heart and ultimately heart failure. There are various drugs available for the treatment of Hypertension usually intended to be used for lifelong purposes for hypertensive patients probably to avoid any related complications with hypertension. This incessant use of drugs gives a repeated exposure to the patient body which necessarily potentiates the propensity to cause ADRs; most of these ADRs are well predicted in due course of Clinical trials, although a limited duration of clinical trials routes out a possibility to skip to discover some of the ADRs which possibly may entirely remain unknown till date and thus may prove to be fatal. ADRs indeed pose an economic burden nationally as well as globally.⁴Worldwide cardiovascular disease accounts for just about 17 million deaths per year, nearly one-third of the total, in which complications of high blood pressure account for 9.4 million deaths all-inclusive every year¹. The assessment of different ADRs occurs by the Naranjo assessment scale². The study has suggested the evidences of majority of ADRs present in Group-II (51-65 y.) along with the involvement of presence of more ADRs in 19 males (59.38%) with social habits.

Naranjo scale has potentially projected the Spiranolactone shows existence of Probable ADRs in most of the case cases (56 % ADRs) with the propensity to cause and affect the CNS and urinary system reflecting the major and severe ADRs in 46% under investigation. The female I the post menopausal age has shown to increase risk of hormonal imbalance with the ongoing therapy of concurrent use of diuretics with other antihypertensives. Hartwig severity assessment scale calcium channel blocker like Amlodipine shows occurrence of moderate ADRs in 38% cases under investigation.

ISOLATION AND MORPHOLOGICAL CHARACTERIZATION OF ANTIBIOTIC

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ABSTRACT

The main aim of the studies was to isolate some antibiotic producing actinomycetes strains from various soil samples. The isolation of antibiotics producing actinomycetes was done by crowded plate methods and isolates were tested for antibiotic production on selected bacteria species. The antibacterial activity of soil sample was done by well diffusion methods. According to antibacterial activity and spectrum broadness, the result of antibacterial activity showed that three actinomycetes isolates were more zone of inhibition against two gram-positive and two gram-negative bacteria compare with other samples. Streptomycin was used as a standard antibiotics. Three of the isolates were selected and characterized by conventional methods. The unusual antibiotic profile of these isolates underlined their potential as a source of novel antibiotics.

Keywords: Actinomycetes, Antibiotic, Crowded plate technique.

WOUND HEALING POTENTIAL OF *JATROPHA CURCAS*

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ABSTRACT

Microbial infections and free radical generation in the pathophysiology of wound are a challenge to the treatment of wounds and wound healing. The study was to investigate antimicrobial and antioxidant and wound healing properties of aqueous solution of *Jatropha curcas* latex. Antioxidant activity of latex was exhibited using 1,1-diphenyl-2-picrylhydrazyl (DPPH) method, IC₅₀ (20.42 µg/ml) was found remarkable. The antimicrobial activity using agar well diffusion method, showed significant antibacterial activity against *S. aureus*, *B. subtilis* maximum zone of inhibition achieved were 17 and 18.5 mm respectively. The wound contracting ability in excision wound model was found to be significantly higher on day 16th as compared to the control with the least epithelization period (18.7 d) at higher dose. The results revealed us that *J. curcas* latex has possessed potent wound healing capacity.

NOVELTY EXPLORED IN HUMAN BEHAVIOR WHILE DECISION MAKING: DOPAMINE MODULATION

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ABSTRACT

Novelty basically resembles here to the fact that comprising habitual fact of humans and animals to explore novel and unfamiliar formulations or the stimuli. The idea of dopamine modulation roams around the approach towards the fact that, the novel stimuli excite dopamine neurons and activate the brain regions receiving dopaminergic input.

The present review basically enriches the fact of various conceptual strategies involved for dopamine modulation which enhances the novelty driven value and led to imply that excessive novelty seeking characteristic impulsivity, behavioral addictions might be caused by increase in dopamine steaming from fewer reuptakes.

Keywords: Curiosity, Impulsivity, Dopamine, Foraging, Exploitation, Novelty seeking.

STARVATION BASED DIFFERENTIAL CHEMOTHERAPY: A NOVEL EXPLORATION TOWARDS CANCER TREATMENT

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ABSTRACT

Conventional Methodologie for chemotherapy treatment is advised to lead increment in their food intake, so as to overcome therapy induced side effects. It is been novelly explored that fasting or short term starvation is more effective than dietary restrictions to prevent cancer growth so as starved cells may switch off signals for growth. The present review lays major importance over differential stress resistance, a novel citerai possible Saïd to bé ver effective in over all réduction of hémothérapie Sidé effets in cancer patients.

Keywords: Salvation, Dietary Restriction, Differential Stress Resistance, Differential Hémothérapie.

A SHORT REVIEW ON PHARMACOVIGILANCE AND ITS STATUS IN INDIA

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ABSTRACT

Pharmacovigilance is the pharmacological science relating to the recognition, assessment, understanding and prevention of adverse effects, particularly long term and short term adverse effects of medicines. India is fourth largest producer of pharmaceuticals in the world and emerging as Clinical trial hub. Many new drugs are coming up. Therefore, there is a need for a vibrant Pharmacovigilance system to be followed to protect the population from the potential risk by some of these new drugs. On WHO recommendation the Central Drugs Standard Control Organization (CDSCO) has initiated a well-structured and highly participative National Pharmacovigilance programme in India. In India problems with Pharmacovigilance is essentially due to the absence of a robust ADR monitoring system and also the lack of awareness of reporting concepts among Indian health care professionals. The present review seeks attention of healthcare professionals, patients, pharmaceutical industries to follow and adopt pharmacovigilance programme for betterment of society which is greatly affected by undesirable and unwanted drugs in a large population.

AUGMENTATION OF WOUND HEALING THROUGH HERBAL FORMULATION

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ABSTRACT

The present study was carried out to determine wound healing potential of some phytoactive constituents. Four cream based formulations (F1, F2, F3 & F4) were prepared and evaluated for physicochemical parameters viz. pH, consistency, spreadability and extrudability were examined. The formulations were also screened for preliminary wound healing potential using antioxidant, antibacterial activity and excision wound model. F4 formulation was found to be stable and effective with rapid healing and enhanced epithelization.

PHARMACOVIGILANCE: APPROACHES AND CHALLENGES

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ABSTRACT

Pharmacovigilance is defined as the science and activities concerned with the detection, assessment, understanding and prevention of adverse reactions to medicines (i.e. adverse drug reactions or ADRs). Our knowledge of a drug adverse reactions can be increased by various means, including spontaneous reporting, intensive monitoring and database studies. New processes, both at a regulatory and a scientific level, are being developed with the aim of strengthening pharmacovigilance. On a regulatory level, these include conditional approval and risk management plans; on a scientific level, transparency and increased patient involvement are two important elements. There are many challenges and barriers in pharmacovigilance which are from health professionals like lack of training or awareness, due to self-medication from patients etc. This can be overcome by monitoring each patient. The pharmacovigilance of tomorrow must be able to identify new safety issues without delay. If we succeed herein, patients' confidence in drugs will return. Furthermore, pharmacovigilance methods must also be able to describe which patients are at risk of developing an ADR and what the course of the ADR is. A scope of closer pharmacovigilance studies are much needed in older age groups due to polypharmacy which can cause ADRs leading to hospital readmission and the direct and indirect treatment costs to treat ADR. **Keywords:** Pharmacovigilance, Drug safety, spontaneous reporting, intensive reporting.

SCREENING OF HERBAL MOLECULES AGAINST TYPE 2 DIABETES MEDIATED NEUROLOGICAL COMPLICATIONS

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ABSTRACT

Aim of the present study was to screen out commonly consumed dietary natural compounds for their potential to alleviate diabetes and its associated complications and compare them with commercially available antidiabetic drugs. We screened ascorbic acid, gallic acid, quercetin, caffeine, ellagic acid, cinnamic acid and piperine through docking and simulations studies followed by in-vitro antioxidant, antiinflammatory, genotoxicity and antidiabetic assays and compared them with rosiglitazone, metformin and glimepiride. Natural molecules, especially ascorbic acid, quercetin and ellagic acid, showed excellent in-vitro antioxidant, antiinflammatory and genotoxicity preventive activities, which were 1.5-3 folds better than marketed drugs. Quercetin, ellagic acid and ascorbic acid were better than commercially available drugs in inhibiting α -amylase activity and showed comparable results for glucose uptake into L6-rat myogenic cells. Docking studies predicted quercetin, ellagic acid and piperine to be most potent antidiabetic moieties which may act through DPP-IV, insulin or PPAR- γ receptor. Stability of these compounds was observed through simulation studies. Further, quercetin (30 mg/kg/p. o./o. d.) was administered to streptozotocin (40 mg/kg/i. p.; 5 consecutive days) induced type-2 diabetic mice for 8 w to evaluate effect on diabetes and associated neurological complications. Quercetin significantly reduced blood glucose level, improved glucose tolerance and alleviated diabetic neuropathy in mice as evident from significantly improved working memory performance in Morris-Water Maze test. It can be concluded that quercetin possesses high potential to control diabetes and associated CNS complication and therefore, quercetin be a useful adjuvant therapy along with clinically prescribed drugs to prevent diabetes and its associated complications.

Keywords: Diabetes, Quercetin, Docking, Herbal therapy, Neuropathy.

ANTIASTHMATIC EFFECT OF KANKASAVA IN OVA-INDUCED ASTHMA MOUSE MODEL

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ABSTRACT

Objectives: Main object of this study was to evaluate the effect of kankasava on ova-induced asthma in mouse model.

Methods: In ova sensitized mice, airway hyperresponsiveness, ige and cytokines estimation was carried out.

Results: Present study has demonstrated that kankasava exhibited an antiasthmatic effect by attenuated ahr and reducing level of ige, il-5, and il-13, in both serum and balf in ova induced asthmatic mice. effect of kankasav on airway responsiveness was obtained by monitoring the enhanced pen value. kankasava significantly reduced ahr can be explained, in part, by reduction in both ige overexression and cytokine levels. kankasava significantly decreased il-4, il-5, and il-13 in balf indicate that it may suppress the excess activity of t-cells and th2 cytokines, which are implicated in the pathogenesis of allergic asthma, and consequently restore the th1/th2 imbalance of the immune system.

Conclusions: It was hypothesized that kankasava effectively suppressed elevations in ige and cytokines levels, ahr, and mucus overproduction in mice with ova-induced asthma suggested kankasava could be efficacious in immunological and pharmacological modulation of allergic asthma.

PHARMACOKINETICS AND ORAL BIOAVAILABILITY ALTERATION OF NIMESULIDE IN FIXED DOSE COMBINATION WITH PARACETAMOL IN RABBITS

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ABSTRACT

The purpose of this study was to investigate the pharmacokinetic alteration of Nimesulide, after oral administration of Nimesulide in rabbits with or without Paracetamol co-administration. Healthy white rabbits of either sex weighing (2-2.5) kg were divided into different groups of six each and housed under standard animal room conditions. After overnight fasting, the rabbits were administered a single oral dose of Paracetamol (56 mg/kg), Nimesulide (10 mg/kg) or a combination of Paracetamol (56 mg/kg) with Nimesulide (10 mg/kg) in propylene glycol, respectively. Blood samples were collected in heparinized tubes from the marginal ear vein of rabbits at 0, 0.25, 0.5, 1, 1.5, 2.5, 3, 4, 6, 12, 18 h after drug administration and were subjected to HPLC analysis. The mean plasma concentration-time parameters for oral administration of 10 mg/kg Nimesulide alone and its combination with 56 mg/kg Paracetamol were calculated. The low peak concentration of Nimesulide with a combination dose might be because of high distribution and hence an increase in concentration in the central compartment which lead to lower AUC value. The significant alteration of pharmacokinetic parameters in combination may lead to sub therapeutic or irrational fixed dose combination.

MICRONUCLEUS ASSAY A PARAMETER FOR ASSESSMENT OF GENOTOXICITY

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ABSTRACT

Genotoxicity testing of new chemical entities is an integral part of the preclinical drug development process. Genotoxicity is determined with the help of standard test battery concept to detect some carcinogens (non-genotoxic) and weak genotoxins. In the present study doxorubicin (DOX, 10 mg/kg) was used to evaluate the DNA damaging potential in Swiss female mice (22±2 g). The endpoints of evaluation include the micronucleus formation and supported with the help of oxidative stress parameters (Malondialdehyde and Glutathione) [1]. The present study results clearly demonstrated that the doxorubicin is a potent genotoxic compound.

IMMUNOMODULATORY ACTIVITY OF *ALOE VERA* LINN

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ABSTRACT

The aim of the present research work was to study the immunomodulatory activity of *Aloe vera* Linn. family liliaceae. The extract of *Aloe vera* leaves was administered in the albino mice orally through feeding needle according to their body weight. The immunomodulatory activity was studied by administration of test extract and observed the effect on specific and non-specific immunity. The induced immunosuppressant in albino mice was done by pyrogallol to study the effect of immunomodulatory activity of the extract. The edema was induced in the right paw of mice by injecting Sheep Red Blood Cell in the sub planar region to observed the cellular immune response and humoral antibody response to Sheep Red Blood Cell measures the antibody titer by haemagglutination reaction was done. Pyrogallol induced suppression of humoral as well as cell mediated immune response was significantly attenuated by daily oral treatment with extract of *Aloe vera*. Vitamin E treated group exhibited similar attenuation of the suppression in immune responses. *Aloe vera* extract at the dose of 100 mg/kg was found to suppress delayed type hypersensitivity reaction induced by Sheep Red Blood Cells in mice. As evidenced by marked increase in haemagglutination titers in mice was also observed. The study shows that *Aloe vera* extract triggers both specific and non-specific immunity and the results shows that *Aloe vera* extract has greater immunomodulatory effect.

Keywords: Immunomodulatory activity, Humoral antibody response, Haemagglutination.

EVALUATION OF ANALGESIC AND ANTI-INFLAMMATORY ACTIVITY OF *CUCUMIS CALLOSUS* ROOT IN ANIMAL MODELS

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ABSTRACT

This organism is used as a novel model because of its similarities between disease pathway and gene expression with humans. The worm has a total count of 959 cells which can be easily observed under a microscope and any effect due to any drug can also be easily detected due to its transparency of the worm. Use of *C. elegans* technique is cheaper and faster. It is a valuable disease model if the disease can be defined on a molecular basis. It is not economic to remove all druggable genes from any organism however in this scenario the number of genes are highly limited and the RNAi can be easily targeted for target identification mediated by gene knockdown and accomplished by directly injecting dsRNA in the worm. The exposed *C. elegans* develops a phenotype as soon as the activity of gene is reduced. There are three general ways to generate a model, knocking out or knocking down, selection of reproduction process, and expressing human gene. The model is used in Genetic diseases like ADKPD where PKD1, PKD2 pathway is used in disease gene knockdown model another disease in this category is muscular dystrophy where dystrophin (*dys-1*) and emerin genes are used, *dys-1* is mutated to develop a muscle generating phenotype. Another area where this model is being used is oncological study i.e. cancer where EGF or RAS are the pathway of action and Vulva development model for cancer biology is used. Neurodegeneration diseases like Alzheimer's disease where Presenilin gene is used and genetic egg laying model and neuronal model are used. In Parkinson's disease where α -synuclein gene is used and *C. elegans*'s transgenic model is preferred. The metabolic syndromes were studied on diabetes related gene like Insulin/AKT and Dauer formation model is used. *C. elegans* models can be a useful in addition to many drug discovery. The data procured from *C. elegans* studies can help better understand mechanisms of many diseases in humans and can be used to bridge the gap between *in vivo* and *in vitro* studies.

PHARMACOGNOSY

PHYTOCHEMICAL SCREENING AND STANDARDIZATION OF MEDICINAL PLANT *ASTERACANTHA LONGIFOLIA* (L) NEES

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ABSTRACT

Asteracantha longifolia (L.) Nees, Acanthaceae, is a source of the ayurvedic drug. It is also known as 'kokilaaksha', 'Talimakhana', 'Indian Cuckoo'. The plant is widely distributed throughout India, Srilanka, Burma, Malaysia and Nepal. It contains lupeol, stigmasterol, butelin, fatty acids, saponins, alkaloids, steroids, tannins, flavonoids and triterpenoids are the main phytoconstituents. The plant is known to possess antitumor, hypoglycemic, aphrodisiac, antibacterial, free radical scavenging and lipid peroxidation, hepatoprotective and haematopoietic activity. Standardization of herbal formulations is essential in order to assess of quality drugs, based on the concentration of their active principles, physical, chemical, phyto-chemical and standardization, and In-vitro, In-vivo parameters. The result of the *Asteracantha longifolia* showed the presence of alkaloids, amino acids, carbohydrates, proteins, steroids, cardiac glycosides, saponins, flavonoids, tannins, and phenolics compounds. Results of macroscopic study, chemical study, phytoconstituents, ash value, (acid-insoluble and water soluble ash value), extractive value, (alcohol-soluble and water soluble extractive value) were also determined. The plant can be studied further for the advanced parameters.

Keywords: *Asteracantha longifolia*, Phytochemistry; Quality Control, Standardization

**EVALUATION OF CYTOTOXIC ACTIVITY OF INDIAN MEDICINAL PLANTS USED TRADITIONALLY TO TREAT
CANCER**

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ABSTRACT

The the srb assay was used to test *in vitro* cytotoxicity against four human cancer cell lines of six indian medicinal plant species which are being used by traditional people in tribal regions for the treatment of ulcers and other diseases of patients. the ethanolic and aqueous extracts were tested against human cancer cell lines such as human neuroblastoma cell line (imr-32) and colon cell lines (ht-15 & ht-29) and lung cancer cell lines a-549. the results showed that plants calotropis procera, ocimum sanctum and cannabis sativa, exhibited a very high degree of *in vitro* cytotoxic activity. the results showed a certain degree of selectivity against the different cell types with different extracts.

keywords: Human cancer cell lines; *in vitro* cytotoxicity test, Srb assay, Indian medicinal plants.

DEVELOPMENT AND VALIDATION OF HPTLC METHOD FOR QUANTIFICATION OF APIGENIN IN *HYGROPHILA SPINOSA* T. ANDERS

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ABSTRACT

A novel accurate and cost effective HPTLC method has been developed for quantification of apigenin in alcoholic extract of whole plant of *Hygrophila spinosa*. The separation was carried out on silica gel plates using mobile phase, toluene: ethyl acetate: formic acid (6.0:4.0:1.0) and detected at wavelength 349 nm. The method was validated for linearity, accuracy, precision, LOD, LOQ etc. by ICH guidelines. The calibration range was found to be 80-560 ng/band with $r^2 = 0.997$. Method was found to be accurate in triplicate results at different standard addition levels and the average recovery was 99.94%. The LOD and LOQ were 40 and 80 ng/band respectively. The %RSD was less than 2 for the system suitability testing. Further, the method was found to be simple, precise, robust, specific, rapid and cost effective. The quantity of apigenin was found to be 8.84 mg/gm in the alcoholic extract. The developed method could be used for quality control analysis and quantitation of apigenin in plant raw material, single herbal formulation and multiherbal formulations or combined herbal dosage forms.

DETERMINATION OF ANTIPSORIATIC ACTIVITY OF CASSIA TORA SEED

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ABSTRACT

Psoriasis is a chronic relapsing skin disease. The present investigation was carried out to study the unexplored area of these drug towards their antibacterial activity with respect to their traditional use as antipsoriatic agents. The herbal extract was subjected to antibacterial evaluation against both gram positive and gram negative organisms by spread plate method and their effect was compared to marketed preparation widely used for treatment of psoriasis. Therefore present investigation would lead to the development of potent phytomedicine for the treatment of psoriasis and offers valuable alternative to conventional psoriasis treatment for providing eternity success and growth to industries as well as for welfare of human being.

DEVELOPMENT AND EVALUATION OF HERBAL ANTI-BACTERIAL HAND WASH

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ABSTRACT

Herbal medicines are significant part of healthcare throughout the world. Herbal medicines have been extensively utilized as effectual remedies for the prevention and management of multiple health conditions. Hands are a prime mode of transmission of microbes and nosocomial infections. Hand-washing is extremely imperative in healthcare and domestic sector. Numerous of the antiseptic hand wash available in the market are alcohol based sanitizers which have some adverse effects. To avoid these adverse effects like itching, drying, irritation, dermatitis etc., of the synthetic hand wash formulations an attempt has been made to formulate a poly herbal hand wash using extracts of Garciniaindica, Curcuma longa extracts. The anti-microbial activity of the prepared poly-herbal hand wash was tested against the skin pathogens collected from volunteers, and its efficiency was verified using Cup Plate Method. The results from Cup Plate Method showed that the hand wash prepared from alcoholic extract of Curcuma longa and aqueous extract of Garciniaindica have effective activity due to the combined activity of phytoconstituents present in the extracts. The results from the present work support the incorporation and utilization of herbs in the formulations to give a better effect. Herbal hand wash evaluated by tested parameters like physical parameters like colour, fragrance and chemical parameters like pH, Viscosity, Foam height, Foam retention, Anti-Microbial Activity, Skin irritation test etc. and obtained results were in the acceptable limits with less or no side effects.

ROOT EXTRACTS OF 'DUDHILATA' IMPROVES TISSUE ANTIOXIDANT STATUS IN STREPTOZOTOCIN-NICOTINAMIDE INDUCED TYPE-II DIABETIC RATS

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ABSTRACT

Oxidative stress plays an important role in chronic complications of diabetes mellitus. In the present study the antioxidant effect of oral administration of ethanolic and aqueous root extracts of Dudhilata, *Ichnocarpus frutescens*. on tissue antioxidant enzymes and lipid peroxidation in liver and kidney of streptozotocin-nicotinamide induced type-II diabetic rats was evaluated. The diabetic rats showed lower activities of superoxide dismutase (SOD), glutathione peroxidase (GPx), glutathione transferase (GST) and reduced glutathione (GSH) content in liver and kidney, which were restored to near normal levels by treatment with the root extracts. The increased levels of lipid peroxidation (TBARS) in diabetic rats were reverted back to near normal levels after treatment with the extracts. Normal architecture was also restored back in the kidney and liver of diabetic rats after treatment with the extracts which was confirmed by histopathological examinations. A two dose level study was conducted. The present study reveals the efficacy of the root extracts in the amelioration of diabetes, which may be attributed to its antioxidant potential.

AMELIORATIVE EFFECT OF *BAMBUSA VULGARIS* LINN. FOR WOUND HEALING ACTIVITY BY REDUCED INFLAMMATION

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ABSTRACT

Objectives: The wound healing process consists of four highly integrated and overlapping phases: hemostasis, inflammation, proliferation and tissue remodeling. These phases and their biophysiological functions must occur in the proper sequence and continue for a specific duration at an optimal intensity. *Bambusa vulgaris*, commonly known as bamboo is taxonomically a grass, but its habit is tree-like. Report on the analysis of leaves of *B. vulgaris* revealed that it contains crude protein of 10.1%, phosphorus 86.0 mg/100 g, iron 13.4 mg/100 g, vitamin B1 0.1 mg/100 g, vitamin B₂ 2.54 mg/100 g and carotene 12.32 mg/100 g (Tamolang *et al.*, 1980). Bamboo leaves have been claimed to be used as astringent, ophthalmic solution, sudorific and febrifuge and used in ayurvedic medicine in paralytic complaints and to treat various inflammatory conditions. The aim of present study was to evaluate wound healing properties of *Bambusa vulgaris* Linn. leaves and stems used in Indian medicine.

The phytochemical analysis reveals the presence of steroids, glycosides, flavonoids, carbohydrates, saponins and proteins. The different fractions of leaves and stem extract were tested for wound healing activity and anti-inflammatory activity by incision and carragennon model respectively. Ethanol extract was shows significantly ($P < 0.01$) faster wound healing up to days 9th day. The hydroxyproline and protein content in animals treated with fraction and reference ointment was found significantly ($P < 0.01$) greater than control group of animals. The paw edema of extracts fraction treated groups with and reference ointment was found significantly ($P < 0.01$) increased than control group of animals. The histopathological findings also support with formation of angioblasts and fibroblasts throughout the tissue on 9th days.

In conclusion, the observation and results obtained in present study indicated that ethanol extract of *Bambusa vulgaris* Linn. possesses a definite wound healing action and reduce inflammation.

ASSESSMENT OF EFFECT OF ETHANOLIC EXTRACT OF *ACACIA NILOTICA* L. ON REPRODUCTIVE TISSUES OF MALE RATS

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ABSTRACT

The present study was designed to investigate the effects of ethanolic extracts of *Acacia nilotica* L. on testicular tissue of experimental male rats. The ethanolic extract of bark part of *A. nilotica* at the dose of 250 and 500 mg/kg body weight were administered in male rats for 28 d. At the end of 28 d experiment male animals were autopsied under anesthesia and sacrificed and testes was removed, freed from adherent tissues and subjected to histopathology studies. Conventional techniques of paraffin-wax sectioning and haematoxylin-eosin staining were used for histological studies. Results of histoarchitecture study revealed that testicular tissue of rats treated with alcoholic extract 500 mg/kg showed spermatogenesis, increase in diameter of the seminiferous tubules, instead of the normal round shape, many tubules became oblong in shape to accommodate the growth due to this blood vessels of testis were slightly dilated, connective tissues were compressed and seminiferous tubules completely filled with sperm bundles and spermatozoa appeared in the lumen. Results of histopathology studies revealed that ethanolic extract of *Acacia nilotica* L. significantly improves the histoarchitecture of testicular tissue of male rats as compared to control group.

HERBAL FORMULATION OF *COCOS NUCIFERA* L. FOR TREATMENT OF ECZEMATIC INFECTIONS

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ABSTRACT

Objective: Atopic eczema is a chronic inflammatory skin condition characterized by an itchy red rash that favors the skin creases such as folds of elbows or behind the knees. The eczema lesions themselves vary in appearance from collections of fluid in the skin to grass thickening of skin (lichenification). Atopic eczema also associated with other atopic diseases such as hay fever and asthma (Hoare *et al.*, 2000). The objective of the present study was to formulate an ointment containing aqueous extract of *Cocos nucifera* shells and evaluate their efficacy for growth inhibition of microorganisms that cause infection in atopic eczema.

Methods: In the present study we describe *in-vitro* efficacy of *Cocos nucifera* (family: Arecaceae) husk fiber extract ointment for growth inhibition of four microbes (*Candida albicans*, *Aspergillus fumigatus*, *Staphylococcus aureus* and *Trichosporon asahii*) that may cause severe infection in eczema patient. The stability parameters of extract ointment such as physical stability, spreadability, centrifugation etc. would be performed and found applicable results. The therapeutic effect was compared with marketed product Tacrolimus 0.1%w/w ointment. The shells of *Cocos nucifera* have rich in polyphenolic compounds and have been reported for arthritis, diarrhoea, and antibacterial, antiviral and also have inhibitory lymphocyte production.

Results: The ointment formulation was found stable at room temperature, 37 C and 40 C for 45 d. No change in color and odor was found. Spreadability was determined in repeated experiment and data are tabulated in table 1. After centrifugation we don't found any separation and deterioration in ointment. The results were given in table 2-3; show that MIC for all microorganisms between 6 and 7 mg/ml and inhibition zone diameter of and were *Candida albicans* *S. aureus* more efficient than of other bacterial strain.

Erythema and edema was observed visually on rabbit skin. We don't found any change in skin color (redness) in both control as well as extract ointment groups. Catechins are favonoids that were present in shells, already have antioxidant, powerful cellular growth inhibitor and anti-inflammatory activity which might be correlated with this study.

Conclusion: The aqueous extract ointment of *Cocos nucifera* L was found effective and require further study for eczema as well as isolation of responsible active constituents for in-vivo this activity.

EXTRACT OF SESBANIA GRANDIFLORA AMELIORATES HYPERGLYCEMIA IN HIGH FAT DIET-STREPTOZOTOCIN INDUCED EXPERIMENTAL DIABETES MELLITUS

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ABSTRACT

Sesbania grandiflora has been traditionally used as antidiabetic, antioxidant, antipyretic, expectorant, and in the management of ulcer, bronchitis, cough, vomiting, wounds, diarrhoea, dysentery, internal and external haemorrhages, and intermittent fevers. The present study evaluates the antidiabetic activity of methanolic extract of Sesbania grandiflora (MESG) in type 2 diabetic rats induced by low dose streptozotocine and high fat diet fed. Diabetic rats were administered with vehicle, MESG (200 and 400 mg/kg, p. o.) and the standard drug, metformin (10 mg/kg) for 28 d. During the experimental period body weight, abdominal girth, food intake, fasting serum glucose, urine volume and presence of glucose and ketone bodies were measured. Serum analyses for lipid profile, SGOT, SGPT, serum creatinine, urea, protein, SOD and MDA were carried out after 28th day of treatment. MESG (200 and 400 mg/kg, p. o.) induced significant reduction ($P < 0.05$) of raised blood glucose levels in diabetic rats and also restored the other parameters to the normal level. Therefore, it is concluded that MESG has potential antihyperglycemic and antihyperlipemic activities.

STUDY OF HEPATOPROTECTIVE EFFECT OF BARK OF CRATAEVA NURVALA BUCH: EXTRACTION, ISOLATION AND IN-VITRO & IN-VIVO EVALUATION

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ABSTRACT

The present work is focused on investigation of hepatoprotective activity of bark of Crataeva nurvala. Its hepatoprotective activity was studied in the form of its aqueous and ethanolic extract and its isolated compound, against CCl₄ induced hepatotoxicity in albino rats. The In-vitro study demonstrated the lowering of GPT and LDH level in isolated hepatocytes. Further more, an alteration in the level of biochemical markers, i.e., SGOT, SGPT, SALP and bilirubin were studied in-vivo on albino rats after CCl₄ induced hepatic damage. Ethanolic extract (dose 250 mg/kg & 500 mg/kg) and isolated compound (dose 50 mg/kg) induced lowering of biochemical markers near to the normal levels in dose dependent manner, while there was no remarkable change with the aqueous extract (dose 250 mg/kg and 500mg/kg). Hence, the findings confirmed that ethanolic extract and isolated compound of C. nurvala bark possess hepatoprotective activity.