GOA – CENTER FOR EXCELLENCE IN INTELLECTUAL PROPERTY

6th Annual International Conference
on

Global Trends in IPR: *Patenting & Beyond !!*

Dec. 1-2, 2021
Goa College of Pharmacy
Panaji, Goa - INDIA

G-CEIP

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Goa – Center for Excellence in Intellectual Property

Umesh Banakar, PhD, Professor and Founder

Goa-Center for Excellence in Intellectual Property [G-CEIP]

Message …….

Goa – Center for Excellence in Intellectual Property [G-CEIP] - ***Where we are; where we are going and where we wish to be ..!!***

At the outset, it is my distinct privilege to welcome you to the 6th Annual International Conference on Intellectual Property organized by the **Goa – Center for Excellence in Intellectual Property [G-CEIP]** in association with **Goa College of Pharmacy [GCP]**. Global experts in IP have gathered here to share their rich and extensive experience in IP matters.

G-CEIP completes five years, as of date !! Of the many "***first of its kind***" the Center has accomplished, such as, Research Showcase Presentation (RSP) – a platform for the scientists (IP generators); scientific and technical focus-based courses in IP to enhance the knowledgebase of the IP generators; signing of MOUs with institutions, professional associations, and industry, among others. The Center continues to strive to reach out and provide services to its stakeholders (IP generators) nationally through various formats such as institution based professional advancement programs, focus presentations at scientific conferences, both inter- and intra-national. Such reach out programs and services have been well supported and equally well received by industry and academia. The Center has reached nine states: Goa, Maharashtra, Karnataka, Haryana, Punjab, Telangana, Madhya Pradesh, Rajasthan and Uttarakhand; and four global scientific forums: ISC, IPC, SPDS and FPQL. The Center has demonstrated sustained commitment to its vision and is gaining traction within the scientific community.

India celebrates her 75th year of independence – diamond jubilee – this year. Numerous initiatives, both new and on-going, to galvanize economic development, industrial growth, academic enhancement among others to elevate the country's standing globally. The focus on intellectual property rights (IPR) while initiated in late 1995 the realization that the path to sustained prosperity goes through IPR is slowly being realized. Simply stated, the entire domain of IPR – identification, possession, and protection – remains to be fully appreciated. G-CEIP, over the past five years, has a demonstrated continuing commitment to enhance the knowledgebase and awareness of IP within the scientific communities across disciplines and

across state borders in the entire country. It is time to ask ourselves: ***Where we are; where we are going and where we wish to be ..!!***

The central theme of **G-CEIP 2021 International Conference on Intellectual Property Rights (IPR)** is entitled:

Global Trends in IPR: *Patenting and Beyond !!*

I, personally, welcome each one of you to take maximum advantage of this opportunity, not only to listen to these experts in IP, but also to interact one-on-one with them. I hope this program will be a professionally enriching and rewarding experience which will go a long way in your professional development.

Warm wishes,

Umesh Banakar, Ph.D.
Professor & President
Founder: **Goa - Center for Excellence in Intellectual Property [G-CEIP]**

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TITLE: FABRICATION AND EVALUATION OF MANNOSYLATED CURCUMIN AND SESAMOL LOADED NANOSTRUCTURED LIPID CARRIERS: IN VIVO HEPATOPROTECTIVE ACTIVITY IN WISTAR RATS

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ABSTRACT:

Curcumin is a well-recognized antioxidant phytoactive isolated from rhizomes of Curcuma longa. Sesamol is a well-recognized antioxidant phytoactive isolated from sesame oil. Benzodioxole group of sesamol has potential to scavenge hydroxyl radical that impart hepatoprotective potential to such phytoactive. Mannose, a water soluble carbohydrate was hydrophobized by anchoring stearylamine with an aim to conjugate mannose on surface of curcumin and sesamol loaded nanostructured lipid carriers for targeting asialoglycoprotein receptors on hepatocytes. Mannose anchored stearylamine was synthesized and characterized using sensitive analytical techniques. The synthesized targeting ligand was incorporated sesamol loaded nanostructured lipid carriers and characterized by photon correlation spectroscopy as well as hemolytic toxicity. Both curcumin and sesamol loaded nanocarriers were evaluated for *in vivo* hepatoprotective potential using Liv-52 was used as standard drug. The hepatoprotective potential was assessed by measuring serum liver injury markers and oxidative stress parameters in liver post–mitochondrial supernatant. Mannose conjugated nanostructured lipid carriers showed acceptable particle size which revealed its suitability for hepatocytes targeting. In addition to this, mannose conjugated nanostructured lipid carriers revealed significantly better ($p < 0.05$) reduction of serum liver injury markers and proinflammatory cytokine compared to unconjugated one which confirmed hepatocytes targeting potential of synthesized ligand.

KEYWORDS: D-mannose; Stearylamine conjugate; Asialoglycoprotein receptors; Sesamol; Curcumin; Nanostructured lipid carriers

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TITLE: Formulation and Evaluation of Flurbiprofen Nanosuspension Loaded in-situ gel for Ocular Treatment

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ABSTRACT:

BACKGROUND: Flurbiprofen, a cyclooxygenase inhibitor is used for the treatment and management of ocular inflammation and cystoids macular edema. It is a BCS class II drug and undergoes rapid drug loss due to nasolachrymal drainage, lacrimation, tear turnover, systemic absorption, enzymatic degradation resulting in low ocular bioavailability of less than 5% upon ocular administration.

OBJECTIVE: The present work is aimed to formulate pH sensitive in-situ gel containing flurbiprofen nanosuspension for ocular administration. Such formulation increases the precorneal residence time onto the ocular surface and helps in better absorption of drug.

METHODS: Antisolvent precipitation-ultrasonication method was adopted for the preparation of flurbiprofen nanosuspension which was further incorporated into the in-situ gelling matrix. Formulation with least particle size and PDI was chosen for incorporating in the gelling matrix.

RESULTS: The nanosuspension prepared with PVP K-25 showed good particle size of 403.9nm, zeta potential of 0.160 and PDI of 0.060 and was chosen as the optimized formulation. The optimized nanosuspension was incorporated into in-situ gelling base consisting combination of Carbopol 974P NF and HPMC. The optimized formulation was extensively characterized for various physical parameters like in-situ gelation, rheological studies and in-vitro drug release. Formulation with 0.8% Carbopol 974P NF and 0.6% HPMC E50 demonstrated good gelation and over 70% drug release at the end of 8 hrs.

CONCLUSION: Nanosuspension loaded in-situ gel is a promising approach for delivery of drugs via ocular route in order to increase drug permeation through cornea and thus improving overall bioavailability.

KEYWORDS: Flurbiprofen, Ocular drug delivery, Nanosuspension, in-situ gel, sustained release, pH sensitive

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TITLE: FORMULATION DEVELOPMENT AND EVALUATION OF RAPIDLY DISSOLVING TRANSMUCOSAL FILMS CONTAINING BCS CLASS II DRUG FOR DISSOLUTION ENHANCEMENT

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ABSTRACT: Rapidly dissolving films are advanced alternatives due to their rapid onset of action, enhanced bioavailability and improved patient compliance. Ramipril (ACE inhibitor), used for the treatment of hypertension and congestive heart failure (CHF) is a BCS Class II drug having low aqueous solubility and poor dissolution profile with oral bioavailability of 28% and therefore serves as the basis of this study.

The study aimed to formulate and evaluate rapidly dissolving sublingual film containing Ramipril solid dispersion for transmucosal delivery for the drug.

The solubility of Ramipril was enhanced by preparing the solid dispersions using PEG 4000 and Poloxamer 188 in three different ratios (1:1, 1:2, 1:3) by Physical mixture, Kneading method and Solvent Evaporation method which was then incorporated into film formulation by solvent casting method. Box Behnken design was used to select the film formulation with optimum properties. The DSC and the XRD studies revealed the amorphous nature of the drug in solid dispersion and film formulation. Rapidly dissolving films were evaluated for their weight variation, folding endurance, disintegration time, thickness, surface pH, FT-IR, surface morphology, dissolution studies and stability studies.

The solid dispersion (F16) prepared by kneading method (ratio1:1) exhibited the highest Drug Content of 99.15±1.434 % and maximum *in vitro* release of 99.89% in 15 mins. Drug release kinetics data revealed that the optimised film showed 95.45 ± 0.851% release within 7 minutes.

The Ramipril loaded films possessed optimum physio-mechanical properties along with rapid drug release and a good stability profile.

KEYWORDS: Ramipril, Solid dispersion, Kneading method, Rapidly dissolving transmucosal film, Drug content, *In vitro* dissolution.

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TITLE: FORMULATION AND CHARACTERIZATION OF PROVESICULAR BASED DRUG DELIVERY SYSTEM FOR EFFECTIVE TRANSDERMAL DELIVERY OF ANTIFUNGAL DRUG

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ABSTRACT:

Itraconazole (ITZ) is an antifungal agent, used in the treatment of a broad-spectrum fungal infections. Oral intake of ITZ is associated with severe side effects in the gastrointestinal tract and has low bioavailability approximately 55%. Owing to these disadvantages, Transdermal drug delivery of such antifungal agents can overcome such issues and can improve the efficacy and bioavailability. The aim of this study was to evaluate the potential of proniosomes as a transdermal drug delivery system for ITZ by encapsulating the drug in various formulations of proniosomal gel composed of various surfactants like polyoxyethylene sorbitan fatty acid esters and sorbitan fatty acid esters, with cholesterol, Phosphatidylcholine prepared by Coacervation-phase separation method. Among all the formulated proniosomal gel formulation TF5 containing tween 20 was found the most appropriate surfactant, yielded vesicle size of 517nm and showed highest entrapment efficiency of 94.63±0.65% ($p<0.05$) and *in-vitro* release up to 35.72%. The TF5 formulation was then selected for the preparation of Transdermal proniosomal hydrogel which was formulated using different concentrations of Carbopol and HPMC. These gels were characterized for pH, spreadability, drug content and *in-vitro* diffusion study and stability studies wherein the optimized formulation showed the values of 7.01±0.101, 33.70 g.cm/sec, 99.5% and 87.83% ($p<0.05$). The drug release kinetics studies revealed that release was prolonged up to 8hrs and release pattern was found to be diffusion controlled which was confirmed by Higuchi's plot. The results of this study suggest that proniosomes are promising nano vesicular carriers to enhance the transdermal delivery of ITZ.

KEYWORDS: Itraconazole, Antifungal, Proniosomes, Transdermal drug delivery, Hydrogel.

TITLE: Fabrication and Characterization of 3D printed fast dissolving oral films of Ivabradine Hydrochloride

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ABSTRACT:

3D printing technology is gaining significance due to its rapid prototyping and customization. One of the 3D printing techniques is Fused Deposition Modelling (FDM) or Fused Filament Fabrication (FFF) which adopts the principle of Hot Melt Extrusion (HME). Fast-Dissolving Oral Films (FDOFs) increase consumer acceptance by advantage of rapid disintegration and dissolution and administration without water. Ivabradine Hydrochloride (Anti-Anginal drug) was selected for formulating FDOF whose oral bioavailability is 40% due to First Pass Metabolism and therefore it serves as the basis of this study. The aim of the present study is to fabricate filament extruder and 3D printed fast dissolving oral films by FDM technique and to check the influence of disintegrant on disintegration time and drug release kinetics. For FDM 3D printing technique the film forming polymers like PVA and HPC SL are converted into filaments by using hot melt extrusion process along with Sodium Starch Glycollate as Super-disintegrants and PEG 400 as plasticizer and the drug which were introduced into 3D printer and printed at 185°C (HPC SL) and 195°C (PVA). Preformulation studies and compatibility studies (DSC, FT-IR) were done with physico-chemical parameters and mechanical strength evaluation. All the formulations exhibited more than 90% of drug release within 15 minutes. The optimized formulation, P3 was selected as it showed lowest disintegration time of 42.33 ± 1.15 sec and faster dissolution rate of 99.22% with a release time of 8 minutes. The morphology of the films was studied by SEM analysis.

KEYWORDS: Ivabradine HCl, 3D printing, Fast Dissolving Oral film, HPC, PVA, Disintegration, Dissolution, Morphology

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TITLE: Formulation development and Evaluation of Pterostilbene loaded Colon targeted beads.

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ABSTRACT:

Pterostilbene, a phytochemical with a colon chemopreventive effect suffers poor bioavailability therefore incompetent to penetrate the tissues of the colon. To overcome this, colon targeted beads loaded with pterostilbene was prepared for oral administration utilizing pectin as polymer and zinc acetate as crosslinker. Formulation of colon targeted beads was carried out by ionic gelation. Optimization was performed using 2^3 full factorial design by considering polymer concentration (X_1-2% w/v), crosslinker concentration (X_2-2% w/v) and drug:polymer ratio (X_3-1:4) as independent variables. The effect of these were studied on entrapment efficiency (64.80%) and *in vitro* drug release (37.88%) till 24 h taken as dependent variables. The zinc pectinate beads were found to possess uniformity size, spherical and rough morphology, and appropriate swelling. Furthermore, coating of optimized zinc pectinate beads was carried out by fluidized bed coater using Eudragit S-100 as a pH dependent coat. Coated optimized zinc pectinate beads were found to have smooth morphology with optimal drug release till 24 h. After administration of optimized coated beads in rats, pterostilbene was detected at 14 h in plasma reaching maximum concentration at 22 h (T_{max}) compared to plain pterostilbene showing T_{max} of 3 h. Thus, delayed T_{max} with a substantial pterostilbene distribution in colonic tissue compared to the tissues of stomach and small intestine ascertain the formulation targeting the colon.

KEYWORDS: Pterostilbene, Colon targeted beads, Ionic gelation, Zinc pectinate, 2^3 factorial design, Eudragit S-100, Pharmacokinetic, Organ distribution.

TITLE: Optimized polyethylenimine (PEI) based lipopolyplexes for siRNA delivery, analyzed in vitro for targeting VEGF indirectly

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ABSTRACT: (Not more than 250 words)
Diabetic retinopathy (DR) is one of the most severe complications of diabetes, which damages the retina and entire microcirculatory system. RNA interference (RNAi) therapy acts on straightway on disease causing gene thereby lowering the toxicity and other side effects. Therefore, HuR targeted small interfering RNAs (siRNAs) are potential mediator to target VEGF which plays a critical role in the aetiology of DR and could be a new therapeutic option for treatment of DR. Cationic polymers like PEI facilitate the complexation with siRNA for RNAi induction whereas different liposomes also act as transfecting reagent which impact on endosomal escape via increasing endocytosis. In this study we have combined the effects of both by creating liposome-PEI complexes called lipopolyplexes (LPP) by adding liposomes to pre-formed polyplexes. Formed LPPs were analyzed for their size, zeta-potential, serum RNase stability and transfection efficiency *in-vitro* compared to their 'parent' polyplexes. Polyplex entrapped 60% of siRNA, whereas LPPs ensured more than 70% siRNA encapsulation. Developed LPP showed ~2 times less hemolytic potential as compared to the parent polyplexes at 100pmol siRNA concentration. At 50pmol siRNA concentration Lipofectamine 2000 showed 0.25±0.06 and PEl polyplex showed 0.30±0.09-fold reduction in HuR mRNA levels while LPP2 showed 0.39±0.03-fold downregulation of HuR mRNA in 48 hrs. post-transfection. Furthermore, all formulations lead to minimum 50% reduction of VEGF protein levels at 48 hrs. post-transfection. Thus, developed novel delivery facilitated the transfection of siRNA across retinal cells and could be utilized as a promising approach for long-term treatment of ocular neovascularization.

KEYWORDS: siRNA delivery, HuR, VEGF-A, liposome, Lipofectamine 2000, Diabetic retinopathy, lipopolyplexes, Polyethylenimine (PEI)

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TITLE: DESIGN, DEVELOPMENT AND IN VITRO CHARACTERISATION OF MICROSPONGES BASED GEL FOR TOPICAL DELIVERY OF KETOCONAZOLE

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ABSTRACT:

The aim of the present study was to formulate topical microsponge-based delivery system containing ketoconazole for controlled release of the drug for proficient treatment of fungal infections. Ketoconazole loaded microsponges were prepared by quasi emulsion solvent diffusion method using ethyl cellulose N22 polymer with varied drug polymer ratios. The prepared microsponges were characterized by SEM, FTIR, and evaluated for surface morphology, % drug loading, particle size, % entrapment efficiency and *in vitro* drug release. The effect of formulation variables such as drug to polymer ratio, stirring speed on the physical characteristics of microsponges was examined. Compatibility studies using UV and FTIR indicated that there is no chemical interaction between drug and polymers. SEM studies revealed that the prepared micro sponges were spherical and porous with a mean particle size of 82.25µm. The formulations were subjected to *in vitro* release studies for 8 hr which showed sustained release. Microsponges were further incorporated in to carbopol gel formulation for topical delivery. Prepared gel formulations were evaluated for physical parameters like pH, spreadability and *in vitro* drug diffusion. Hydrogel loaded with ketoconazole microsponges showed desirable physical properties and *in vitro* drug release, *i.e.* 54.66% in 6 h, which is more controlled than the gel prepared with the pure drug *i.e.* 82.64% in 6 h.

KEYWORDS: Ketoconazole, Ethyl cellulose N22, Sustained release, Carbopol gel, In vitro diffusion studies

TITLE: "Formulation and Evaluation of Immediate Release Tablet of Pioglitazone HCl"

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ABSTRACT:

According to the BCS, Pioglitazone HCl is a class 2 drug. Pioglitazone hydrochloride has a low solubility at room temperature. In the present study it was planned to improve solubility of pioglitazone HCl by preventing its dihydrate formation, by using co-crystal formation approach. It is widely accepted method to improve physical properties of pioglitazone HCl especially solubility. Nicotinamide was selected as a co-crystal former because it contains many hydroxyl groups and thus has potential to form hydrogen bonds with other components.

Co-crystal of pioglitazone HCl were prepared by using nicotinamide as a co-former by using solvent drop and solvent evaporation method. Prepared co-crystal were characterized by IR spectral study, DSC study, X-ray diffraction study and dissolution study. The expected improvement in dissolution was achieved with the co-crystal formation due to complete inhibition of dihydrate formation.

Immediate release tablet formulation of co-crystal of pioglitazone HCl was formulated using Crosprovidone and Crosscarmallose sodium disintegrating agent and microcrystalline cellulose by using direct compression method. Formulated tablet were evaluated for all parameter, viz., appearance, weight variation, hardness, thickness, uniformity of content, disintegration time, dissolution study. The expected drug release was achieved within 30min. On the basis of above findings, it was concluded that successful improvement in solubility and dissolution of pioglitazone HCl were achieved by co-crystal formation.

KEYWORDS: Solubility, Co-crystal Pioglitazone HCl**,** Nicotinamide etc.

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TITLE: Lisinopril Ion-Pair Transdermal Gel for Improvement of Permeability and Cardiovascular Diseases Management: Optimization Using 3-Level Factorial Design

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ABSTRACT:

Objective: Reportedly, oral bioavailability of the lisinopril is 25 to 30%, assigned to its poor permeability. Hence, the aim of current investigation was to formulate transdermal ion-pair gel using permeation enhancer for enhanced delivery of lisinopril.

Methods: Initially, formation of ion-pair is corroborated using Fourier Transform Infrared (FTIR) Spectroscopy, Differential Scanning Calorimetry (DSC), X-ray Diffraction (XRD), Zeta Potential, particle size analysis, Oil/Water partition coefficient study *etc*. Optimization of formulation was done using 3^2 factorial design. Total nine batches (F1-F9) were prepared and effect of propylene glycol (X_1) and carbopol 934 (X_2) was systemically investigated on gel viscosity (Y_1) and permeability through rabbit's skin at 8h (Y_2).

Results: Propylene glycol exhibited non-significant ($p>0.05$) effect on both gel viscosity and skin permeability whereas carbopol 934 demonstrated significant ($p<0.05$) positive and negative effect on both respectively. Viscosity of all the lisinopril ion-pair gel (F1-F9) was ranging between 17.24 ± 2.16 Pa.s (Batch F9) to 7.54 ± 1.34 Pa.s (Batch F4). *Ex-vivo* permeability of all the prepared batches (F1-F9) across excised rabbit's skin was ranging between 85.93 ± 1.26% (Batch F4) to 62.17 ± 1.57% (Batch F9). Remarkably, optimized formulation (F4) exhibited 1.7 folds improvement in skin permeability than plain lisinopril gel.

Conclusions: Conclusively, these findings demonstrate ion pair formation is a promising strategy for significantly improving the skin permeability of lisinopril. Further work is desired pertaining to estimate drug in different organs and resultant anti-hypertensive effects.

KEYWORDS: Ion -pair formation, permeation enhancer, lisinopril, topical drug delivery

TITLE: Novel oxiconazole nitrate nanocarrier's engrossed gel for targeting drug resistant *Candida* infection.

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ABSTRACT:

Background: The progression of fungal infections can be rapid and serious due to compromising with immune function. They may cause liver damage, affect estrogen levels or may cause allergic reactions. Oxiconazole nitrate (OXZN) is a broad spectrum commonly used antifungal drug. It acts by erogosterol biosynthesis inhibition, which causes lysis of the fungal cell membrane because of changes in both membrane integrity and fluidity and direct membrane damage of fungal cells. However, its poor water solubility and short half-life (3-5 h) limit its applications.

Objective: This study aimed to develop and evaluate OXZN-loaded nanostructured lipid carrier (NLC) to improve its solubility and prolong its release for the treatment of fungal infection *via* topical administration.

Method: OXZN-NLC was prepared by ultrasonication method using 3^2 full factorial design. Glyceryl monostearate (GMS) (X1) and oleic acid (X2) were used as independent variables and particle size and percentage entrapment efficiency (% EE) as dependent variables. The OXZN-NLCs were characterized for particle size, particle morphology and entrapment efficiency.

Results: The mean diameter of optimized OXZN-NLCs was found to be 124 ± 2 nm. Spherical shape and size were confirmed using scanning electron microscopy (SEM). Skin deposition study showed about 82.74% deposition as compared with the marketed formulation that showed 68.42% deposition. The developed NLCs show a sustained release pattern and high drug disposition in the infected area.

Conclusion: OXZN-NLC could be a potential alternative for the treatment of topical fungal infection after clinical evaluation in near future.

KEYWORDS: *Glyceryl monostearate; Nanostructured lipid carrier; oxiconazole nitrate; solid lipid nanocarrier; statistical optimization; topical fungal infection.*

TITLE: NOVEL NIOSOMAL *IN-SITU* NASAL GEL FOR BRAIN TARGETING

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ABSTRACT:

The nasal mucosa has advantages *viz; large* surface area, porous endothelial membrane, avoidance of first pass metabolism and ready accessibility lead to faster drug absorption. Thus, the objective was to develop Buspirone hydrochloride (BH) loaded niosomal in-situ nasal gel to deliver drug to the brain via intranasal route. Niosomes were prepared by thin film hydration method and were characterized for particle size, zeta potential, entrapment efficiency, and in- vitro drug release. Buspirone hydrochloride loaded niosomes were further incorporated into Carbopol 934P and HPMC K4M liquid gelling system for formation of in-situ nasal gel. The gel was assessed for gelling time, gelling capacity, viscosity at pH 5 and 6. Ex-vivo permeation of BH through sheep nasal mucosa showed 83.49% permeation after 8h. The nasal toxicity studies showed no signs of irritation. Brain kinetic studies were performed by administering the formulation to Swiss albino mice. The results were compared with pure BH solution. The Area under the plasma/brain concentration-time curve from 0 to 480 min. ($AUC_{0-480)}$ in the brain after intranasal administration of BH formulation was 1.2 times that obtained after i.v. administration. The brain maximum concentration of BH (C_{max}) and AUC_{0-480} values in three groups *viz.*, BH- intranasal solution, BH niosomal intranasal formulation and BH i.v. were (12.20 ng/ml and 3103.20 ng min/ml), (35.07 ng/ml and 10058.72 ng min/ml), (28.47 ng/ml and 8356.81 ng min/ml), respectively. Thus, significant higher concentration (Cmax) of BH in brain obtained after intranasal administration demonstrated greater uptake of BH, which proves to be a promising drug delivery system.

KEYWORDS: *Niosomes, Buspirone Hydrochloride, in-situ nasal gel, intranasal route, brain targeting*

TITLE: Preformulation and characterization studies of antipsychotic drug for development of nanoformulations

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ABSTRACT:

Nano-drug delivery carriers have fascinated researchers worldwide for the last two to three decades. The nanoformulations are preferred over conventional dosage forms as they provide improved drug solubility, bioavailability, drug loading capacity, drug stability under adverse external or physiological conditions. The current aim of the study is to systematically investigate some of the important physicochemical properties of Clozapine for developing an effective nanoformulation. Thus, before selection of excipients, the preformulation study of any API should be completed for any successful formulation development. Preformulation studies like solubility, FTIR, X-Ray Diffraction studies, melting point, drug excipient compatibility study were investigated and reported.

KEYWORDS: Clozapine, nanoformulations, preformulation, schizophrenia.

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TITLE: "DESIGN, SYNTHESIS AND CHARACTERIZATION OF SUBSTITUTED THIAZOLE DERIVATIVES OF LINOMIDE ANALOGUES FOR ANTICANCER AND ANTIBACTERIAL ACTIVITY"

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ABSTRACT:

The current research work deals with the design, synthesis and characterization of a series of 6-substituted-4-hydroxy-1-(2-substituted thiazol-4-yl)quinolin-2(1*H*)-one derivatives [III(a-d)(1-3)] and evaluation of their *in vitro* anticancer activity against MDA-MB (Breast cancer) and A549 (Lung cancer) cell lines based upon MTT assay and *In vitro* antibacterial by the measurement of zone of inhibition and determining the Minimum Inhibitory Concentration (MIC). All the synthesized compounds were characterized by UV, IR, ^{1}H NMR and ^{13}C NMR spectral data.

Molecular docking studies of the title compounds for 6-substituted-4-hydroxy-1-(2-substituted thiazol-4-yl) quinolin-2(1*H*)-one derivatives [III(a-d)(1-3)] were carried out using Molegro Virtual Docker (MVD-2013, 6.0) software. The synthesized derivatives were capable of binding with some of the amino acid residues at the active site and thus can be further developed into new therapeutic agents.

KEYWORDS: Anticancer; Antibacterial; DNA Gyrase protein; EGFRK protein; Molegro Virtual Docker; Quinolin-2-one.

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TITLE: Design, synthesis of a series of 6-substituted- 4-hydroxy-1-[(-4-substitutedphenyl)sulfonyl]quinolin-2(1*H*)-thiones derivatives and evaluation of their *in vitro* anticancer activity.

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ABSTRACT:
The current research work deals with the design, synthesis of a series of 6-substituted- 4-hydroxy-1-(-4-substitutedphenyl)sulfonyl)quinolin-2(1*H*)-thiones [III A (1-3), III B (1-3), III C (1-3), III D (1-3)]derivatives and evaluation of their *in vitro* anticancer activity. Molecular docking studies of the title compounds were carried out using Molegro Virtual Docker (MVD-2013, 6.0) software. The synthesized compounds exhibited well conserved hydrogen bonds with one or more amino acid residues in the active pocket of EGFRK tyrosine kinase domain (PDB ID: 1m17). The MolDock Score of compound (III D-3) was (-77.1739) which is comparable to that of the standard ligand(-121.469) and imatinib (-116.362). Thus, the synthesized derivatives possessed a potential to bind with some of the residues of the active site and can be further developed into potential pharmacological agents. The compounds were synthesized using appropriate synthetic route and all the synthesized compounds were characterized by IR, NMR spectral data. Twelve derivatives were tested for their *in vitro* anticancer activity using A549 cell line. Compound (III D-3) was found to be the most cytotoxic as compared to the other synthesized derivatives, with IC_{50} values of 228.51 µg/ml against A549 cell line was more potent than standard drug Imatinib with IC_{50} value of 370µg/ml.

KEYWORDS: anti-cancer; docking; Quinoline-2-one

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TITLE: Oxidation of hydrogen sulfide by hypersaline sulfur oxidising bacteria from marine salterns of Goa

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ABSTRACT:

Hydrogen sulfide (H_2S) emissions are toxic to the environment. Long-term human exposure to H_2S in petroleum industries, sewer processing units, mining industries pose a major risk to the respiratory, olfactory functions in our body which is in turn fatal in elevated conditions. Marine salterns of Goa are a natural source of hydrogen sulfide produced by the indigenous sulfate reducing bacteria. These saltern also harbour sulfur oxidising bacteria (SOB) that biologically neutralizes this toxicity. In the present study, SOB were grown in minimal media using sodium sulfide as an energy source. SOB isolates viz. 21b, 3b, 13b which were facultative anaerobes with a salinity tolerance of 2.5-35%, 2.515% and 0-7.5% respectively. Isolate 21b and 3b were positive for nitrate reduction and oxidase test. Isolate 13b was negative for nitrate reduction and oxidase test positive. The resultant sulfate produced by H_2S oxidation by the SOB was assessed for a 30-day period, and the sulfide oxidation maximum was on day 15. Sulfide oxidation resulted in a detoxification, showing a removal of almost 60% of hydrogen sulfide from an aqueous solution.

KEYWORDS: Sulfur oxidising bacteria, Detoxification, facultative anaerobes

TITLE: Design, Synthesis and Biological Activity of Pyrimidine Derivatives as Antimicrobial Agents

AUTHORS: Mrs. J. R. Jagtap[a]*, Dr. M. N. Deodhar[b] and Dr. R. S. Chavan[a]
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ABSTRACT:

Pyrimidines have shown numerous biological activities such as antimicrobial, anticancer, anticonvulsant, antiviral and anti-inflammatory and also constitute an important component of nucleic acid. Encouraged by these remarks, the synthesis of Schiff's bases of pyrimidine derivatives was performed. The structures of newly synthesized compounds were confirmed by their physical, chemical and spectral data. The synthesized derivatives were screened for their *in vitro*, antibacterial activity against Gram- positive bacteria: *Staphylococcus aureus* and *Bacillus subtilis* and Gram- negative bacteria: *Escherichia coli* and *Pseudomonas aeruginosa* by using Ciprofloxacin as reference standard. While their antifungal activity was evaluated against *Aspergillus niger* and *Candida albicans* using Amphotericin-B as reference drug. Few synthesized compounds showed moderate to good antimicrobial activity. The docking study was carried out to check the interactions of target compounds. The dock score and binding interactions were recorded. Thus, we conclude that the synthesized compounds have potential for further development as novel antimicrobial agents.

KEYWORDS: Pyrimidine, antimicrobial, Docking

TITLE: "Design, Synthesis and Biological evaluation of Thiadiazole Derivatives as Potential Antimicrobial Agents"

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ABSTRACT:

Resistance to number of antimicrobial agents among a variety of clinically significant species of bacteria is becoming increasingly important global problem. There are various problems arising with the use of antimicrobials such as local tissue irritation, interference with wound healing process, hypersensitivity reactions, systemic toxicity, narrow antimicrobial spectrum, and emergence of resistance. Hence there is a compelling need for designing and synthesizing novel drugs of potent, selective, shorter length treatments with less toxic antimicrobial drugs to fight against these lethal infectious diseases. Taking into consideration, the pharmacological importance of thiadiazole rings, we synthesized a series of six thiadiazole derivatives incorporating pyridine ring and acetamide linkage as the target molecules for biological evaluation. The spectral characteristics and physical properties of the synthesized compounds were identified with the help of Intra-Red, 1H NMR spectroscopy and melting point. All the synthesized compounds were evaluated for the antimicrobial activity by two methods viz Zone of inhibition and Minimum inhibitory concentration by using Gram positive bacteria: B. subtilis and S. aureus, Gram negative bacteria E. coli and P. aeruginosa and antifungal activity using A. Niger and C. albicans.. Compound 3e and f showed the good activity. The compound e has shown good antibacterial activity against S. aureus at MIC of 12.5 µg/ml, B. subtilis at MIC of 6.25 µg/ml, E. coli at MIC of 3.125µg/ml and P. aeruginosa at MIC of 6.25 µg/ml. The compound 3e also shown good antifungal activity against A. niger and C. albicans at MIC of 3.125 and 6.25 µg/ml respectively.

KEYWORDS: Thiadiazole, Antimicrobial

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TITLE: Design, synthesis and characterization of Quinoline Derivatives for Antitubercular activity

AUTHORS: Vaibhav Potdar, Arun Joshi

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ABSTRACT:

Tuberculosis is the ninth leading cause of death worldwide. The drug resistance remains a considerable problem for tuberculosis (TB) treatment, despite the introduction of new anti-tubercular drugs into therapy which is leading to drug-resistant (DRTB), multiple drug-resistant (MDRTB), and extensively drug-resistant (XTRB) tuberculosis.

In order to address drug-resistant tuberculosis, new compounds targeting multiple *Mycobacterium tuberculosis* enzymes appear to be an ideal treatment. CTP synthetase (PyrG) and pantothenate kinase (PanK) enzymes identified as target and Quinoline scaffold, as new substrate. Intensive scientific studies has been carried out on Quinoline and its derivatives like 2-chloroquinoline-3-carbaldehyde throughout the world due to their biological and industrial applications.

Derivatives of 2-chloroquinoline-3-carbaldehyde are key intermediates in the synthesis of important heterocyclic compounds. For this reason the chemistry of 2-chloroquinoline-3-carbaldehyde has been the subject of many investigations.

Hence, attempt was made to design, synthesize and characterize a series of differently substituted new 2-Chloroquinoline-3-Carbaldehyde derivatives for anti-tubercular activity, starting from different acetanilides using hydrazide and different acyl chloride as other reactants. All synthesized derivatives are characterized by various spectroscopy studies.

KEYWORDS: Tuberculosis, 2-Chloroquinoline-3-Carbaldehyde, PyrG, PanK

DESIGN, SYNTHESIS, EVALUATION AND MOLECULAR DYNAMIC SIMULATION OF TRICLOSAN MIMIC DIPHENYL ETHER DERIVATIVES AS ANTITUBERCULAR AND ANTIBACTERIAL AGENTS

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ABSTRA CT:

In the present work, we have explored triclosan mimic diphenyl ether derivatives as inhibitors of *Mycobacterium tuberculosis* enoyl acyl carrier protein reductase (InhA) using a structure-based drug design approach. The virtual library of diphenyl ethers was designed and compounds with acceptable absorption, distribution, metabolism, excretion, and toxicity properties were docked. The compounds with higher dock score (5a-g) than triclosan were synthesized, characterized, and evaluated for *in vitro* antitubercular activity against *Mycobacterium tuberculosis* H37Rv. Among the synthesized compounds, compounds 5f and 5c appeared to be the most promising with minimum inhibitory concentration of 18 μM and 36 μM respectively. The molecular dynamics simulation study of the most active compound 5f and triclosan was performed, which correlates with its activity in comparison with triclosan. All the compounds were further evaluated for cytotoxicity studies against Vero, and HepG2 were found to be safe. Furthermore, compound 5f was evaluated for *in vitro* cytotoxicity against mouse macrophage cell lines (RAW 264.7), and the study indicated its safety in eukaryotes at 50 μM concentration. In addition, compounds 5a-g were also screened for their *in vitro* antibacterial activity against two gram-positive and two gram-negative bacteria by resazurin-based microtiter dilution assay method. Among the synthesized compounds, 5f and 5b appeared to be promising, against various gram-positive and gram-negative microorganisms, indicating its broad-spectrum potential.

KEYWORDS: Triclosan, Diphenyl ether, Molecular dynamics, RAW 264.7 Cell lines.

TITLE: CHEMICAL AND PHARMACOLOGICAL EVALUATION OF AYURVEDIC HERBOMINERAL PREPARATION

AUTHORS: **Ms. GAURISHA alias RESHA RAMNATH NAIK**
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ABSTRACT:

Test Materials Sutshekhar Rasa (SSR), Vanga Bhasma (VB) tablets
Control Distilled Water
Standard Diazepam and Piracetam
Experimental Animals Wistar albino rats

Heavy metals, according to modern medicine, are hazardous to the biological system. Ayurveda, on the other hand, deems these products to be safe for human ingestion. As a result, safety data for these items must be established, thus this research attempted to evaluate SSR and VB. By administering repeated doses of SSR and VB for 28 days, it was attempted to generate evidence on the impact of heavy metals on these preparations. Because of the presence of Hg and Sn in these two preparations, different investigations on animal models were conducted to assess their impact on the Central Nervous System by analysing behavioural models. The light and dark model was utilized to test the effects on anxiety, and it was discovered that VB had better anti-anxiety activity than SSR. The elevated plus maze had similar findings. The Rotarod instrument was used to assess the effect of the test medications on muscular coordination and strength. The findings revealed that the VB had better motor coordination activity than the SSR. Morris Water Maze was used to assess learning and memory in rats. Results demonstrated an improvement in learning and memory. Thus, both of these test medications were found to have a CNS effect in laboratory animals, according to the findings

KEYWORDS: Anti-anxiety, Muscle Coordination and strength, Learning and Memory, Light and Dark model, Elevated plus Maze, Rotarod, Morris Water Maze

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TITLE: PHYTOCHEMICAL AND PHARMACOLOGICAL SCREENING OF ETHANOLIC EXTRACT OF THE *Spondias pinnata* IN RATS.

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ABSTRACT:

Spondias pinnata is the fruit of an indigenous medicinal plant known as Wild mango or Indian hog plum, which belongs to the cashew family Anacardiaceae. The purpose of this study was to qualitatively screen the phytochemical constituents of the Ethanolic extract of *Spondias pinnata* (Peel and Bark) and to investigate its pharmacological effects on the Central Nervous System. Several qualitative chemical tests were performed to screen the phytochemicals present in the ethanolic extract, and animal models (such as Elevated-plus Maze, Rotamex, Opto-Varimex, and Light & Dark Model) were used to evaluate the CNS activity after orally administering test compounds. The test results were statistically reviewed and compared to the control using one way ANOVA and Dunnett's test. Qualitative phytochemical screening of the ethanolic extract of *Spondias pinnata* peel and bark revealed the presence of carbohydrates, proteins, steroids, tri-terpenoids, glycosides, flavonoids, alkaloids and tannins. According to the findings, an ethanolic extract of *Spondias pinnata* (peel and bark) has significant anti-anxiety, CNS-depressant, and partial muscle relaxant activity. The ethanolic extract of *Spondias pinnata* peel demonstrated the greatest anti-anxiety activity at 400 mg/kg, while it demonstrated better CNS depressant activity at 200 mg/kg. *Spondias pinnata* stem bark was found to have good muscle relaxant activity when administered at a dose of 400 mg/kg.

KEYWORDS: *Spondias pinnata*, phytochemical, Central Nervous System (CNS) activity, ethanolic extract, anti-anxiety.

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TITLE: NEUROTOXICOLOGICAL EVALUATION OF VARIOUS MARKETED FORMULATION OF KAUMARIBHRITYA ON CNS OF RATS

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ABSTRACT:

Kaumaribhritya comprises polyherbal compositions like Balkadu, Balguti, and Baal herbal syrup, which contain a range of herbal constituents. It is concerned with the proper rearing of infants, purifying of mother's milk, and the treatment of infant ailments. Toxicity data for these formulations, on the other hand, is rarely provided. Thus this study was undertaken using the Ayurvedic Kaumaribhritya to offer evidence concerning the safety of these products. The effects of these formulations on the CNS were investigated on a variety of animal models using Elevated plus maze (EPM), Light and dark model, Morris water maze (MWM) and Rotamex rotarod. The formulations demonstrated significant antianxiety, increased muscle coordination activity, and improved spatial memory in rats when compared to piracetam and diazepam, respectively. Based on the research, it is clear that Kaumarbhritya products have anti-anxiety, learning and memory, CNS-stimulant, and muscle coordination effects in rats.

KEYWORDS: kaumaribhritya, Central Nervous System (CNS), anti-anxiety, learning and memory, muscle coordination

TITLE: PHARMACOLOGICAL EVALUATION OF *ACAMPE PRAEMORSA* (ROXB.) BLATT. & MCCANN

AUTHORS: Almas Hanif Mulla[1], Madhuri Fagu Naik[1], Nikita Gaonkar[1], Sam Noronha[2], Vedita Hegde Desai[3], Yogita N Sardessai[4]

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. **CORRESPONDING AUTHOR email id: Mrs Vedita Hegde Desai, Assistant Professor**

ABSTRACT:

Aim: Pharmacological Evaluation of *Acampe Praemorsa* (Roxb.) Blatt. & Mc Cann
Objective: To evaluate and compare the antimicrobial activity of the aqueous and methanol solvent extract of fresh and dried leaves of the plant *Acampe praemorsa* by well/disc diffusion method.
Background: *Acampe praemorsa* is a medicinally important epiphytic orchid belonging to the family Orchidaceae. A gap in the literature was observed that the aqueous extract of fresh and dried leaves of *A. praemorsa* were not utilized to explore anti-microbial activity. Having said that, it is important to note that the choice of the extraction solvent directly relates to the yield of the bioactive phytoconstituent (as a consequence of its polarity) in the used solvent and thereby the overall biological activity.
Materials and method: *In-vitro* anti-microbial susceptibility testing was performed by using two gram positive ATCC bacterial strain (*Staphylococcus aureus, Enterococcus faecalis*) and two gram negative ATCC bacterial strain (*Shigella dysenteriae, E. coli).*
Results and Discussion: The aqueous extract of fresh leaves (FAE) and methanolic extracts of fresh (FME) and dried (DME) leaves particularly possess anti-microbial activity against *S.aureus.*
Conclusion: *Acampe praemorsa* possess anti-microbial activity.

KEYWORDS:. ***Acampe Praemorsa*, orchid, anti-microbial activity, aqueous extract, agar well diffusion method**

TITLE: IDENTIFYING THE VARIABILITIES IN LABELLED COMPONENTS OF CARDIOVASCULAR MEDICINE PACKAGES

AUTHORS: Nikita Gopal Gaonkar[1], Raj Vaidya[2], Vedita Hegde Desai[3]

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ABSTRACT:

Aim: To identify the difference in the labelled components of cardiovascular medicines packages from different manufacturers.

Methods: A brief literature search related to the medication errors and labelling components was done. The labelling requirements for a drug to be marketed in India were checked from "Section 96&97 of the Drugs &Cosmetics Rules 1945".The drugs in the formulation that are used to treat various illnesses of cardiovascular system were segregated by visiting a local Community Pharmacy, "Hindu Pharmacy" located in Panjim and the primary package labels of these products were observed to identify the variability and to set the parameters of the study. A total of 146 samples were evaluated in the study.

Results : All the mandatory labelled components were present on the primary packages of the marketed formulation. Some variabilities observed out of 38 brands evaluated in the study. 24 brand names had a correlation with the API in the formulation whereas 14 brands did not have any correlation. Variability's were observed in the manner in which the strength was mentioned in/after the brand and generic name, abbreviations that are used for a drug name, for example. Metoprolol was abbreviated as Beta, MT and M. Variation in storage conditions was identified for the same composition of formulation made by different manufacturers. Variation was also observed in information in pictographical form, stating advice for the patient to prevent degradation of the API, dosage instructions etc.

Conclusion: Irregularity in the way in which strengths are mentioned can lead to errors and hence there is a need for some amendments in the regulatory guidelines.

KEYWORDS: Label component, drugs, medication errors, variabilities, cardiovascular.

TITLE: COMPARATIVE EVALUATION OF ANTIMICROBIAL EFFICACY OF HAND SANITIZERS – AN *IN VITRO* STUDY

AUTHORS: Almas Hanif Mulla[1], Madhuri Fagu Naik[1], Nikita Gaonkar[1], Vishwani Naik[2], Vedita Hegde Desai[3], Yogita N Sardessai[4]

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. **CORRESPONDING AUTHOR email id: Mrs Vedita Hegde Desai, Assistant Professor**

ABSTRACT:

Aim: To assess and compare the antimicrobial effectiveness of four different brands of hand sanitizers against test organisms.

Methods: Four different brands of hand sanitizer's viz.Sterillium hand rub disinfectant, P-1 hand sanitizer, A-1 hand sanitizer and PS-1 hand sanitizer were incorporated in the study. Sterilium was considered as the standard for comparison of effectiveness of the brands considered. The test organisms employed were *Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus and Enterococcus faecalis.* The antimicrobial efficacy was assessed using Agar well diffusion method, Minimum inhibitory concentration, Minimum bactericidal concentration and viable count method.

Results: In case of agar well diffusion method, antimicrobial effectiveness was analyzed using Analysis of variance (ANOVA) test followed by *Tukey's* test for pair wise comparison. Zone of inhibition ranged from 55.40 ± 1.816 (P-1) to 8.80 ± 0.836 (PS-1). P-1 hand sanitizer gave maximum zone of inhibition of 54.40 ± 5.594. MIC results of P-1 and Sterillium sanitizers were similar displaying MIC value of 50%. MBC value of P-1and Sterillium were found to be 50%. Viable count method showed inhibition of test organisms upon treatment with the sanitizer.

Discussion: Hand sanitizers have become an integral part of our lifestyle especially during COVID-19 pandemic. Based on active ingredients, sanitizers are classified as alcohol based and alcohol free. Hand sanitizers are convenient when access to soap and water isn't possible for example in public places.Prominent mode of action for sanitizers is membrane damage, inhibition or uncoupling of mRNA and protein synthesis.

Conclusion: P-1 hand sanitizer was found to be superior over Sterillium, A-1and PS-1

KEYWORDS: Hand sanitizer, Hand hygiene,COVID-19 pandemic

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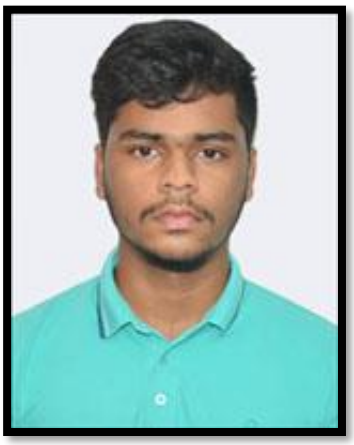

TITLE: COMPARATIVE STUDY AND PHARMACOLOGICAL INVESTIGATION OF DRAKSHASAV.

AUTHORS: Miss. GLADY VERONICA ASSUMPTION MENEZES.
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ABSTRACT:

Materials :

Test: Aqueous extract of Raisins(AER), Drakshasav formulations.
Standard: Piracetam.
Control: Distilled water.
Experimental Animals: Wistar-albino rats.
Methods : Rotarod & Novel object recognition Model.

Discussion :

Drakshasava is a fermented liquid preparation, chief ingredient being draksha, dried fruits of *Vitis vinifers*.

In Ayurvedic medicine, Asava-Arishtas is a relatively common dosage form and an excellent nutritious supplement used at all ages. It's a one-of-a-kind liquid dosage form that contains self-produced alcohol, and commonly referred to as medicinal wine. Thus, the presence of self-produced alcohol necessitated an investigation into addiction assessment as well as testing for its CNS activity. A comparison was made between Drakshasav by Sandu(DRV S), Baidyanth(DRV B) & Dhootapapeshwar(DRV D) on Learning and memory with respect to motor skill learning and recognition memory. DRV S showed significant improvement as compared to the control in the motor skill learning test, using Rotarod. DRV S, DRV B, and DRV D performed well in the novel object recognition test, demonstrating good working, short-term, and long-term memory. In comparison to the control, the AER demonstrated good working and long-term memory, similar to Piracetam. DRV S outperformed the control in terms of novel object discrimination. In addiction assessment it was discovered that rats preferred 10% aqueous extract of raisins. The study concluded that test products have an effect on learning and memory. The polyphenolic content of the test samples can be attributed to their effects on improving learning and memory.

KEYWORDS: Drakshasav, Addiction, CNS, Rotarod & Novel object Recognition Model.

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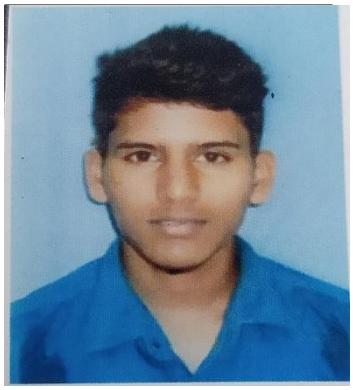

TITLE: STUDY OF PHARMACOLOGICAL EFFECT OF AQUEOUS EXTRACT OF Psidium guajava Linn. (Leaves) ON ANXIETY AND LEARNING AND MEMORY IN RATS

AUTHORS: Mr. OMKAR GOVIND GAWDE SURLAKAR
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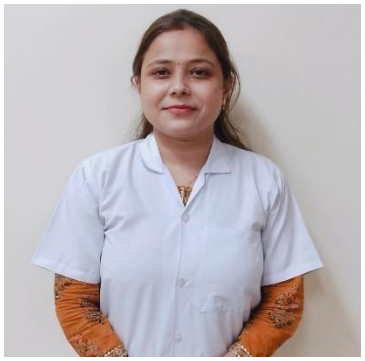
ABSTRACT:

The medicinal uses of aqueous extracts of guava leaves in folk medicine include the treatment of various types of gastrointestinal disturbances. These extracts have also been indicated to cause disturbances of the central nervous system: insomnia, convulsions and epilepsy. The aim of the study was to subject the aqueous extract of the leaves of Psidium guajava Linn. to preliminary phytochemical screening for its phytoconstituents and pharmacological screening for neuropharmacological activity namely anti-anxiety activity and for its effect on learning and memory in rats using different behavioural models. The models which were used are Morris Water Maze, Novel Object Recognition Test and Olfactory Learning and effect on anxiety was measured using Novelty Suppressed Feeding Test and Opto Varimex Instrument. The qualitative phytochemical screening of aqueous extract of Psidium guajava Linn. revealed the presence of carbohydrate ,steroids, triterpenoids,glycosides,flavonoids, alkaloids and tannins. The test, standard and control doses were administered to the rats. Aqueous extract of Psidium guajava (AEPG), in doses of 300mg/kg and 600mg/kg, was administered to the rats by oral gavage. The test doses were administered for a period of seven days. The observation were recorded and results were analysed. It was found that dose of 600mg/kg showed good results for spartial and probe memory , good results for olfactory learning, better locomotor activity. It may thus be concluded that the aqueous extract of Psidium guajava showed better effect on learning and memory and anxiety at a dose of 600 mg/kg compared to the dose of 300 mg/kg.

KEYWORDS: Psidium guajava Linn., CNS activity,, antianxiety, learning, memory



TITLE: Disulfiram and Its Copper Chelate Attenuate Cisplatin-Induced Acute Nephrotoxicity in Rats via Reduction of Oxidative Stress and Inflammation

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ABSTRACT:

The consideration of cisplatin in the chemotherapeutic regimen of resistant cancers is limited due to its dose dependent nephrotoxicity. The aversion therapy for alcoholism, disulfiram (DSF), has lately been discovered to be an anticancer and chemo preventive drug. In the presence of copper, its anticancer action is enhanced. The present study was aimed to evaluate the beneficial effects of disulfiram and Cu-DEDC against cisplatin induced kidney toxicity. A single intraperitoneal dose of CP (5 mg/kg) was used to induce nephrotoxicity. The treatment groups included control (vehicle treated), CP (CP treated), CP + DSF (CP followed by DSF),
CP + DSF + Cu (CP followed by DSF and CuCl2), CP + Cu-DEDC (CP followed by Cu-DEDC), and CP + AMF (Amifostine pre-treated and CP-treated). The DSF, Cu-DEDC, and CuCl2 were given orally at a dosage of 50 mM/kg/day for 5 days after the CP injection. AMF was given intravenously 30 minutes before CP as a conventional chemo protectant. On the sixth day, both DSF and Cu-DEDC significantly reduced the CPinduced rise in serum/urine creatinine and blood urea nitrogen, as measured by indicators of oxidative stress, inflammation, and kidney function. The reduction of SOD, catalase, and GSH in the kidneys caused by CP was reversed by these medications. There was a considerable decrease in TNF- and IL-1 production generated by CP. Significant reduction in the histological alterations. These findings concerning DSF and Cu-DEDC against CP-induced nephrotoxicity allow for a more thorough examination of its potential as a cancer chemotherapy adjuvant.

KEYWORDS: Cisplatin, Cucl2, Cu-DEDC, Cytokines, Disulfiram, Nephrotoxicity

TITLE: *In vitro* anticancer activity of *Bauhinia foveolata* Dalzell. against HOP-62 cell lines.

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ABSTRACT:

Cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020. According to the World Health Organisation, lung cancer has been the most common cause of cancer deaths in 2020. Phytopharmaceuticals have an enormous role in treatment of various ailments. The species of the genus *Bauhinia* are reported to have antimicrobial, antioxidant, anticancer properties etc. The current study aimed at evaluating the anticancer potential of the ethanolic leaf extract of *Bauhinia foveolata* Dalzell.(EEBF) and its toluene, ethyl acetate and methanol soluble bio-fractions viz. TFBF, EFBF, MFBF on Hop-62 cell lines using *in vitro* assays. Amongst the experimental samples screened for anticancer activity by sulforhodamine assay, TFBF showed a significant growth inhibition of GI_{50}=23.7µg/mL, followed by EEBF having GI_{50}=54.8µg/mL, EFBF with GI_{50}=74.4µg/mL and MFBF with GI_{50}=84.9µg/mL. as compared to the standard Adriamycin with GI_{50} <10µg/mL. The samples were further subjected to apoptosis and cell cycle analysis by flow cytometry. MFBF showed 42.1% cells in early apoptosis, while 4.1% in late apoptosis and 1.6% in necrosis stage, that was comparable to the standard Adriamycin used. EEBF and its methanolic biofraction demonstrated remarkable anticancer property thus displaying a promising profile against Hop-62 lung cancer cell lines.

Keywords: *Bauhinia foveolata* Dalzell, anticancer, sulforhodamine assay, apoptosis, flow cytometry

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TITLE: PHYOCHEMIICAL AND *IN VITRO* ANTI-TUBERCULOSIS ACTIVITY OF *SPONDIAS PINNATA* LINN

AUTHORS: **Pranaya Chodankar, Uma Nadkarni, Dr. Arun B. Joshi**

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ABSTRACT:

Spondias pinnata also known as *Spondias Mangifera*, belongs to the family Anacardiaceae is an evergreen to deciduous tree which is distributed throughout India, Sri Lanka and South-East Asian countries. Traditionally it has been used to treat several human ailments like obesity, hemorrhagic disease, dyspepsia, gonorrhea, severe cough, aphrodisiac, leprosy, diabetes, diuretic, eye inflammation etc. Various parts of *Spondias pinnata* have been reported to possess, activities like anthelmintic, antioxidant, hypoglycaemic and anticancer.This study was aimed to carry out phytochemical analysis of the root bark of *Spondias pinnata* and test for Anti- Tuberculosis activity. The roots of *S. pinnata* were collected, authenticated and dried. The coarsely powdered root bark was defatted with Petroleum ether and extracted with Methanol. The extract was further subjected to fractionation using acetone into acetone soluble and acetone insoluble components. The total phenolic content of the methanolic extract was estimated using Folin-Ciocalteu method spectrophotometrically and it was found to be 12.2562 mg/g of GAE. The total flavonoid content of extract and fractions was determined by Aluminium chloride colorimetric assay. Flavonoid content in Acetone soluble fraction was 9.268 mg/g of QUE; methanolic extract (3.787mg/g of QUE) and acetone insoluble fraction (2.4697mg/g of QUE). The in vitro anti-tuberculosis activity revealed that the acetone soluble fraction had MIC of 25µg/ml. The acetone soluble extract was subjected to open column chromatography which led to the isolation of five compounds; Stigmasterol, Squalene, Chlorogenic acid, β-sitosterol & Gallic acid.

KEYWORDS: *Spondias pinnata*, Anacardiaceae, Root bark, Anti-tuberculosis

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TITLE: PHYTOCHEMICAL AND *IN VITRO* ANTI – TUBERCULOSIS ACTIVITY OF LEAVES OF *TERMINALIA PANICULATA*

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ABSTRACT :

Terminalia paniculata (Combretaceae) is a semi - deciduous timber tree endemic to Pennisular India, commonly distributed in Karnataka and Kerala. The study focussed on isolation and characterization of the phytoconstituents from Ethylacetate (EtOAc) fraction of the methanolic extract of *T.paniculata* and evaluation of its *in-vitro* anti-tuberculosis activity. The leaves of *T. paniculata* were shade dried, defatted with petroleum ether and further extracted with methanol. The methanolic extract was then partioned with ethyl –acetate in a separating funnel to get ethyl – acetate fraction which was then subjected to column chromatography. The antimycobacterial activities of methanolic extract and ethyl acetate fraction of the leaves of *T.paniculata* were evaluated against *M. tuberculosis* ATCC No- 27294 using the micro plate Alamar Blue assay (MABA). Drugs like Rifampicin, Ethambutol, Pyrazinamide, Streptomycin and Isoniazid were used as reference standards.Phytochemical screening of methanolic and ethylacetate extract gave positive test for alkaloids, tannins, flavonoids, and saponins. Phytochemical investigation of EtOAc fraction of the methanolic extract of *T.paniculata*, led to the isolation of three compounds viz; Ursolic acid, Arjunolic acid and Gallic acid. *In - vitro* anti-tubercular activity exbited that the MeOH extract and EtOAc fraction displayed MIC of 25µg/ml and 12.5µg/ml respectively. Hence, EtOAc fraction of *T.paniculata* can be developed as a potential antitubercular agent.

KEYWORDS: *Terminalia paniculata*, Combretaceae, Phytochemical investigation, Tuberculosis activity

TITLE: EXTENSIVE EVALUATION OF POLYHERBAL TOPICAL FORMULATIONS FOR VARIOUS SKIN RELATED DISORDERS

AUTHORS: SUJIT NAGARE[1*], Dr. BIRENDRA SHRIVASTAVA[1], Dr. AMOL KHADE, VIPUL SANSARE[2], PRASHANT GURAV[2], KETAKI DHANE[2].

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ABSTRACT:

Skin disease is a common ailment and it affects all ages from the neonate to the elderly and causes harm in number of ways. There are more than a thousand conditions that may affect the skin but most skin diseases can be categorized Rashes Viral infections, Bacterial infections, Fungal infections, and Parasitic infections, Pigmentation disorders, Tumors and skin cancers and Psoriasis.

The present research focusses on the formulation Polyherbal formulation of Manjishta, Guduchi, Aloe vera and Neem. The authentic phytochemical constituents of individual plants Manjistha, Guduchi, Aloe Vera, Neem Oil and Moringa Oil with different ratio used to prepare Polyherbal formulations to achieve the desirable antifungal effects. Optimized formulation evaluated for antimicrobial and anti-inflammatory activity against various methods like measurement of pro-inflammatory and anti-inflammatory cytokines (TNF-α, IL-1 α and IL-10) production. Formulations with good antimicrobial activities were tested against MDR microorganism. Polyherbal formulations are tested for Multi drug resistant organisms such as *Candida albicans* fungi found effective and also against various Multidrug resistant bacterial strains too. Conclusion of this research work that mainly emphasizing importance of the polyherbalism and its significant use in skin disorders.

KEYWORDS: Psoriasis, TNF-alpha, Polyherbalism, Antimicrobial.

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A COMPREHENSIVE REVIEW ON PHARMACOLOGICAL POTENTIAL OF POLYHERBAL FORMULATIONS

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ABSTRA CT:

Modern medicinal prescriptions involve the use of drugs of synthetic origin. With the advantages of synergism, compliance and convenience, several disadvantages such as increased adverse drug reactions, incompatibility and altered physiology may restrict the use of allopathic medicine. Ayurveda is one of the traditional medicinal systems being practiced for centuries. The *Tridoshas* namely *Vata*, *Pitta* and *Kapha* regulate the entire functioning of the body. Any alterations in the equilibrium of the body will lead to the disease. Traditional knowledge of medicinal values of herbs along with modern technology has led to the development of Ayurveda into a modern context of therapeutics. The use of the whole herb for the treatment of disease has been practiced for decades. However, the recent advances in the analytical techniques have led to the isolation of the phytoconstituents for the discovery of their benefits in therapeutics. The Ayurvedic literature "Sarangdhar Samhita" acknowledges herb-herb combinations for better results in the treatment of ailments. A polyherbal formulation is the combination of more than one herb with several advantages like synergistic effects, better patient compliance, and reduction in dose of individual drugs without any compromise in the therapeutic actions. In the past two decades, a vast number of polyherbal formulations have been developed and evaluated for their pharmacological potentials. The present review briefs about the composition of some polyherbal formulations and the preclinical models for testing the therapeutic potentials.

KEYWORDS: Ayurveda, Pharmacological activities, PHF, Phytoconstituents, Polyherbal formulations

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TITLE: Synthesis and evaluation of Qurcetin loaded porous polymeric vesicles.

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ABSTRACT:

Microsponges are polymeric, non-collapsible drug delivery systems consisting of porous microspheres that can entrap a wide range of active ingredients. Microsponges display a myriad of advantages over conventional dosage forms such as sustained-release, self-sterilization, and stable at high temperature, non-toxic and non-irritating. The present study deals with the synthesis of quercetin loaded microsponges using QbD approach. Different drug-polymer ratios, emulsifier concentrations, rate of stirring were utilized in determining of optimized batch with independent variables of production yield and entrapment efficiency. Preformulation studies viz. characterization of quercetin, solubility studies and drug polymer compatibility were performed by DSC, FTIR spectroscopy and XRPD. Porous polymeric vesicles were fabricated by quasi -emulsion solvent diffusion method. 11 batches were synthesized and optimized batch Q-7 was characterized by analytical methods of FT-IR, DSC, SEM, particle size, zeta potential determination and XRD analysis. Preformulation studies did not show any incompatibility of the polymer with quercetin. Optimized batch showed production yield of 76.25 %, entrapment efficiency of 96.23 % and particle size of 7.368 μm with zeta potential of -22.4 mV.

KEYWORDS: Microsponge, quercetin, QbD, quasi-emulsion, XRPD

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TITLE: COMPARATIVE STUDY ON CONVENTIONAL AND NOVEL METHODS FOR EXTRACTION OF *AVERRHOA CARAMBOLA.*

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ABSTRACT:

Averrhoa carambola commonly known as star fruit is an evergreen tree native to Southeast Asia and Indian subcontinent belongs to the family Oxalidaceae. Traditionally plant leaves are used for the treatment of chickenpox, to relieve angina and aphthous stomatitis. It is found to contain phytoconstituents such as alkaloids, tannins and phenolic glycosides. Pharmacological investigation have demonstrated anti-inflammatory, analgesic, hypoglycemic, anthelmintic, hypocholesterolemia, and antitumor activity. This study was aimed at comparison of the conventional (maceration, soxhlet) and novel (microwave-assisted and ultrasound-assisted extraction) extraction techniques and optimization of various parameters such as particle size, time, solvent choice, and solvent/solute ratio in order to obtain the highest yield. Leaves of A. carambola were extracted using methanol, ethyl acetate, and petroleum ether.. Results revealed that highest yield was obtained 11.5459% with particle size of 44 and solvent solute ratio of 10:1 at 10 min by microwave-assisted extraction, followed by UAE, soxhlet and maceration. The marc obtained was subjected to scanning electron microscopy to study the surface morphology.

KEYWORDS: *Averrhoa carambola*, carambola, Oxalidaceae, maceration, soxhlet, microwave-assisted extraction, ultrasound-assisted extraction, scanning electron microscopy.

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TITLE: COMPOSITION OF VOLATILE OIL OBTAINED BY CONVETIONAL AND NEWER TECHNIQUES: A COMPARATIVE STUDY

AUTHORS: Swati Naik, Siddhi Fogueri, Anant V. Bhandarkar

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ABSTRACT:

Zanthoxylem rhetsa also known as Indian prickly ash is a deciduous and evergreen tree belonging to the family Rutaceae. Fruits *Z. rhetsa* is rich in triterpinoids. Various parts of this plant have been used for various human ailments such as treatment of asthma, dyspepsia, bronchitis, CV problems, toothache, rheumatism and digestive problems. This study was conducted to determine the composition of the volatile oil from fruits of *Z. rhetsa* obtained from conventional (maceration, soxhlet) and novel (Ultrasound assisted [UAE] and Microwave assisted [MAE]) methods of extraction. The composition of volatile oil was analysed by GC-MS technique. The results revealed that, the variation in the composition of volatile oil obtained from different extraction technique. Constituent showing RT of 9.83 min in GC obtained from conventional techniques have been identified as α-thujene which was found absent in UAE and MAE. β-ocimene and β-pinene were reported in extract obtained from Maceration. Volatile oils obtained by soxhlet, UAE and MAE has shown the presence of octanol and which was absent in volatile oil obtained by maceration.

KEYWORDS:*Zanthoxylem rhetsa,* maceration, Soxhlet, Ultrasound assisted extraction, Microwave assisted extraction, GC-MS.

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TITLE: Identification of the degradation products of Haloperidol by using LC/QTOF MS.

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ABSTRACT:

The work carried out in the current study involves the evaluation of the stability of Haloperidol under the stress conditions detailed in the ICH Q1A(R2) guideline. The drug was found to be prone to oxidative degradation when heated with 15% hydrogen peroxide at 70°C for 2 hours. There was formation of two distinct degradation products (DPs). The UV spectra of DPs acquired through the PDA detector were found to be similar to that of the drug signifying that they have originated from the drug. The drug was found to be stable under other conditions viz. acidic, basic, thermal and photolytic. The optimized HPLC method was developed on a Hiqsil C18 Column (250mm×4.6mm, 5µm) using Acetonitrile, ammonium formate (pH adjusted to 3.7 with formic acid) and Triethylamine in the ratio of (40:60:0.1, V/V/V). The flow rate was set to 1.0ml/min and the absorbance was read at 246nm. The developed HPLC method was validated as per the ICH Q2(R1) guideline. The Linearity of the method was established in the concentration range of 10-110 µg mL^{-1} (r^2=0.999). It was found to be precise, specific and accurate with a mean recovery of 100.1%. The DPs were identified by using LC-MS/MS studies and their fragmentation pattern was studied.

KEYWORDS: Stress studies, LC-MS, HPLC, QTOF

TITLE: Development of simple RP-HPLC Methods for Levofloxacin and its Degradation Products

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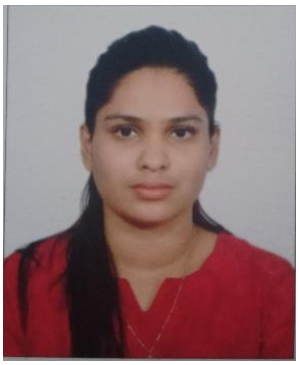
ABSTRACT:

Fluoroquinolones are antibacterial agents, used extensively in many countries, but with rising concerns about being found in soil and water. Not only the pharmaceutical field, but other sciences like chemical engineering and environmental sciences are constantly in need of analytical methods for these drugs to trace their presence and degradation pathways in environment.
The main objective of this work was to establish some simple stability indicating analytical methods for a member of the fluoroquinolone class, Levofloxacin, in presence of its degradation products. The aim was to develop a Reversed Phase- High Performance Liquid Chromatographic method which could be adopted by any industry and modified easily for their applications.
RP-HPLC methods presented here use C18 column of dimensions 25 cm (length) × 0.46 mm (i.d.), 5 μm particle size. The first method made use of methanol and phosphate buffer (pH 3.0) in the proportion 43:57 as mobile phase; while the other method used acetonitrile and 0.1% triethylamine (pH 3.0) in the ratio 15:85. Both methods were run at 0.8 ml/min flow and the analytes were detected using PDA detector at wavelength 294nm. ICH prescribed validation guidelines were consulted to validate parameters, applying statistical approaches including ANOVA.
The two simple and robust RP–HPLC methods which were developed, could further be adapted for LC-MS studies for proposing degradation pathways and structures of degradants.

KEYWORDS: Fluoroquinolones, Levofloxacin, Degradation, RP-HPLC, LC-MS



TITLE: DEVELOPMENT OF NOVEL SPECTROPHOTOMETRIC METHOD FOR QUANTIFICATION OF ANTIHYPERTENSIVE DRUGS IN FORMULATION

AUTHORS: Ms. Saeeli Gaonker, Dr. Anand Mahajan

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ABSTRACT:

The present research work describes development of novel spectropohtometric method for quantitative estimation of atenelol (ATE) and nifedipine (NIF) present in fixed dose combination. The ATE is determined using ratio subtraction method, while determination of NIF is carried out using extended ratio subtraction approach.

Linear correlations were obtained in the concentration range of 10 – 50 µg/mL for ATE and 4 – 20 µg/mL for NIF. The concentrations of 20 and 12 µg/mL were selected as divisor concentrations of ATE and NIF respectively for determination of NIF and ATE respectively. The precision studies were carried out at assay concentration, the method was found precise with percentage relative standard deviation (%RSD) less than 2. The accuracy studies were performed using standard addition method at 80, 100 and 120% of assay concentration. The mean accuracy was found between 98 – 102%. The method was found to be accurate and precise for determination of ATE and NIF and can be successfully used for quantitative estimation of ATE and NIF in fixed dose combination.

KEYWORDS: Ratio Subtraction Method, Extended Ratio Subtraction Method, Atenelol, Nifedipine

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TITLE: Quantification of Related Impurity in Active Pharmaceutical Ingredient using Area Under Curve Approach

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ABSTRACT:

The current research was undertaken to develop an accurate and precise UV spectrophotometric method for quantitative estimation of methimazole impurity in carbimazole API. The method was developed using the principle of area under curve (AUC). Acetonitrile was used as a preferred solvent. Area under curve in the range of 229-239 nm and 259-269 nm was selected for carbimazole and methimazole respectively. The method was validated in accordance with ICH Q2(R1) guideline. Linearity of the method was established with r^2 value of 0.999 and 0.993 for carbimazole and methimazole respectively. Satisfactory values of percentage relative standard deviation (% RSD) for intraday and interday precision were obtained indicating the precision of the method. The average recovery was found to be between 98 % to 102 % for methimazole impurity at 80 %, 100% and 120 % of its concentration. The developed method can be used for routine analysis of carbimazole API samples for determination of methimazole impurity at a level of 5 %.

KEYWORDS: Carbimazole, Methimazole, Area under curve, ICH Q2(R1) guideline.

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TITLE: Simultaneous Estimation of Methocarbamol and Ibuprofen in a Binary Mixture by UV Spectrophotometric Method

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ABSTRACT:

The aim of the present research study was to develop a simple, precise and accurate UV spectrophotometric area under curve (AUC) method for quantitative estimation of methocarbamol (MET) and ibuprofen (IBU) in a binary mixture. All solutions were prepared using methanol as solvent. The Measurement of AUC was carried out at wavelength range of 269-279 nm and 216-226 nm for methocarbamol and ibuprofen respectively. Validation of the method was carried out as per ICH guidelines (Q2R1). Linearity range was established for methocarbamol (r^2= 0.995 and 0.994) and ibuprofen (r^2=0.995) respectively. Percentage relative standard deviation (% RSD) value of less than 2 % for intraday and interday precision was obtained confirming the precision of the method. Accuracy of the method was found to be in the range of 98 % to 102 %. The developed method can be used for routine analysis of methocarbamol and ibuprofen in pharmaceutical dosage forms.

KEYWORDS: Methocarbamol, Ibuprofen, ICH guidelines, Area under curve, UV-spectrophotometry.

TITLE: EVALUATION OF EASE OF LOCATING AND READING OF INFORMATION ON LABELS OF NON-PRESCRIPTION MEDICINES

AUTHORS: Raj Vaidya[1,*], Pooja Kamat[2], Dr. Madhusudan P Joshi[1]

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ABSTRACT:

Self-medication with non-prescription medicines is a common, accepted practice. Besides essential and adequate information being present on the label of these medicines, it is important that this information be easy to locate and read. Some countries have guidelines or regulations which specify the manner in which the information should be presented on the labels. We evaluated labels of 300 non-prescription allopathic medicines in India, and checked for ease of locating the information, spacing between lines, font size of the information printed, contrast of the wordings and the background, and shine, by setting up criteria for scoring. On most labels it was found that not all information had a heading or title. The colour contrast of the wordings and the label background of most labels was good, and in most, the background shine did not affect reading. However, on many of these labels the font size was too small, making it difficult to read the information. Many labels had information well spread out but some also had too much information cramped together, making it difficult to read. Also, on many labels though there was space available, it was not utilized judiciously. It is therefore recommended to have detailed regulations in India, pertaining to the layout and which will make it mandatory for the manufacturers to print labels of non-prescription medicines wherein contents are presented in a manner that the information for the patient is easy to locate and easy to read.

KEYWORDS: Non-prescription medicines, label information, ease of location, reading.

TITLE: _ Compatible solutes from bacteria isolated from salt crystals of a salt pan in Goa, India.

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ABSTRACT:

Crude salt from a salt pan in Curca, Goa was collected during the salt manufacturing month of May 2021. Bacteria (24) were isolated which only survived in hypersaline conditions and could not grow in a media which was devoid of salt i.e., NaCl. The mechanism of survival in these extremophilic conditions was explored. These bacteria produced "Compatible Solutes" in this condition of high salinity (200 psu), Three of the bacteria showed production of glutamic acid and one of them produced betaine hydrochloride. These cultures showed luxuriant growth from 10- 20% of salinity and 6.3 pH and a temperature at 36C^{o}. The isolates were found to produce either betaine hydrochloride or glutamic acid.

KEYWORDS: Compatible Solute, Hypersaline, Glutamic Acid, Betaine Hydrochloride.