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Cover photos/figures: Left: Pseudo-ternary phase diagrams of the oil-surfactant mixture-water system at the 1: 1, 2: 1, 3: 1, 4: 1 and 5: 1 weight ratio of Tween-80 to propylene glycol at ambient temperature, dark area represent microemulsions region (Patel *et al.*, pp 60-68). Top right: Leaves and flowers of *Quisqualis indica* Linn. (Bose *et al.*, pp 1-4). Bottom right: Stem bark of *Eugenia jambolana* (Sudeep *et al.*, pp 46-49).

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Arti Bose, Sankhadip Bose, Sushomasri Maji, Pranabesh Chakraborty (India) Free Radical Scavenging Property of *Quisqualis indica* (pp 1-4)

ABSTRACT

Short Communication: Antioxidants have been reported to prevent oxidative damage by free radical and reactive oxygen species. Leaves of *Quisqualis indica* are given in a compound decoction for flatulent distension of the abdomen. Since flavonoids have been isolated and characterized from the leaves of *Q. indica*, this study attempted to verify the free radical scavenging property of various leaf extracts when assayed against superoxide anion, hydroxyl and nitric oxide radicals, hydrogen peroxide, metal chelation and reducing power. All *Q. indica* extracts inhibited all these free radicals in a dose-dependent manner.

William Dakam, Dieudonne Kuate, Boris Azantsa, Julius Oben (Cameroon) Inhibitory Effects of *Glyphaea brevis* Spreng. (Monach.) on Pancreatic α -Amylase Activity: Impact on Postprandial Blood Glucose and Weight Control in Rats (pp 5-10)

ABSTRACT

Original Research Paper: This study investigates the possible utilisation of *Glyphaea brevis* Spreng. (Monach.), a Tiliaceae family member, as a novel source of α -amylase inhibitors or "starch blockers". Aqueous (AE) and hydroalcoholic (HAE) extracts were prepared from the leaves and their effects on pancreatic α -amylase activity were assessed *in vitro* using starch and 4,6-ethylidene-(G7)-p-nitrophenyl-(G1)- α ,D-maltoheptaoside (ethylidene-G₇PNP) as substrates. Both extracts were administered at doses of 250 and 500 mg/kg to male albino Wistar rats over a 4-week period and their effects on oral starch tolerance (OST), weight gain and faecal output were evaluated and compared to a control group. Both extracts showed an inhibitory effect on α -amylase *in vitro* (AE: starch: 43.09%; ethylidene-G₇PNP: 94.59%; HAE: starch: 52.05%; ethylidene-G₇PNP: 98.31%). They also improved OST, increased fresh and dry faecal weight ($p < 0.05$), and significantly reduced weight gain ($p < 0.001$) in rats over the experimental period. All these effects appeared to be dose-dependent for each extract. These results suggest that *G. brevis* can constitute a source of α -amylase inhibitors reducing dietary starch digestibility, glucose bioavailability and, therefore, endogenous lipogenesis. This finding may find applications in the areas of human obesity management and weight loss.

Nitin Dubey, Nidhi Dubey, Rajendra S. Mehta, Ajay K. Saluja, Dinesh K. Jain (India) Physicochemical and Pharmacological Assessment of a Traditional Biomedicine: *Kukutandatwak Bhasma* (pp 11-16)

ABSTRACT

Original Research Paper: *Kukutandatwak bhasma* (KTB) is a traditional Ayurvedic medicinal preparation. This biomedicine is synthesized through special calcination of eggshell as mentioned in classical Ayurvedic text. Physicochemical characterization of KTB was carried out using modern state-of-the-art techniques such as transmission electron microscopy, scanning electron microscopy, X-ray powder diffraction analysis, Fourier transform infra-red spectroscopy, inductively coupled plasma analysis, energy dispersive X-ray analysis and thermogravimetric analysis. The study showed that the raw material *Kukutandatwak* (egg shell) is a mineral-organic matrix containing calcium carbonate in calcite form. The calcite form of calcium carbonate remains stable during the process of *bhasma* formation and forms the main crystalline component of KTB. The heat treatment does result in partial conversion of calcite to calcium oxide, which appears as calcium hydroxide in the final product. The organic content of processed material degraded gradually. Physical evaluation revealed that KTB is a fine grayish white powder having poor flow property with narrow particle size distribution of 0.87 to 16.10 μm having a mean particle size of 5.38 μm . Trace element analysis of KTB revealed the presence of some other important metals like arsenic, lead, chromium, cadmium, mercury, and tin under regulatory acceptable limits at the prescribed dose of KTB. Energy dispersive X-ray analysis revealed calcium as the major element (44.07 wt %) in KTB. Microbial load for the formulation was found to be within limits. Animals were found to be safe up to a maximum dose of 2000 mg/kg body weight in acute toxicity studies.

B. B. Hosetti, M. P. M. Pramod Kumar, H. Raja Naika, P. Ujwal, G. Prakash (India) Modulation of the Micronucleus Formation by Total Extracts from Leaves, Bark and Seeds of *Pongamia pinnata* (pp 17-20)

ABSTRACT

Research Note: Possible anticlastogenic activity of *Pongamia pinnata* leaves, bark and seed extracts, applied at 25, 100, 500 and 1000 mg/kg body weight induced a micronucleus (MN) effect in a dose-dependent manner. A single dose of Positive clastogen, cyclophosphamide (CP) 50 mg/kg body weight – was administered to Swiss Albino mice. Various doses of plant extract showed a marginal increase in the frequency of MN. All three extracts showed an inhibitory effect on CP-induced MN in polychromatic erythrocytes. The petroleum ether extracts of *Pongamia* leaves, bark and seeds induced MN to a lesser extent than those of CP-induced groups. In the treatment of various extracts against CP-induced drug, we observed that the percentage inhibition varied depending on the time interval: in leaves or bark it was higher at 24 h then at 48 and 72 h. The percentage inhibition decreased at all given doses at both 48 and 72 h. This infers that the frequency of inhibition is relatively good at all doses when compared with individual treatment with CP. In the experiment with seeds extract treated with CP, the percentage inhibition was found to be extremely high with respect to doses and time intervals.

Gouthamchandra Kuluvar, Riaz Mahmood, Basheer Mohamed, Khadeer Ahamed, Parameshwarappa Suresh Babu, Venkatarangaiah Krishna (India) Wound-healing Activity of *Clerodendrum infortunatum* L. Root Extracts (pp 21-25)

ABSTRACT

Original Research Paper: Validation of the ethnotherapeutic claim of *Clerodendrum infortunatum* L. was investigated to evaluate its wound-healing potency in experimental rats. For topical application, 4% (w/w) ointment cream bases of petroleum ether, chloroform and ethanolic extracts were prepared and assessed for their effect on excision-incision and dead space wound models. Significant wound healing was observed in animals treated with chloroform and ethanol extracts, similar to the reference standard drug Nitrofurazone. It was evaluated by increased area of epithelialization, followed by an increase in wound contraction, skin breaking strength and tissue granulation dry weight. Histopathological studies of the granulation tissue also indicated that there was an increase in collagen formation in those rats treated with chloroform and ethanol extract compared to the control and petroleum ether-treated animals. The chloroform and ethanol extract showed significant ($P < 0.01$) results compared with the control. The presence of bioactive constituents, including flavonoids, is thought to promote the wound-healing process due to their antioxidant and antimicrobial activities. Further studies are in progress to isolate the active compounds.

Karthik Mohan, Jeyachandran Robert (India) Protective Effect of *Stevia rebaudiana* Bertoni on Cadmium-induced Nephrotoxicity in Male Albino Rats (pp 26-28)

ABSTRACT

Short Communication: It is important to understand the mechanism of cadmium (Cd) toxicity and its potential risk to the health of a population exposed to Cd occupationally or environmentally. Kidneys inefficiently excrete Cd after prolonged intake and damage to the nephrons occurs, seriously affecting kidney functions. Rats treated with *Stevia rebaudiana* leaf extract could withstand Cd administered at a dosage of 6 mg/kg of body weight for 30 days. *S. rebaudiana* is a non-calorific natural sweetener considered as a food supplement. It has been widely used worldwide as a substitute for artificial sweeteners and is safe, unlike artificial sweeteners. The parameters analyzed from kidney samples were total proteins, cholesterol, GOT, GPT, acid phosphatase, alkaline phosphatase, and glutathione reductase. Histological and biochemical observations were also made.

Natrayan Mutharaian, Jagathala Mahalingam Sasikumar, Palaniswamy Pavai, V. Narmatha Bai (India) *In Vitro* Antioxidant Activity of *Pterocarpus marsupium* Roxb. Leaves (pp 29-33)

ABSTRACT

Original Research Paper: The leaves of *Pterocarpus marsupium* Roxb. (Fabaceae) was extracted in methanol and subjected to determination of total phenolic content. The plant yielded high phenolic content in the leaves (260 ± 0.021 mg gallic acid/g of dry plant material). The methanol extract was then screened for antioxidant activity using 1,1-diphenyl-2-picryl hydroxyl (DPPH) quenching assay, nitric oxide radical inhibition activity, scavenging capacity towards hydroxyl ion radicals, superoxide scavenging activity and ferric reducing activity power (FRAP) using established procedures. The data obtained in the present study showed a high level of antioxidant activity. A positive correlation was found between total phenolic content and the antioxidant activities of the extract. These findings indicate that phenolic components may have antioxidant capacity, as reported in other plants.

Sompol Paramapojn, Santi Tip-pyang, Wandee Gritsanapan (Thailand) High-performance Liquid Chromatographic Analysis of Selected Bioactive Components in *Zingiber cassumunar* Roxb. (pp 34-38)

ABSTRACT

Techniques Paper: The rhizomes of *Zingiber cassumunar* Roxb. have long been used as a traditional medicine for treatment of asthma, and muscle and joint pain. Major constituents, (*E*)-4-(3',4'-dimethoxyphenyl)but-3-en-1-ol (A), curcumin (C), and *cis*-3-(2',4',5'-trimethoxyphenyl)-4-[(*E*)-2''',4''',5'''-trimethoxystyryl]cyclohex-1-ene (G) have been reported to be the active anti-inflammatory constituents in the rhizomes of this plant. A photodiode array HPLC method has been developed and validated for quantitation of the major bioactive compounds in the methanolic extracts of the rhizomes of *Zingiber cassumunar* collected from 14 different locations in the North, North-East, East, Central and South of Thailand. The content of (A) in the dry powdered rhizomes was found in the range of 0.400 ± 0.001 to $1.642 \pm 0.005\%$ w/w while those of (C) and (G) were 0.066 ± 0.001 to 0.265 ± 0.002 , and 0.027 ± 0.001 to $0.287 \pm 0.004\%$ w/w, respectively. The proposed HPLC method was found to be accurate, precise, specific and suitable for quantitative analysis of these bioactive constituents. The method can be used for quality control of raw material of *Zingiber cassumunar*, extract and its pharmaceutical products. It can be also applied in quantifying these marker compounds in other drugs. The information of ranges of the contents of bioactive compounds will be useful as a guide for standardization of *Z. cassumunar* powder and its extract, and finding sources of good quality of *Z. cassumunar*.

Piyanuch Rojsanga, Leena Suntornsuk, Wandee Gritsanapan (Thailand) Rapid Capillary Electrophoretic Analysis of Berberine in the Stem Extracts of *Coscinium fenestratum* (Gaertn.) Colebr. (pp 39-41)

ABSTRACT

Techniques Paper: *Coscinium fenestratum* (Gaertn.) Colebr. (Menispermaceae) is a medicinal plant widely used in the Indochina region. The stem has been claimed for the treatment of hypertension, hypercholesterolemia, cancer and diabetes mellitus. The major and active constituent is known to be berberine alkaloid. In the present study, a simple and rapid capillary electrophoresis (CE) was developed and validated to determine berberine content in the stem extracts of *C. fenestratum*. The background electrolyte system was composed of 0.1 M phosphate buffer pH 7.0: methanol (65: 35). Linear calibration range for berberine was 74.9-374.9 $\mu\text{g/ml}$ ($r^2 = 0.999$, $n = 3$) with relative standard deviation from intra- and inter-day precisions of less than 4.7%. The recovery of berberine was found to be 95.8-99.6% with a limit of detection (LOD) and limit of quantitation (LOQ) of 4.5 and 15.0 $\mu\text{g/ml}$, respectively. Capillary electrophoresis is a satisfactory system for the standardization of *C. fenestratum* stem extract.

Aurapa Sakulpanich, Wandee Gritsanapan (Thailand) Determination of Anthraquinone Glycoside Content in *Cassia fistula* Leaf Extracts for Alternative Source of Laxative Drug (pp 42-45)

ABSTRACT

Original Research Paper: The pod of *Cassia fistula* Linn. has been used as a laxative drug in Thai traditional medicine for a long time. The pods and leaves contain anthraquinone aglycones and anthraquinone glycosides which are the active laxative form, while rhein is a major component. The degree of laxative potency is depended on the content of anthraquinone glycosides. This study determined the content of total anthraquinone glycosides in leaves of *C. fistula* collected in early summer (February-March, 2008) from 10 provinces in the North, North-East, Central, and South of Thailand. The leaves were extracted by decoction which was found to be a suitable method for extraction of anthraquinone glycosides from *C. fistula*. All extracts were analyzed using a UV-visible spectrophotometric method. The contents of total anthraquinone glycosides in the decoction leaf extracts were 0.62-2.01% dry weight (average 1.52% dry weight) while in the dried leaves were 0.09-0.63% w/w (average 0.36% w/w) calculated as rhein. The leaves collected from the Central and the North-East area, where the weather is warm in summer, contained high amounts (average 0.46 and 0.45% dry weight of total anthraquinones glycosides, respectively) while the samples from the South, where the weather is cool and raining throughout the year, contained a lower amount (average 0.13% dry weight). According to the standard of ASEAN Herbal Medicine, the central and north-eastern leaf samples of *C. fistula*, which contained about 0.5% of total anthraquinone glycosides, might be used as a source of laxatives just as the ripe pods. The decoction extract of the leaves containing an average total anthraquinone glycosides 1.52% w/w might be used as an alternative source of raw material for various laxative preparations.

H. V. Sudeep, Y. L. Ramachandra, P. S. Sujana Ganapathy, S. Padmalatha Rai (India) *In-vitro* Anthelmintic and Antimicrobial

ABSTRACT

Original Research Paper: In order to scientifically appraise some of the folkloric uses of *Eugenia jambolana* Lam. (Myrtaceae), the present study was undertaken to examine the anthelmintic and antimicrobial properties of stem bark extracts. The anthelmintic activity of ethyl acetate and methanol extracts was tested on tape worm (*Moniezia expansa*) and hook worm (*Gaigeria pachyscelis*) at two concentrations, 100 and 200 mg/ml. Time taken for the inhibition of motility and the death were noted and compared with the standard drug, Piperazine citrate at 15 mg/ml. The plant extracts significantly paralysed the worms followed by death, which was comparable with that of standard. Further, these extracts along with petroleum ether extract were tested for their activity against 24 clinically isolated microbial strains, including identified strains, using agar well diffusion method. The methanol extracts showed highest activity followed by ethyl acetate, while the petroleum ether extract showed the lowest activity at 100 mg/ml. The inhibitory effect of extracts was compared with standard antibiotic Ciprofloxacin and antifungal miconazole. This study supports the folk claim.

Kartick Chandra Pramanik, Tapan Kumar Chatterjee (India) Isolation, Characterization and Sub-acute Toxicity Studies of a New Compound PITC-2 Isolated from Tissue-Cultured Medicinal Plant, *Pluchea indica* (L.) Less (pp 50-54)

ABSTRACT

Original Research Paper: The present study focused on the chemical characterization of PITC-2 (2-(prop-1-ynyl)-5(5,6-dihydroxyhexa-1, 3-diynyl)-thiophene, a thiophen derivative) isolated from the root extract of tissue-cultured medicinal plant *Pluchea indica* (L.) Less. Evaluation of sub-acute toxicity study of the new compound was also done *in vivo*. Methanolic root extract of tissue-cultured *P. indica* was separated by solvent-solvent partition into three fractions (water, *n*-butanol, and ethyl-acetate). The ethyl-acetate soluble fraction was subjected to column chromatography using silica gel and PITC-2 was isolated and characterized by NMR IR, and MS. Sub-acute toxicity study of PITC-2 was studied on Swiss Wistar rats. The studies included the gross observation such as changes in body weight, hematological profiles [total count of red blood cell (RBC), white blood cell (WBC) and differential count of white blood cell and haemoglobin (Hb) percentage], biochemical parameters of serum [total protein, serum glutamate oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT), serum alkaline phosphatase (SALP), serum bilirubin, creatinine, urea, triglyceride, cholesterol, glucose], liver enzymes level [thiobarbituric acid reactive substance (TBARS), glutathione (GSH), super oxide dismutase (SOD)] and histopathology of the liver, kidney, heart, spleen and lung of both the control and experimental groups of rats. The changes of body weight, hematological profiles, biochemical parameter, and liver enzymes were not significant compared to control groups of animals. However, a change of liver weight but not of hepatic enzymes was observed.

Dilip Kumar Midya, Kartick Chandra Pramanik, Tapan Kumar Chatterjee (India) Effect of Andrographolide-Encapsulated Liposomal Formulation on Hepatic Damage and Oxidative Stress (pp 55-59)

ABSTRACT

Original Research Paper: Andrographolide (diterpinoid lactone) is the major active bitter glycoside obtained from *Andrographis paniculata* and has been found to possess remarkable hepatoprotective activity. We entrapped andrographolide into a liposomal formulation to facilitate the delivery of andrographolide to the liver and enhance the therapeutic efficacy during hepatic damage and stress. Liposomes were prepared with egg lecithin and cholesterol by a freeze drying method using a molar ratio of 4.8:1:1 and the optimal shape and drug content was found to be 44%. A significant increase in liver enzymes and bilirubin were found in CCl₄-treated animals when compared with the control group and this was significantly reversed by liposome- (P<0.01) and andrographolide (P<0.5)-treated groups. Total protein level decreased in CCl₄-treated animals when compared with control animals which was reversed by liposome- (P<0.01) and andrographolide (P<0.05)-treated animals. Thiobarbituric acid reactive substances (TBARS) increased significantly whereas antioxidants like glutathione (GSH), superoxide dismutase (SOD) and catalase (CAT) levels decreased in the liver homogenates of CCl₄-treated rats when compared with the animal control group. Treatment with andrographolide liposomes (10 mg/kg) successfully attenuated the effects of CCl₄ whereas the effect produced by andrographolide alone was less than that of the liposome-treated group of animals. This may be attributed to their enhanced aqueous solubility as well as physicochemical stability which prolong the activity of andrographolide in the liposomal formulation, which could be safer and more effective. Hepatic damage and oxidative stress in CCl₄-induced rats was significantly protected by the liposomal formulation.

Patel Mrunali Rashmin, Patel Rashmin Bharatbhai, Parikh Jolly Rajesh, Solanki Ajay Babulal (India) Investigation of Efficiency of Isopropyl Myristate-Based Oil in Water Microemulsions for Topical Delivery of Fluconazole (pp 60-68)

ABSTRACT

Original Research Paper: This paper investigates the efficiency of isopropyl myristate (IPM)-based oil in water microemulsion formulations for topical delivery of fluconazole (FLZ). IPM was screened as the oil phase of microemulsions due to a good solubilizing capacity of the microemulsion system. The pseudo-ternary phase diagrams for microemulsion regions were constructed using IPM as the oil, Tween-80 (T-80) as the surfactant and propylene glycol (PG) as the co-surfactant. The physicochemical properties of selected microemulsion formulations were examined for pH, viscosity, conductivity, solubility, polarized light microscopy, transparency, drug content and particle size distribution. Efficiency of microemulsion formulations to deliver FLZ through the rat skin was evaluated *in vitro* using Franz diffusion cells fitted with excised rat skins. The *in vitro* permeation data showed that microemulsion increased the permeation rate of FLZ six times over the saturated aqueous solution. Finally the microemulsion containing 2% FLZ was optimized with 14% IPM, 42% T-80/PG (5: 1) and 42% double distilled water (w/w), which showed a highest permeation rate of $67.58 \pm 1.26 \mu\text{g cm}^{-2} \text{h}^{-1}$. The infrared study of optimized formulation showed the absence of any possible interaction between drug and formulation components. *Candida albicans* was used as the model fungus to evaluate the antifungal activity of the best formula achieved, which showed the widest zone of inhibition compared to FLZ reference. The studied microemulsion formulation showed good stability over a period of three months. These results indicate that the studied microemulsion formulation might be a promising vehicle for topical delivery of FLZ.

Ejikeme Nwachukwu, Victor Olugbue (Nigeria) Microbiological Evaluation of Ten Commercial Cough Syrups during Storage (pp 69-73)

ABSTRACT

Original Research Paper: Fifty samples of 10 different brands of cough syrups were analyzed for microbial quality during storage at ambient temperature ($28 \pm 2^\circ\text{C}$) and refrigeration temperature ($4 \pm 2^\circ\text{C}$). Physicochemical studies were also conducted to ascertain the stability of their active ingredients. Alcoff[®] cough syrup recorded the highest average bacterial count of 2.0×10^5 cfu/ml at ambient temperature, and 1.5×10^5 cfu/ml at refrigeration temperature, while Benylin[®] with 9.0×10^4 cfu/ml at ambient temperature and Tutolin[®] with 6.4×10^4 cfu/ml at refrigeration temperature were the least. Parkalin[®] had the highest average fungal count of 5.6×10^4 cfu/ml at ambient temperature while Emzolyn[®] with 2.2×10^4 cfu/ml was least. The fungal counts at refrigeration temperature showed that Tutolin[®] and Piriton[®] with 2.4×10^4 cfu/ml each was the highest, while Coffin[®] with 4.0×10^3 cfu/ml was the least. The percentage occurrence of isolates were *Staphylococcus aureus* (100%), *Micrococcus* spp. (80%), *Bacillus subtilis* (90%), *Azotobacter* spp. (10%), *Proteus* spp. (20%), *Lactobacillus* spp. (40%), *Pseudomonas aeruginosa* (20%), *Aspergillus fumigatus* (100%), *Aspergillus niger* (100%), *Aspergillus flavus* (100%), *Fusarium solani* (50%) and *Penicillium* spp. (40%). The antibiotic susceptibility of isolates showed that *S. aureus* was sensitive to gentamycin (100%) and resistant to cloxacillin (100%), ampicillin (100%), and penicillin (100%). *Proteus* spp. was sensitive to gentamycin (100%) but resistant to colistin (100%), nitrofurantoin (100%), cotrimoxazole (100%), tetracycline (100%), and ampicillin (100%). *P. aeruginosa* was resistant to all antibiotics tested. The level of antibiotic resistance of bacterial isolates in cough syrup is a problem to public health. The cough syrups evaluated did not generally meet the standards for microbial limit as specified in official monographs. These products can adversely affect health status of consumers, hence, the need for regular quality control and assurance.

Ramappa Raghavendra, Shivayogeeswar Neelagund (India) Partial Purification and Biochemical Characterization of Antimicrobial and Analgesic Novel Bioactive Protein (Substances) from Silkworm (*Bombyx mori* Linn.) Fecal Matter (pp 74-78)

ABSTRACT

Original Research Paper: Silkworm fecal matter is considered to be one of the richest sources of antimicrobial and antiviral protein (substances), which was exploited by preparing fecal matter extract with 0.02 N phosphate buffer (pH 7.4). The clear supernatant was subjected to 50% ammonium sulphate precipitation, dialyzed and lyophilized. The above preparation was subjected to further purification by column chromatography. SDS-PAGE analysis showed a major band at 35 kDa along with other associated high molecular weight proteins. The UV-visible spectrum of the partially purified protein indicated the association of tetrapyrrole pigment. This protein showed excellent antibacterial activity against Gram-positive bacteria such as *Staphylococcus aureus*, *Bacillus subtilis*, and *Streptococcus haemolyticus* and Gram-negative bacteria (*Salmonella typhi*,

Escherichia coli, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae*). Good analgesic activity was also assessed by conducting an acetic acid induced writhing test in mice.

Veintramuthu Sankar, Venkatesan Harikrishnan, Kalvarasariel Gopinathan Pillai Prasanth, Kandasamy Ruckmani, Munusamy Nithyananth (India) Nanoparticles for Post Cataract Treatment (pp 79-82)

ABSTRACT

Original Research Paper: Dexamethasone sodium phosphate (DSP) nanoparticles were prepared by solvent evaporation process. The prepared nanoparticles were evaluated for size, drug content uniformity, viscosity and release studies. The prepared particulates ranged from 1 to 3 μm . The highest drug content uniformity was high in 0.2% methyl cellulose (MC) in 1% sodium alginate (SA) gel and Poly (DL-lactide-co-glycolic acid) (PLGA) in 3% SA gel. *In vitro* release from a formulation containing 0.2% MC in 1% SA gel and PLGA in 3% SA gel showed a 2-3-fold increase in drug release when compared to a drug in solution. The release from 0.2% MC in 1% SA gel and PLGA in 3% SA gel formulation followed a zero order release. The 0.2% MC in 1% SA gel formulation follows a non-Fickian release mechanism whereas PLGA in 3% sodium alginate gel follows an anomalous type mechanism. Hence these ophthalmic gels may be a viable alternative to conventional eye drops which will help to improve patient compliance.

Anwesa Bag, Subir Kumar Bhattacharyya, Nishith Kumar Pal, Rabi Ranjan Chattopadhyay (India) The Kill Kinetics of Phenolics of Chebulic Myrobalan (Fruit of *Terminalia chebula* Retz.) against Methicillin-Resistant *Staphylococcus aureus* and Trimethoprim-Sulphamethoxazole-Resistant Uropathogenic *Escherichia coli* (pp 83-85)

ABSTRACT

Short Communication: In this study, phenolics of chebulic myrobalan (CM) (fruit of *Terminalia chebula* Retz.), which was previously determined to have strong antibacterial activity, were tested for the rate of killing bacteria in given time (kill kinetics). Assays were conducted against methicillin-resistant *Staphylococcus aureus* (MRSA) and trimethoprim-sulphamethoxazole (SXT/TMP)-resistant uropathogenic *Escherichia coli*. Inoculated strains were tested against serial dilutions at time intervals of 0, 2, 4, 6, 8 and 24 h with different concentrations of phenolics based on their MIC values against the tested strains. Results obtained showed that phenolics at dosage levels of 6.25 mg/ml (2X MIC) and 12.5 mg/ml (4X MIC) strongly inhibited the bacterial growth of MRSA. On the other hand, the growth of SXT/TMP-resistant uropathogenic *E. coli* was strongly inhibited by phenolics from 1.56 mg/ml (1X MIC) to 6.25 mg/ml (4X MIC) for 6 h. After that regrowth of the tested strain (*E. coli*) occurred. These findings revealed that phenolics have pharmacodynamic properties against the tested strains and reinforce the importance of an ethnomedical approach as a potential source of bioactive compounds for the treatment of multi-drug resistant key bacterial pathogens.

Subramanian Ganesh Manikandan, Ramalingam Saravanan, Cuntheepuram Lakshminarasimhan, NooruddinThajuddin (India) SDS-PAGE and Western/Immunoblot Studies on Methicillin-Resistant *Staphylococcus aureus* Isolates from Tamil Nadu, India (pp 86-87)

ABSTRACT

Research Note: *Staphylococcus aureus* is the most prominent species in medical microbiology. It causes various diseases in humans and animals. *S. aureus* have become resistant to various antibiotics, particularly methicillin. Methicillin-resistant *S. aureus* proteins were isolated and purified with 10% trichloro acetic acid (TCA) and estimated with the Lowry's method. In SDS-PAGE protein bands were found between 5.8 and 23.5 kDa regions. Polyclonal antibody was raised in normal healthy rabbits and it was used for an Immunoblot study, which showed a 5.8 kDa band.