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Minori Shoji, Nat Prod Chem Res 2017, 5:5 (Suppl)
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Evaluation of the fatty acid composition of *Eriobotrya japonica* (Thunb.) Lindl., seed and their application

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The climate of Setouchi region in Japan where it is warm and has ample rainfall is suitable for fruit cultivation and many citrus fruits (oranges, lemons etc.) are cultivated. Especially in Akitsu district of Hiroshima prefecture, there is a long tradition of growing loquats. Previous researches reported on components and physiological function loquat seeds. However, there are limited studies on oil extracted from the loquat seed. In this study, we extracted 35.3 g of loquat seed oil from 15.1 kg of Tanaka Biwa (a variety of loquats) which is easy to obtain. Then, we analyzed fatty acid composition of seed oil and examined its utilization. As a result, we found oil components similar to beef tallow and cocoa butter and the main components were behenic acid lignoceric acid. In the modern society, problems caused by malodor are considered to be one of major issues. Therefore, we examined deodorizing effect of the loquat seed oil on malodor. In consequence, the extracted oil components demonstrated high deodorizing effect on malodor elements including ammonia, trimethylamine, isovaleric acid and nonenal. In addition, we found high deodorizing effect on allyl methyl sulfide exhibits very high deodorizing activity by considering the mixing ratio of linoleic acid and lignoceric acid. At the present time, pharmacological activity tests of loquat seed oil components are now being examined.

Biography

Minori Shoji belong to Graduate School of System Engineering, Kindai University in Japan. She researches on plants and other natural products.

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Chen-Wei Su et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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LC-MS-based metabolomics study on the different growth stages of *Hermetia illucens* L.

Chen-Wei Su and Ching-Kuo Lee
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Hermetia Illucens L. (HI), the species of Stratiomyidae insects, which lives by livestock manure and kitchen waste. Due to abundance of protein they can be used to produce high-value animal protein feed. In addition, there are many advantages, i.e., reproduce rapidly, euryphagous except human food, raise easily and low cost. Based on the above, HI is a good media for resource transformation. In this study, we applied LC-MS technique combined with statistical analysis (PCA, OPLS-DA) to explore the different growth stages of HI. The growth stages of the larvae are five; the freshly hatched larvae were sacrificed and freeze-dried as the blank of zero stage. The rest of larvae were reared and fed on *Sesamum Indium* (SI) and they would enter the next stage by each peeling. We took the second, fourth and fifth stages by each peeling a week for analysis. According to the LC-MS data, we run the database software-Compound discoverer 2.0 to get predicted compounds information like retention time, chemical formula and area under the curve. After obtaining the information, we had run statistical software-SIMCAP to analyze the difference among SI and HI, HI with fed SI. In summary, the results from LC-MS technique combined with statistical analysis can be speculated that the use of energy insects *Hermetia illucens* L. is not only amino acids but also free fatty acids.

Biography

Chen-Wei Su had completed his Bachelor's degree from Pharmacy and Science of Chia Nan University and joined Taipei Medical University for Master's degree.

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Shu-Han Yang et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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An efficient synthesis of a bioactive benzenoid derivative from the mycelium of *Antrodia camphorate* and its anti-viral activity

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Antrodia Camphorata (AC), a highly valued polypore mushroom native only to Taiwan, has been traditionally used as a medicine for the treatment of liver-related cancer and inflammation syndromes. Compound S3 was isolated from the mycelium of AC. In this study we found that S3 displayed potent anti-influenza A virus activity. Influenza A (H_1N_1) virus is the subtype of influenza A virus that was the most common cause of human influenza (flu) in 2009. Now the influenza A (H_1N_1) treatment is done by Tamiflu®. However, Tamiflu® has a lot of side effects, for example users may have mental illness symptoms. The cytotoxicity evaluation of S3 against baby hamster kidney cell lines (BHK-21) showed that S3 was slightly higher active than Tamiflu® (cell viability still has more than 80%), but S3 treatment effect better than Tamiflu®. In addition, the animals have no adverse effects after long-term use S3. It was a potent inhibitor of influenza A (H_1N_1) virus, with higher activity than the reference compound Tamiflu®. However, the content of S3 is rarely found in the mycelium of AC. Synthesia of the key chemical S3 compound in our laboratory was done through the AlC_{13} followed by demethylation. The yield was 23% in one step. This paper offers the first report of the anti-influenza A virus activity by S3. Moreover the key benzenoid component S3 was prepared only in one step.

Biography

Shu-Han Yang has completed her Master's degree from National Taiwan Normal University. She is an Assistant Researcher at Research and Development Department of Power Nature Company and School of Pharmacy of Taipei Medical University. She has published 1 paper in reputed journal.

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Mei-Hsien Lee et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Effects of active compounds from *Turpinia formosana* on osteoblast cells

Mei-Hsien Lee, Yi-Fiang Wang and Zuha Imtiyaz
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Turpinia formosana belongs to Staphyleaceae family; it is endemic to Taiwan and is found in the hilly areas. The plant is a small evergreen shrub. The following study starts with the extraction, which was done by using 95% ethanol from the leaves of the plant and later the fractionation was done using various solvents n-hexane, ethyl acetate (EtOAc) and n-butanol (n-BuOH). The isolated compounds were identified by using different physical and spectroscopic properties. Six compounds including one new ellagic acid derivative from EtOAc layer and five known compounds classified as hydrolysable tannins from n-BuOH layer were obtained. Effects of isolated compounds were determined on the human osteoblast (HOb) cells and the compounds giving the viability more than 80% were taken into positive consideration. Further, ALP activity and mineralization ability of the CP-1 (new compound) and CP-2 was evaluated in order to elucidate their effect and efficacy on HOb cells. And we observed that the new compound which is an ellagic acid derivative (CP-1) showed more ALP activity as well as mineralization which was found to be 119.58% and 128.99%, respectively. Because of all these properties which prove to be more promising in CP-1, it seems that CP-1 can be the potential therapeutic target for further research and can prove to be another milestone in the treatment of osteoporosis.

Biography

Mei-Hsien Lee is a Professor in Graduate Institute of Pharmacognosy in Taipei Medical University, Taiwan. Her research interest are Chinese herbal medicine Translational Research, Pharmacognosy, Chinese herbal medicine, Chinese medicine chemical, Active natural products chemistry, Functional cosmetic raw materials and active R & D. She was appreciated by various awards.

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Notes:

Yi-Tzu Lin et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Osteogenic activity of constituents from Taiwan native plant

Yi-Tzu Lin, Yi-Wen Mao and Mei-Hsien Lee
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Osteoblasts and osteoclasts are two main cells of bone remodeling. While osteoblasts play an important role in bone formation via different signaling pathways, osteoclasts are responsible for bone resorption. Osteogenesis is characterized by the presence of a number of markers like: Alkaline Phosphatase (ALP) and type-I collagen at the differentiation stage of osteoblasts, while osteopontin and osteocalcin are actively expressed during mineralization (the mature stage). *Uraria crinita* (L.) Desv. ex DC. (Fabaceae) has been used for long as an herbal medicine to treat bone dysplasia in children in Taiwan and China. In the present study, we investigated the active constituents of the root from *U. crinita* by bio-guided isolation in primary human osteoblast (HOb) cells. Cell viability was determined using the WST-8 assay. Osteogenic activity was evaluated in HOb cells using ALP assay and Alizarin red S staining for mineralization. Gene expression was analyzed using real-time PCR. The results showed that 50% ethanolic extract of *U. crinita* roots increased ALP and mineralization activities. Six compounds were purified by chromatography and identified to be as: one phenolic acid, two flavone glycosides and three isoflavones from the active ethyl acetate fraction. Compound 4 (isoflavone) exhibited significantly increasing ALP and mineralization activities in HOb cells and it also up-regulated the osteogenesis-related gene expression. It may be considered to be the potential target for enhancing osteogenic activity in the future.

Biography

Yi-Tzu Lin has completed her Master's degree in 2013 and currently pursuing PhD at Taipei Medical University, Taiwan. Her major research is isolation, identification and purification of the active compounds and investigation of their bioactivities as well as the related mechanisms.

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Chiao-Wen Lin et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
DOI: 10.4172/2329-6836-C1-017

Up-regulation of miRNA-29a is critical for dihydromyricetin-mediated suppression of matrix metalloproteinase-2 and metastatic ability in human oral cancer

Chiao-Wen Lin and Shun-Fa Yang
Chung Shan Medical University, Taiwan

Oral cancer is the most prevalent cancer for middle-aged men in Taiwan and its delayed diagnosis has been shown to be associated with poor survival rates. Therefore, developing a novel natural drug or drug therapy is vital. Dihydromyricetin (DHM), also called ampelopsin is the most abundant flavonoid in *Ampelopsis grossedentata*. However, the anticancer effects and related molecular mechanism of DHM in human oral cancer cells have not been reported. In this study, we investigated the effect of DHM on SCC-9 and SAS oral cancer cells and examined the potential inhibitory mechanisms involved. The results showed that DHM significantly inhibited cell migration and invasion in two oral cancer cell lines. In addition, real-time PCR and western blot analyses suggested that DHM inhibited MMP-2 mRNA and protein expression. Luciferase assay showed that MMP-2 promoter activity was inhibited after DHM treatment. Moreover, a microRNA (miRNA) analysis showed that miRNA-29a was predominantly up-regulated after DHM treatment. Inhibition of miRNA-29a significantly relieved MMP-2 and motility suppression was imposed by DHM treatment. Furthermore, ectopic miRNA-29a expression in highly invasive cells decreased MMP-2 expression and invasive abilities. Taken together, our results provide new insights into the role of DHM-induced molecular and epigenetic regulation in suppressing oral cancer metastasis.

Biography

Chiao-Wen Lin is an Associate Professor of Institute of Oral Sciences, Chung Shan Medical University, Taiwan. She has received her PhD degree in Molecular Biology. In particular, her researches have been focused on pharmacology, cancer metastasis, apoptosis and autophagy in oral cancer. She has published more than 40 papers in reputed journals.

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Shun-Fa Yang et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Dehydroandrographolide inhibits human oral cancer metastasis by transcriptionally repressing MMP-2

Shun-Fa Yang and Ming-Ju Hsieh
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Oral cancer is one of the most common cancers worldwide and metastasis is recognized as a major factor causing its low survival rate. It is a critical research objective to inhibit the metastasis progress and improve the survival rate for oral cancer. Dehydroandrographolide is the principal component of *Andrographis paniculata* (Burm.f.) Nees and is the main contributors to its therapeutic properties. However, the molecular mechanism underlying the anticancer effect induced by dehydroandrographolide remains unclear. In this study, we investigated the effect of dehydroandrographolide on SCC-9 oral cancer cells and examined the potential inhibitory mechanisms involved. The results indicated that dehydroandrographolide attenuated the migration and invasion abilities of SCC-9 cells by reducing the activity and protein expression of matrix metalloproteinases-2 (MMP-2). Dehydroandrographolide inhibited the phosphorylation of ERK1/2, p38 and JNK 1/2 in SCC-9 cells. According to the mRNA levels detected using real-time PCR, dehydroandrographolide inhibited MMP-2 expression in SCC-9 cells. In addition, dehydroandrographolide administration effectively suppressed MMP-2 expression and tumor metastases in the oral carcinoma xenograft mouse model *in vivo*. These data indicate that dehydroandrographolide could be a potent therapeutic agent for the prevention and treatment of oral cancer and a prominent plant source for anticancer research in the future.

Biography

Shun-Fa Yang is a Professor of Institute of Medicine, Chung Shan Medical University, Taiwan. He has received his PhD degree in Molecular Biology. In particular, his researches have been focused on pharmacology, head and neck cancer metastasis, cancer biology, genetic polymorphism and environment risk factors in cancer.

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Chia-Yu Chen, Nat Prod Chem Res 2017, 5:5 (Suppl)
DOI: 10.4172/2329-6836-C1-017

Chemical constituents from the red alga-derived fungus *Acremonium* sp. NTU492

Chia-Yu Chen
National Taiwan University, Taiwan

Marine natural products were the secondary metabolites of marine organisms with highly diversified structural features and varied bioactivities that keep the chemists and pharmacologists being intrigued. Among the great diversified species in the ocean, endophytic fungi remained to be less investigated so far. It was shown that marine-derived fungi were a rich source of structurally unique chemical entities. Thus, a number of endophytic fungal strains were isolated from marine algae collected from north eastern coast of Taiwan. In the preliminary antimicrobial screening against bacteria and fungi, including *Escherichia coli, Staphylococcus aureus, Candida albicans* and *Cryptococcus neoformans*, the ethyl acetate extracts of liquid (potato dextrose broth) and solid (brown rice) fermented products of *Acremonium* sp. NTU492, a derived fungus from the red alga *Mastophora rosea*, were found to exhibit significant growth inhibitory activity against *C. albicans* and *C. neoformans*. A series of bioassay-guided fractionation and separation was thus undertaken, and which has resulted in the isolation and purification of six peptides along with a trichothecene. Of these, new compounds were determined to be one depsipeptide and three highly N-methylated linear peptides, respectively, by spectral data and in comparison with literatures.

Biography

Chia-Yu Chen has obtained her Bachelor's degree from the Department of Biochemical Science and Technology, National Taiwan University, Taipei, Taiwan. She is presently studying in the Aquatic Microbial Metabolomics Laboratory in the Institute of Fisheries Science, National Taiwan University, Taipei, Taiwan.

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Tsai-Yen Shih, Nat Prod Chem Res 2017, 5:5 (Suppl)
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Antimicrobial constituents from a marine brown alga-associated fungus *Albifimbria terrestris*

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The discovery of new natural products from marine-derived fungi has increased drastically over the last few decades and some of them revealed great potentials for drug developments. In our preliminary screening, the bioactivities of 300 fungal strains, isolated from marine alga collected from northeast coast of Taiwan, were tested intensively. Of these, the ethyl acetate extract of the fermented broth of *Albifimbria terrestris*, isolated from marine brown alga *Sarrassum fulvellum* was found to exhibit significant antifungal activity against *Candida albicans*. Therefore, bioassay-guided separation of the active principles from this extract was carried out and which has resulted in the isolation and identification of compounds following compounds: Myrochromanic acid, roridin A, roridin D, roridin J, epiisororidin E, verrucarin A, verrucarin B, verrucarin J, verrucarin H and trichoverrin A. Their structures were elucidated by spectroscopic analysis and myrochromanic acid was previously unreported.

Biography

Tsai-Yen Shih was graduated from the Department of Bioscience and Biotechnology, National Taiwan Ocean University, Taiwan. She is currently pursuing Master's degree in the Institute of Fisheries Science, National Taiwan University, Taiwan and is performing research of the natural products from marine algae-associated fungi in Aquatic Microbial Metabolomics Laboratory.

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Su-Jung Hsu et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Rapid identification of natural hypouricemic compounds from alfalfa extract using UPLC-MS/MS coupled with molecular docking

Su-Jung Hsu[1], Shu-Mei Lin[1] and Ching-Kuo Lee[2]
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Xanthine Oxidase (XO) is a key enzyme that catalyzes the oxidation of xanthine and hypoxanthine to the end product (uric acid) in purine metabolism and is the major target enzyme for the hyperuricemia treatment and gout arthritis prevention. For the past five decades, allopurinol is the only available XO inhibitor for hyperuricemia treatment. It is of great interest to search for other natural XO inhibitors. Recent pharmacological studies demonstrated that alfalfa extract exhibits a variety of bioactivities, including neuroprotective, hypocholesterolemic, antioxidant, antiulcer, antimicrobial, hypolipidemic and estrogenic activity. It has been shown to be effective for treating atherosclerosis, heart disease, stroke, cancer, diabetes and menopausal symptoms. The aims of our study were to investigate the XO inhibiting potential and to identify the corresponding active components in alfalfa extract. The alfalfa extract was first combined with xanthine oxidase before applying to UPLC-ESI-QTOF-MS/MS for fingerprint analysis and structure identification of active compounds. The potential XO inhibitors from alfalfa extract were identified, including tricin and chrysoeriol. The XO inhibition and antioxidant activities of these compounds were further predicted using molecular docking software. The results revealed that tricin showed the lowest inhibition constant value (Ki) which means that this compound was predicted as the strongest inhibitor of XO. The method established in this study, LC-MS technique combined with Molecular Docking, might be also applied to rapid identification of anti-oxidative compounds and enzyme inhibiting agents from other natural resources in addition to alfalfa.

Biography

Su-Jung Hsu is currently a PhD student at the Department of Food Science, National Chiayi University, Taiwan. Her Doctoral research is focused on nutraceutical properties of alfalfa, including bioactive components purification, structure identification and bio-function evaluation. She acquires expertise in purification and chemical structure identification of natural products. She has purified and identified numbers of biologically functional components, especially compounds possessing tyrosinase and xanthine oxidase inhibition activity, from a variety of natural resources. She also conducted studies to investigate bioavailability of the active compounds from alfalfa extract. Her recent research interest is to study metabolomics of alfalfa extract, using *in vitro* cell co-culture model comprising enterocytes and hepatocytes in tandem with UPLC-ESI-QTOF-MS/MS technology.

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Minchoel Kang et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Resveratrol-enriched rice suppresses atopic skin inflammation in the NC/Nga murine model of atopic dermatitis

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Gachon University, Republic of Korea

Atopic Dermatitis (AD) is a chronic inflammatory skin disease that has characterized by pruritic eczematous lesions and skin barrier dysfunction. AD develops from a complex interplay between genetic, environmental, immunologic factors lead multiple changes of immune system to eczematous and itchy lesion. Resveratrol is a natural polyphenol found in various types of fruits and vegetables, mainly found in red grapes and berries. Several studies indicated that bioactivities of resveratrol have anticancer, antioxidant, antiangiogenic and anti-inflammatory effect. Resveratrol-enriched Rice (RR) was developed using genetic engineering technique and contains high level of the resveratrol, might have biological effects synergistically similar to each resveratrol or normal rice alone in skin disorder. Previous study has already shown RR might regulate metabolic syndrome and related disease such as skin pigmentation with UVB exposure. Furthermore, each resveratrol and rice had anti-inflammation and improving skin condition, we expected that RR might be effective treatment for pruritic skin disease such as AD. We evaluated the effect of RR on pruritic skin inflammation in AD-like skin lesions using DNCB-induced NC/Nga mice and 3D skin model. RR significantly reduced scratching frequency, also inhibited increased dermatitis score, TEWL and improved skin hydration. Both level of IL-31 and serum IgE production were significantly reduced by treatment of RR. Furthermore, RR treatment suppressed the secretion of pro-inflammatory cytokines such as IL-6 in keratinocytes and 3D skin model. Therefore, RR may have potential effects as treatment for improving epidermal skin barrier function and modulated AD disease severity.

Biography

Mincheol Kang is currently a Master's student in College of Pharmacy at Gachon University, South Korea. He has been investigating the underlying mechanism of the development of atopic dermatitis. Especially, he is interested in the identification of natural products that regulate skin inflammation, hoping that his efforts will contribute to drug development for patients suffering from dermatitis.

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Young Sook Yun et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Search for natural compounds that promote CHOP-induced apoptosis

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The transcription factor CHOP, also known as GADD 153, increases expression level and induces apoptosis in response to endoplasmic reticulum stress caused by various factors including genetic mutation, pathogens and active oxygen. In order to search for natural compounds that induce CHOP expression, we screened about 6,000 kinds of methanol extracts from various higher plants and their different parts using a luciferase reporter gene assay with CHOP promoter in Mia PaCA-2 cells. In the first screening, 121 extracts showed induction of 2-fold or more luciferse activity compared to the control. By a second screening on the 121 extracts, 6 extracts showing 3-fold or more luciferase inducing activity were selected. Among them, the extract of *Macleaya cordata* (Willd.) was separated on silica gel column chromatography and then HPLC was done. Two compounds were thereby isolated, then identified as dihydrosanguinarine and 6-methoxydihydrosanginarine based on NMR and MS spectral data. Both compounds were found to induce CHOP promoter-driven luciferase expression in the reporter gene assay, but did not significantly affect endogenous CHOP protein levels. Dihydrosanguinarine increased the levels of cleaved-PARP and cleaved-caspase-3 known as apoptosis markers. This suggests that dihydrosanguinarine may induce apoptosis not only through the ER stress pathway but also through other pathways. Although sanguinarine was reported to be a major compound of *M. cordata*, it was not isolated in this study. This may have been due to conversion of sanguainarine to 6-methoxysanguinarine during extraction with MeOH.

Biography

Young Sook Yun has completed her PhD from Tokyo University of Pharmacy and Life Sciences and Postdoctoral studies from Korea Institute Biosciences and Biotechnology and National Institute of Health Science in Japan. Recently, her researches have been focused on natural chemistry related to cancer and neurosciences.

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Yukiko Matsuo et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Vetiverianines A, B and C, three new sesquiterpenoids from *Vetiveria zizanioides* roots

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Vetiveria zizanioides (Gramineae) is a perennial grass that grows widely in India and Indonesia. *V. zizanioides* has deep complex root systems and it is widely used to prevent red soil erosion and soil contamination. The volatile matter obtained from steam distillation of the roots of *V. zizanioides*, which is commonly called vetiver oil, shows antibacterial, antioxidant and antifungal activities and is used in aromatherapy and perfumery. The roots of *V. zizanioides* contain sesquiterpenoids such as α-vetivone, β-vetivone and isovalencenol and several flavonoids. However, no systematic phytochemical investigation has been carried out on *V. zizanioides* roots. During our continuous search for bioactive secondary metabolites of higher plants that yield essential oils, we performed a chemical examination of a methanolic extract of *V. zizanioides* roots and isolated three new sesquiterpenoids, named vetiverianines A (1), B (2) and C (3), and a known eudesmane sesquiterpenoid, identified as (+)-1β, 4β, 6α-trihydroxyeudesmane (4). In particular, vetiverianine A has a unique carbon framework of a rigid tricyclic ring system, designated here as the neo-eremophilane skeleton. Vetiverianines B and C are new eremophilane sesquiterpenoids. The structures of 1-3 including their absolute configurations were determined by analysis of NMR, X-ray crystallography and vibrational circular dichroism (VCD) data. Furthermore, the cytotoxic activity of 1-4 against HL-60 cells is briefly presented.

Biography

Yukiko Matsuo has received her PhD degree in 2014 from Tokyo University of Pharmacy and Life Sciences, Japan. She has been an Assistant Professor in the Department of Medicinal Pharmacognosy at Tokyo University of Pharmacy and Life Sciences since 2014. Her current research includes isolation and structural determination of plant natural products with tumor-selective cytotoxic activities.

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Sung Yeon Kim et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Macrophage mediated host defense against Salmonella typhimurium by morus alba L

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Climatic effects are predicted to include crowding, famine, water contamination, human migration, and alterations in vector ecology, all of which increase infectious diseases. The innate immune system, play a crucial part in the initiation and subsequent direction of adaptive immune responses, as well as participating in the removal of pathogens that have been targeted by an adaptive immune response. Moreover, because there is a delay of 4–7 days before the initial adaptive immune response takes effect, the innate immune response has a critical role in controlling infections during this period. We evaluated that Morus alba extract enhance immunostimulating activity and defense effects of Morus alba extract and pomace on bacteria infection mice model. The present study was carried out to investigate the immunomodulating activity of Morus alba L. on the expression of Nitric Oxide (NO), tumor necrosis factor alpha (TNF-α) and phagocytic uptake in macrophages. Multiple signaling molecules of the TLR4 signaling pathway were also detected. We have chosen experimental bacterial infection with S. Typhimurium. Morus alba extract stimulated the production of NO and TNF-α and phagocytic activity in RAW 264.7. Morus alba activated macrophages through the mitogen-activated protein kinase and nuclear factor-κB signaling pathways downstream from TLR4. Morus alba extract and pomace enhances the survival rate of salmonella infected mice by augmenting the phagocytosis activity of macrophages. The observed activation of macrophage and induction of cytokines results on fruit of Morus alba L. treatment are the most probable reasons for the reduced mortality of bacteria. The reported data clearly support the hypothesis that Morus alba L. acts as an immunomodulator. "This work was supported by the Industrial Core Technology Development Program (10067293, Development of immunostimulatory feed additive and vaccine adjuvants for animal from mulberry) funded by the Ministry of Trade, Industry and Energy (MOTIE, Korea)"

Biography

Sung Yeon Kim has completed PhD from Seoul University of Pharmacy. She is active in research activities in the field of medicinal plants. Several studies have been published in various journals and presented various research papers by oral / poster at the national and international seminars

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Da Eun Kim et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Effects of *Mesembryanthemum crystallinum* on the anti-oxidant, anti-wrinkle and whitening skin agents

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These days, the demands for the effective and safe whitening and anti-aging agents of the skin have increased due to the medical, pharmaceutical and cosmetic reasons. *Mesembryanthemum Crystallinum* (MC) is a facultative halophyte, adapted to extreme environmental conditions by synthesis of protective substances and antioxidant molecules such as β-cyanins and other flavonoids. MC has been reported to show anti-diabetic activity to inhibit various cancers and also shows anti-oxidation activity and promotes lipid metabolism. In this study, we investigated the effects of MC extracts (water, methanol, ethyl acetate, hexane, chloroform, buthnol and methylene chloride) on the improvement of anti-oxidant, anti-aging and whitening effects. MC-methylene chloride extract (MCMC) showed the most prominent free radical DPPH, Super Oxide Dismutase (SOD) like activities. We used mushroom and cellular tyrosinase activity and cellular secreted melanin content assays. MCMC did not exhibit any inhibitory effect on the tyrosinase activity in cell-free condition. Interestingly, the cellular tyrosinase and melanin content in B16F10 cells stimulated by α-MSH was significantly inhibited by treatment with MCMC in a dose-dependent manner. MCMC has elastase inhibitory activity, procollagen synthesis and TNF-α induced Matrix Metalloproteinase-1(MMP-1) expression in human dermal fibroblasts. At 50, 100 μg/ml concentrations, the procollagen biosynthesis effect of MCMC were 110.6 and 112.2%. However, elastase inhibitory activity and MMP-1 expression was not changed. All these findings suggested that MC extract have great potential as cosmeceutical ingredients with anti-aging and whitening effects.

Biography

Da Eun Kim has completed her MS from Chosun University of Pharmacy. She is active in research activities in the field of medicinal plants. Her several studies have been published in various journals.

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Rashida Bashir et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Bioactives profiling of Australian native *Cordycep gunnii*

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Cordyceps gunnii, caterpillar fungi growing on insect larvae, has long been known as exotic medicinal fungi. Commercially available Chinese *Cordyceps* species are very expensive and known to treat cancer, asthma, TB, diabetes, erectile dysfunction and hepatitis. However, the Australian native *Cordyceps* species, especially *Cordyceps gunnii*, have not been investigated in detail. Recent investigations of biologically active metabolites of Australian native *Cordyceps gunnii* fungi have indicated their tremendous potential as a source of new medicines and nutraceuticals. LC-ESI-MS analysis of *Cordyceps gunnii* has demonstrated the presence of pharmacologically active nucleosides which are known to be responsible for the regulation and modulation of various physiological and pharmacological actions .They elevate cAMP which results in increase energy levels and protect the body from cardio and neuropathies. Fatty acid methyl ester (FAME) derivatization followed by GC MS analysis has showed that stearic acid, linoleic acid, oleic acid, ergosterol and its derivatives, lanosterol and squalene are the main components of natural *Cordyceps gunnii*. Ergosterol is a provitamin form of vitamin D_2 and squalene has superior antioxidant activity which plays a preventive role against several types of carcinogenesis. A reaction flow-post column derivatization (RF-PCD) FRAP assay has indicated the presence of strong antioxidant peaks, which will be further investigated for the characterization of bioactive compounds. Hence, current studies have demonstrated that Australian native *Cordyceps gunnii* is a promising source of nutraceuticals and pharmaceuticals.

Biography

Rashida Bashir is currently pursuing her PhD in the area of natural products and bioanalytical chemistry. She has previously completed Master's degree of Biotechnology and Bachelor's degree of Pharmaceutical Sciences.

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Notes:

Yi-Chen Liu et al., Nat Prod Chem Res 2017, 5:5 (Suppl)
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Blue, green and UV lights inhibit *Scrophularia yoshimura* hairy roots growth but enhance their secondary metabolites production

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Scrophularia yoshimura (Scrophulariaceae) is a Taiwan endemic plant. It has been proved that its main active compounds are higher than *Scrophularia ningpoensis* (Chinese figwort, xuán cān). Transformed hairy root which grows rapidly is used to produce large quantity of active compounds for many medicinal plants. However, there is no research about different wavelengths of light influence transformed hairy root. The aim of this study is to investigate the effect of different wavelengths of light on *S. yoshimura* hairy root. In this study, *S. yoshimura* hairy roots were inducted by *Agrobacterium rhizogenes* LBA1334. Different combinations of various wavelength light-emitting diodes (LEDs) were used to irritate *S. yoshimura* hairy root for 4 weeks. The content of harpagoside and cinnamic acid in the hairy root were analyzed by high performance liquid chromatography. We found that *S. yoshimura* hairy root irritated by red light and infrared light increase both fresh and dry weight, but reduce the amounts of harpagoside and cinnamic acid compared to dark-culture. On the other hand, *S. yoshimura*e hairy root irritated by blue light, green light and UV light reduce both fresh and dry weight, but increase the amounts of harpagoside and cinnamic acid. The results of this study is the first time showed that different wavelengths of light affect transformed hairy root growth and secondary metabolites production of *S. yoshimura*. These findings can be applied in the large production of harpagoside and cinnamic acid.

Biography

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Notes:

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Study of phenolic content and anti-microbial activity of Thai sappan wood and pomegranate peel extracts

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Thai sappan wood and pomegranate peel were extracted by maceration technique with water and ethanol as a solvent. The total phenolic content with Folin-Ciocalteau colorimetric method and antimicrobial activity were studied in these extracts. The result showed that the ethanol extract of pomegranate peel had the highest total phenolic content (73.53 ± 0.04 mg GAE/g) followed by the water extract of pomegranate peel (70.29 ± 0.04 mg GAE/g), the ethanol extract of sappan wood and the water extract of sappan wood (61.71 ± 0.02 mg GAE/g and 56.36 ± 0.06 mg GAE/g), respectively. The agar well diffusion method followed with macro-broth dilution were employed to evaluate the antimicrobial activity against four strains of bacteria (*Micrococcus sedentarius* DMST 9365, *Micrococcus sedentarius* DMST 37451, *Corynebacterium xerosis* DMST 17001, and *Propionibacterium acnes* DMST 14914) and one strain of yeast (*Candida albicans* ATCC 10231). Moreover, the results also presented that both water and ethanol extract of sappan wood had better antimicrobial activities against all four strains of bacteria than the water extract and the ethanol extract of pomegranate peel. Meanwhile, the water extract and the ethanol extract of pomegranate peel showed the higher antimicrobial activity against *Candida albicans* than the water extract and the ethanol extract of sappan wood.

Biography

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Notes:

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Evaluation of Ginseng on improving sperm quality

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Ginseng has been proved to be a precious herbal medicine due to its multiple bioactive compounds such as ginsenosides, polyphenols and flavonoids to promote health. With a lack of effective medicinal treatment for poor sperm quality, this study aims to investigate the effectiveness of ginseng supplement on improving sperm quality. Rats were orally gavaged with ginseng powder (100 mg/kg/day) provided by Gincare International Enterprises Co., Ltd., for 49 days before sacrifice. The serum total testosterone was measured and the sperm collected from epididymis was quantified and its activity is determined. The sperm was also subjected to YE stain for morphological observation. DNA content of testicular cells was differentiated into haploid (H), diploid (D), tetraploid (T) and S-phase. In addition, haploid cells were further divided into round spermatids (RS) and elongating spermatids (ES). The results indicated that the experimental groups demonstrated a significantly higher ratio of sperms with normal type morphology than the control groups (62.4±3.5% to 54.7±2.8%). Amongst the different types of morphological abnormalities, the ratio of sperms with abnormal tail (28.0±3.8% to 34.2±3.6%) and multiple abnormalities (1.8±0.5% to 3.2±1.3%) was especially reduced. The DNA content in testicular cells on the other hand, showed higher percentage of diploid type, which indicated spermatogonium, primary spermatocytes and meiotic prophase of spermatocytes as the preferable cell types after ginseng supplement. In conclusion, our study suggests a potential advance in ginseng supplement to produce more normal sperms for reproduction purpose.

Biography

Nai-Wen Mei has completed his PhD from National Tsinghua University. He is the Director of Bioscience Division of Gincare International Enterprises Co., Ltd., and has been working in this company for about 9 years to investigate the bioactivities of ginseng in cooperation with various institutes and universities.

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e-Poster

L N Gvazava, Nat Prod Chem Res 2017, 5:5 (Suppl)
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Stilbene glycosides and flavonoids from the roots of *Euphorbia armena*

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Plants of the genus Euphorbia are widely distributed around the whole world. About 45 of the more than 800 known species are indigenous to Georgia. The chemical composition of many plants of this genus has been well studied. We have previously studied the chemical compositions of *E. armena* Prokh., and *E. glareosa* Pall. ex- Bieb., plants of the Georgian flora. We isolated and characterized the new hydrolyzed tannins glareins A, B and C. In continuation of the study of the chemical composition of *E. armena*, we isolated total phenolic compounds, which contained stilbenes from the plant roots. Raw material was extracted three times by refluxing in MeOH (80%) for 1 hour, and then solvent was removed. The remaining aqueous phase was treated with hexane to remove lipophilic substances and then extracted with EtOAc. The EtOAc fraction was chromatographed over a column of Sephadex LH-20 with gradient elution by H_2O:MeOH with an increasing alcohol concentration to produce six fractions. Fractions 5 and 6 contained stilbenes and were combined and re-chromato¬graphed over an analogous column with elution by EtOH to isolate three pure compounds. Compound 1 was identified as 2-O-β -D-glucopyranosyl-2, 3, 5, 4'-tetrahydroxystilbene. Compound 2 was identified as 2-O-[β -D-glucopyranosyl-(2"-O-galloyl)]-2,3,5,4'-tetrahydroxystilbene. Compound 3 was identified as 2-O-[β -D-glucopyranosyl-(3"-O-galloyl)]-2,3,5,4'-tetra¬hydroxystilbene. All studied stilbene glycosides were isolated and described for the first time from plants of the genus Euphorbia. From the EtOAc fraction were isolated three derivatives of kaempferol-kaempferol-(3,5,7,4'-tetrahydroxyflavone), kaempferol-3-O-β-D-glucopyranoside (astragalin) and kaempferol-3-O-α-D-arabinopyranoside. All studied flavonoids were isolated for the first time from the title plants.

Biography

Lili Gvazava is the Professor of Pharmacy at the Tbilisi State Medical Universitu's Iovel Kutateladze Institute of Pharmacochemistry, Tbilisi, Georgia. She has various publications in national and International Journals.

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Accepted Abstracts

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The discovery of anti-parasitic benefits of olive leaf for goats infected with intestinal parasites: Seeking novel strategies to manage intestinal worms from the plant pharmacy

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The discovery of anti-parasitic benefits of olive leaf for goats infected with intestinal parasites-olive leaf was screened for anti-parasitic activity to a major intestinal nematode that infects goats, often causing mortality, *Haemonchus contortus*. Intestinal parasites are arguably the biggest constraint to goat production internationally. Chemical drugs are no longer the sustainable solution for controlling nematode infections due to drug resistance. Instead management plans are recommended to be tailor-made to individual goat farms utilizing the toolbox of strategies available. The use of plants and their medicinal compounds is an important component of this toolbox. Olive leaf extract was isolated as a novel plant for screening against goat nematodes, having shown medicinal activity in human medicine. The use of *in vitro* bioassays determined anti-parasitic activity to the larval stages of *H. contortus*. Consequently, during a preference test research trial, goats were offered a choice between olive leaf and wheaten chaffs. The goats exhibited an ability to learn the anti-parasitic ability of olive leaf. They increased their consumption of olive leaf in response to infection with *H. contortus*. They decreased their consumption of olive leaf following the termination of infection. This evidence of self-medication is valuable to goat farmers, particularly to those seeking to make use of the pharmacological capabilities of plants and highlights there remains much to discover in natures pharmacy. As more plants are screened, those endemic to particular regions can be isolated for anti-parasitic benefits and incorporated as a sustainable worm management strategy for goat farmers.

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Investigation of the antibacterial properties of the bracket fungus *Ganoderma lucidum*

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The wound healing properties of aboriginal medicinal plants is well established amongst native Australians. *Ganoderma lucidum*, a bracket fungus indigenous to Queensland's tropical rainforests, is also common to Japan (known as Red Reishi) and China (Lingzhi). Traditionally, *G. lucidum* was used to heal wounds and ensure smooth tissue regeneration. As such, we aim to evaluate the bactericidal properties of *G. lucidum* with regards to reducing microbial load in a chronic wound. Bioactive compounds were extracted separately with 90% v/v ethanol, absolute methanol and deionized (d.i.) water, submitted to separate protocols and obtained as lyophilized crude extracts (denoted as primary extracts). Next, the extracts were dissolved in d.i. water to various concentrations (10, 25, 50 mg/mL) and assessed for their antimicrobial activity against a range of common wound-colonizing bacteria in the well diffusion assay. All assays were performed in triplicate (n=3). Zones of inhibition were measured (mm) and expressed as ±SEM. Positive controls: trimethoprim+sulfamethoxazole for MRSA, penicillin G for MSSA, gentamicin for *Escherichia coli, Pseudomonas aeruginosa* and *Klebsiella pneumoniae*, erythromycin for *Streptococcus pyogenes* and *Bacillus cereus*. After 24 hours and at a concentration of 50 mg/mL, in the well diffusion assays, all the Gram-positive bacteria resulted susceptible to the primary extracts with the exception of *S. pyogenes*. MRSA was most inhibited by the ethanol extract, which elicited an IZ of 12.7±0.3 mm, by the hot water (IZ 12.1±0.7 mm) and cold water extract (IZ 11.4±1.3 mm), while the methanol extract was less effective (IZ 8.3±0.3 mm). MSSA elicited from the methanol extract an IZ of 12.0±0.0 mm, from the hot water extract an IZ 11.3±1.0 mm and from the cold water extract an IZ 10.8±0.6 mm, while caused a less pronounced IZ from the ethanol extract (8.7±1.3 mm). *B. cereus* stimulated a similar IZ from the ethanol, methanol and cold water extracts (respectively 9.4±0.7 mm, 9.8±0.6 mm, 9.7±0.3 mm), while elicited a smaller IZ from hot water extract (6.5±0.2 mm). *S. pyogenes* prompted a greater IZ of 15.7±1.8 mm from the cold water extract and a lesser IZ from the methanol extract (11.7±0.5 mm) and the hot water (10.5±2.0 mm). The water extracts were able to inhibit successfully the only Gram-negative bacterium *E. coli* with the cold water extract (IZ 9.5±0.5 mm) performing better than the hot water extract (8.4±0.3 mm. The results clearly demonstrate that the primary extracts obtained from *G. lucidum* at a concentration of 50 mg/mL, elicit bactericidal activity against Gram positive and Gram negative bacteria.

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Antibacterial, anti-mycobacterium and cytotoxic activities of Tin fruit (*Ficus carica*) compounds in Java

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Tin Fruit (*Ficus carica*) is one of famous fruit in Indonesia. The antibacterial and cytotoxicity test of pure compounds of *Ficus carica* were done, which was collected from Sidoarjo, East Java, Indonesia. Isolation and purification of the crude extracts and the pure compounds were carried out using several chromatographic techniques. The structures of the isolated compounds were elucidated by spectroscopic methods such as UV, IR, 1D (^{1}H, ^{13}C, DEPT) and 2D (COSY, HMQC and HMBC), NMR and MS. Four compounds were identified such as β-sitosterol, 6-(2-methoxy-Z-vinyl)-7-methyl-pyranocoumarin and 9,19-cycloartane triterpenoid were isolated from this plant. These compounds were screened for their antibacterial and cytotoxic activities. Significant antibacterial activities were shown by compounds against *Staphylococcus aureus* and *Bacillus subtilis* and also for *Mycobacterium tuberculosis* and *Mycobacterium marinum* in high concentration. Meanwhile, the screening for cytotoxicity using SRB assay on MCF-7, SKOV3, HT-29 and MDA-MB-231 cell lines for these compounds revealed the percentage of cells survival at doses 15 µg/ml were higher than 50%.

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Occurrence of antioxidant polyphenols in Indian coastal plants

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India has a vast coast line covering over 7,500 km and numerous plants occur along the coastal region. The coastal plants usually include the mangroves and halophytes and they are found in salty coastal habitats. Some of the coastal plants are widely used to treat a wide range of human diseases inflicted by bacteria, fungi and virus. This study analyzed the antioxidant potentials in the commonly-occurring salt-tolerant plants along the coastal areas of Tamil Nadu state, Southern India. We analyzed 13 plants that include *Arthrocnemum indicum, Suaeda monoica, S. maritima, Sesuvium portulacastrum, Ipomoea pes-caprae, Avicennia officinalis, Bruguiera cylindrica, Ceriops decandra, Rhizophora apiculata, R. mucronata, Aegiceras corniculatum, Excoecaria agallocha* and *Acanthus ilicifolius* and determined the total polyphenol content and antioxidant activity. The total polyphenol content ranged from 23.5 to 384.2 mg/g dry weight and the highest free radical scavenging activity was found in *E. agallocha* (30.3 µg/mL). Moreover, higher DPPH radical scavenging activity was also found in species such as *B. cylindrica* (42.9 µg/mL), *C. decandra* (51.9 µg/mL), *R. apiculata* (64.9 µg/mL), *A. corniculatum* (74.3 µg/mL), *R. mucronata* (79.7 µg/mL) and *I. pes-caprae* (83.7 µg/mL), respectively. The results indicate that India's mangrove plants have the potential in scavenging free radicals and can be a vital source of antioxidant phytochemicals.

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Novel protective effects of baicalin on high-glucose induced chick embryo malformation and its molecular mechanisms

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Baicalin, which is a traditional Chinese monomer isolated from a traditional Chinese tocolytic medicine; Baical skullcap root, has shown the ability of anti-oxygenation. Here, we investigated for the first time whether baicalin treatment could improve the high-glucose induced chick embryo malformation and uncovered its underlying mechanisms. In our study, we have found certain concentration of baicalin did not affect the development of early chick embryo. The number of high-glucose induced heart tube and blood island malformation in chick embryos were decreased in baicalin treating. Western blot analysis of the experimental chick embryos revealed that GATA-4 was inhibited, while LC3-II and C-caspase-3 were increased following high glucose treatment. However, baicalin treatment could improve the expression of these genes. In addition, we confirmed that the baicalin could improve the cell survival through both anti-oxygenation and regulating autophagy *in vitro*. Therefore, our data indicated that baicalin could be a potential candidate for gestational diabetes induced malformation.

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A Sino-African pharmacokinetic comparison of berberine: The contribution of the intestinal microbiota

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Berberine is one of the world's most widely used natural products. It has gained recognition as a drug in many Asian and African countries and also as a dietary supplement in many other countries. However, pharmacokinetic (PK) comparisons of berberine in different racial/ethnic groups are lacking. Our study compared the PK differences of berberine in 20 healthy male Africans and Chinese and investigated the possible underlying mechanisms for the racial differences. The plasma levels of berberine after oral administration were monitored for 12 hours by liquid chromatography with mass spectrometry. The Cmax and AUC in the Africans were 2.67-fold and 2.0-fold higher than the Chinese, respectively. Microbial compositions by 16S rRNA pyro sequencing showed higher abundance of the genera *Prevotella, Bacteroides* and *Megamonas* (34.22, 13.88 and 10.68%, respectively) in the Chinese than the Africans (30.08, 9.43 and 0.48%, respectively). Scatter plot showed a strong negative correlation between the microbial abundance and the berberine AUC, especially for the genus *Prevotella* (r=-0.813) and its species. To confirm the effects of micro biota on the PK of berberine, we compared the metabolic capacities of microbiota between the two races. A more extensive metabolism was observed in Chinese with 1.83-fold higher metabolites, possibly contributing to the lower AUC than the Africans. In conclusion, significant PK differences were observed between Africans and Chinese, which is partly attributable to variations in gut micro biota and its corresponding metabolic capacity. Our findings are of clinical significance in the design of individualized dosage regimen based on differential microbial compositions.

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Development and validation of a rapid LC-MS/MS method for simultaneous determination of Kaempferol and Quercetin in *Thespesia populnea* extract

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In this study, a simple and rapid liquid chromatography-tandem mass spectrometry (LC-MS/MS) method was developed and validated for simultaneous determination of Kaempferol and Quercetin in *Thespesia populnea* extract. The compounds were eluted using Gemini C18, (50×2.0 mm, 3µm) with the mobile phase consisting of acetonitrile and 0.3% formic acid in water at the flow rate of 0.400 mL/min. The assay exhibited a linear dynamic range of 25-2500 µg/ml for Kaempferol and Quercetin. The values for both intraday and interday precision and accuracy were within the generally accepted criteria for analytical methods (<15%). Selectivity, linearity, limit of detection (LOD), limit of quantification (LOQ), accuracy and precision were evaluated for all analytes. The proposed method is more accurate and sensitive can be used for the routine quantification of the Kaempferol and Quercetin in the herbal extracts as well as polyherbal formulations.

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Evidence based validation of *Dendrobium fimbriatum* as a hepatoprotectant: An orchid from Northeast India

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Dendrobium fimbriatum Hooker., is an important orchid found in Northeast India. It is used by the locals as traditional medicine in resetting of fractured bones and possesses antioxidant activity. It has been reported to possess constituents like rhein, fimbriatone, etc. However, there is a dearth of scientific data on its phytochemical and pharmacological evaluation. Thus, on the basis of published reports, the present study was aimed to evaluate the hepatoprotective activity of hydroalcoholic extract of *Dendrobium fimbriatum* stem in CCl4 intoxicated albino Wistar rats. The quality of the plant material was assessed and individual plant parts were evaluated for the presence of active markers; ursolic acid, β-sitosterol and lupeol using a validated HPTLC and HPLC method. Safety of the plant extract was established in albino Swiss mice following the OECD guidelines no. 420 and it was found to be safe up to an oral dose of 2000 mg/kg body weight. Hepatoprotective activity of the extract of *Dendrobium fimbriatum* stem was studied at three doses in terms of various biochemical parameters and histopathology. The results were compared with a known herbal drug, Silymarin. Oral administration of the extract of *Dendrobium fimbriatum* stem showed hepatoprotective activity in a dose-dependent manner and the results were at par with the positive control Silymarin. The results of histopathological observation were also found to be in compliance with the findings of biochemical parameters analysis suggesting the possible use of *Dendrobium fimbriatum* as hepatoprotective agent and forms baseline for future pharmacological investigations.

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Natural products of medicinal plants in India: Export potential

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Medicinal plants are regarded as esteemed therapeutic agents for the prevention of diseases and ailments in almost all parts of the world and more so in developing nation like India. Increasing shift towards herbal medicine in modern India reflects a sustained history of standardization that has completely changed the tradition of native medicine industry. India, with more than 80% of world's biodiversity, including plant genetic diversity with medicinal properties, holds tremendous potential in occupying a global significant position in market for medicinal plants based herbal formulations, medicines and products. As per the estimation, the international market for herbal products is anticipated to acquire a market worth of US $5 trillion by the end of year 2050. The global production of medicinal plants which acquired a worth of 1150 million USD in the year 2000 is anticipated to acquire a worth of 5 trillion USD mark by the end of the year 2050. Near about 80% of the contribution to the global supply of medicinal plants will be handled by India and China alone. So, the main focus of the current study will be to critically examine India's performance in world's medicinal market. The results of the study suggest that over the years, the extent of Indian exports of the medicinal and aromatic plants has increased from 2010 to almost double the value in the year 2014. Despite India's share in global export market of medicinal plants being 0.5%, the country still holds a great importance at global level and more so in the upcoming years. This study will be useful for practitioners, researchers, academicians and policy-makers.

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Proximate composition, mineral profile and β-carotene contents of new cultivars *Daucus carota* indigenous to Pakistan

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Root vegetables traditionally prepared and eaten with starchy bread are recognized for their adequate nutritive potential. The aim of present study was to explore the nutritive potential of newly invented cultivars of *Daucus carota* on commercial scales. The physicochemical and nutritive attributes of selected cultivars were investigated and the significant results (ρ>0.05) obtained viz., moisture (86.6-92.89%), proteins (0.56-1.68%), crude fibers (1.55-3.28%), ash (0.40-1.20%), carbohydrates (6.44-8.13%), fats (0.27-0.46%) and calorific energy (26.38-38.42 kcal/100 g). The mineral contents determined by atomic absorption spectrophotometer (AAS) viz., Co (0.19-0.48 µg/g), Cu (1.20-1.99 µg/g), Fe (4.01-5.90 µg/g), Sr (2.9-4.17 µg/g) and Zn (2.0-3.15 µg/g). Spectrophotometric analysis presented the appreciable level of β-carotene (6.12-14.87 mg/100 g) proving the medicated properties of newly invented cultivars of *D. carota*. All these results proved that the selected cultivars of *D. Carota* if consume in adequate quantity, would contribute significantly to the nutritional requisites for human health.

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Antioxidant potential of *Sapium ellipticum* (Hochst.) Pax. leaf extract against CCL_4-induced reactive species *in vivo*

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The antioxidant potential of *Sapium ellipticum* (SE) leaf extract against CCl_4-induced reactive species *in vivo* was examined in adult female Wister rats. Toxicity was induced in the animals via a single intraperitoneal (i.p) dose of CCl_4 (20% 2 mL/Kg of body weight, BW). SE extract was orally administered twice daily for 28 days at 8 hours interval (400 and 800 mg/kg BW) to different groups of CCl_4-treated animals. Its effects were measured against known antioxidants, Butylated hydroxytoluene (BHT) and L-Ascorbic acid (L-AA). The activities of superoxide dismutase (SOD), catalase (CAT), glutathione-S-transferase (GST) and glutathione peroxidase (GP_X) were analyzed in the post mitochondrial fractions (PFM) of the liver and kidney of rats. The level of tissue protein, reduced glutathione (GSH) and malondialdehyde (MDA) was also estimated. The data obtained showed that SE elicited its antioxidant functionality mainly through anti-peroxidation effect and promotion of superoxide dismutase and catalase activities. The extract significantly ($p<0.05$) lowered the degree of peroxidation (76.7%) and improved the activities of superoxide dismutase (51.2%) and catalase (43.5%) relative to the CCl_4-untreated group. However, its ability to improve endogenous GSH level as well as GST and GP_x activities was poor. Overall, SE leaf extract appears to have the phyto-proficiency to protect against membrane peroxidation and to improve the functions of some first line antioxidant enzymes *in vivo* in the face of overwhelming reactive species. This postulation is substantiated by the identification of antioxidant compounds like α-tocopherol, amentoflavone, lupeol and luteolin-7-O-glucoside in the active fractions of SE through HPLC-MS technique.

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Development of health care textile substrate using polyphenolic rich plant extracts as green functional finishing agents

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The present study was conducted to investigate the effect of annatto, teak and flame of the forest natural dyes on color, fastness and antimicrobial property of protein based textile substrate. The color strength (K/S) of wool samples at various concentrations of dyes were analysed using a Reflective Spectrophotometer. The antimicrobial activity of natural dyes before and after application on wool was tested against common human pathogens *Escherichia coli, Staphylococcus aureus* and *Candida albicans* by using micro-broth dilution method, disc diffusion assay and growth curve studies. The structural morphology of natural protein fiber (wool) was investigated by Scanning Electron Microscopy (SEM). Annatto and teak natural dyes proved very effective in inhibiting the microbial growth in solution phase and after application on wool and resulted in a broad beautiful spectrum of colors with exceptional fastness properties. The results encourage the search and exploitation of new plant species as source of dyes to replace toxic synthetic antimicrobial agents currently used in textile industry.

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Stability testing of botanicals: An exploratory study

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Introduction: The role of herbs as drugs, neutraceuticals and dietary supplements is gaining popularity. There have been several examples of poor quality of these products. The formulation and development of botanicals is challenging due to their complex physical and chemical properties. Stability study of herbals is important as instability modifies three important attributes of product i.e., quality, safety and efficacy. Botanicals mentioned under Ayurveda are receiving attention globally. Scientifically validated and technologically standardized botanicals are currently needed for global market. *Emblica officinalis* is mentioned under Ayurveda as a Rasayana drug and is present in many formulations. In recent years, much success has been obtained in documentation, ensuring contaminants limits, safety and standardization. However, the stability testing has not been adequately addressed. The present study was done as per WHO and ICH guidance.

Objectives: To develop the analytical method for gallic acid estimation using HPTLC and validation as per ICH guidelines, to elucidate the physical, chemical, pharmaceutical and biological attributes of the Amla extract with respect to real and accelerated storage conditions and to establish shelf life of spray dried Amla extract with respect to storage conditions and re-test periods.

Methodology: Mobile phase optimization- Mobile phase consisting of toluene:Ethyl acetate: Formic acid in the ratio of (4.0:5.5:0.5, v/v/v/v) was optimized and good resolution with Rf value of 0.36±0.02 for gallic acid was obtained when densitometry scanning was performed at 277 nm.

Method Validation: The optimized method validated as per ICH guidelines.

Results: Pharmaceutical properties were measured i.e., particle size and flow, extract showed poor free flowing properties and very moisture sensitive. It showed significant change in physical (moisture content 4-7% at real with respect to 4-11% at accelerated). Significant change in form was also observed at real time (clumps) and accelerated (cake) at end of six months. Extract when stored at real time showed significant change in physical (moisture content, form) and chemical (peak areas at Rf-0.47) and pharmaceutical (flow and compressibility) properties on 6 months storage. In accelerated conditions, these changes were seen at 1-3 months of storage. Biological stability of extract was studied using DPPH assay.

Conclusion: No significant change in activity was found at 6 months storage at room and accelerated storage. This suggests that extract re-test period should be within 6 months and proper storage conditions needs to be optimized with respect to container and temperature.

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Cytotoxic and antiproliferative evaluations of a novel diterpenoid from *Euphorbia graminea*

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Bioassay guided fractionation of the methanol extract of *Euphorbia graminea* against breast cancer (MCF-7), lung cancer (NCI-H460) and NIH 3T3 (mouse embryonic fibroblast normal cell line) at 1-250 µg/mL was carried out. Extracts of *E. graminea* was partitioned into aqueous and chloroform fractions and both fractions were tested for their effects on MCF-7 and NCI-H460. Further chromatographic and biological studies of the active chloroform fraction yielded a compound whose identity was revealed as Abietane-11, 23 diene-16-oic-14-ones through NMR and MS studies. This compound was observed to give –3.3±1.4 and 5.30±3.75% cytotoxicity against MCF-7 and NCI-H460 at 100 µM with GI_{50} and TGI of +38±0.74, 96.94±6.95 µM and 53.70±9.30 and 93.88±11.70 µM respectively. The result has established the rationale for the use in ethnomedicinal practice.

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Ethnobotanical survey: A comprehensive review of medicinal plants used against gastrointestinal disorders in Niger, Western Africa

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Gastrointestinal tract, a part of the human digestive system is an important organ that is vulnerable to different disorders which contribute substantially on worldwide morbidity and mortality rates, including in Niger. The majority of the people in Niger still use local medicinal plants to treat these infections or diseases. This study aimed at reviewing the past and actual knowledge about the medicinal plants used to treat digestive system disorders in Niger people of different provinces. Relevant data about the plants species used to treat gastrointestinal tract disorders were extracted from different reports of the past and current ethnobotanical surveys conducted in Niger for a comprehensive review and for a national scale analysis of their use. A statistical approach was used to determine the relative importance index in order to rank all species according to their usefulness. A total of 140 plant species belonging to 50 families were recorded as being used by the Niger population to treat gastrointestinal disorders. Combretaceae (16/50), Mimosaceae (14/50), Caesalpiniaceae (13/50) and Fabaceae (12/50) were the botanical families with the most used species. In this review *Lannea acida, Acacia nilotica, Balanites aegyptiaca, Bauhinia rufescens, Boswellia dalzielli, Combretum micranthum* and *Ziziphus mauritiana* were ranked as the most cited plants. Phytochemical analyses of the plants extracts revealed the presence of tannins, terpenoids, steroids, alkaloids in most of plant species. The review and analysis of the medicinal plants reported through several ethnomedicinal surveys conducted in Niger have permitted to precisely provide substantial details on the medicinal usage of certain plants best to treat gastrointestinal disorders. These baseline comprehensive data could certainly attract most investigators to initiate further research which might lead to the development of new lead-drugs for the treatment of gastrointestinal disorders.

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Synthesis and *in vitro* antiplasmodial, *in vitro* antimycobacterial and *in vitro* cytotoxicity studies of oleanolic acid and its ester

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Tuberculosis (TB) and malaria are chronic fatal diseases and attained a dangerous status worldwide. New drugs are therefore needed to halt the mortality rate. Pentacyclic triterpenes, a group of naturally occurring compound have been reported to have broad spectrum of biological activities that could be harnessed for development of new drugs for TB and malaria. In a quest to find new antimalarial and anti-mycobacterial drugs, oleanolic acid (OA) was isolated from the flower buds of *Syzygium aromaticum*. The derivative, 3-O-Acetyl-Oleanolic acid (OAA), was synthesized from the isolated product and their biological activities were carried out and compared. The antiplasmodial and antimycobacterial activity of oleanolic acid and its derivative were subsequently investigated against *Plasmodium falciparum* (Chloroquine Sensitive Strain) NF54 and *Mycobacterium tuberculosis* $H_{37}RV$, respectively. The compounds were evaluated for cytotoxicity activity using MTT (human embryonic kidney (HEK293) and human liver model (HepG2)). OAA exhibited IC_{50} of 4.3 µg/ml against *P. falciparum* while OA exhibited IC_{50} of 27.4 µg/ml. OAA exhibited MIC_{99} of 79.8 µg/ml against *M. tuberculosis* while OA exhibited MIC_{99} of 73.1 µg/ml. The MTT test (HEK293 and HepG2) were in the range of $IC_{50} \geq 300$ µg/ml, indicating low toxicity level. The data obtained above, indicate that both compounds can serves as template for the synthesis of potent anti-TB and anti-malaria drugs.

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Evaluation of biological activities, isolation and identification of active compounds from selected plants from Kwazulu-Natal, South Africa

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Bioassay guided study involving anti-inflammatory studies measurements of LOX activity effected by a reaction medium containing 15-LOX, linoleic acid in buffer at pH 9 for 30 to 90 seconds after adding plant extract/fraction, free radical scavenging capacity against the $ABTS^{\cdot+}$ radical cation and $DPPH^{\cdot}$ radicals, antimicrobial and bioautography assays against Staphylococcus aureus, ATCC 29213, Pseudomonas aeruginosa, ATCC 27853, Enterococcus faecalis, ATCC 29212, Escherichia coli, ATCC 25922, Candida albicans and A. fumigatus were carried out on the plants extracts, fractions and pure compounds. Isolation of compounds displaying biological activity was characterized by use of spectroscopic techniques.

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Inhibition of phospholipase A_2 of *Naja nigricollis* by oleanolic acid acetate from *Cryptolepis oblongifolia*

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Cryptolepis oblongifolia (Meisn.) Schltr. is a shrub, traditionally used in treatment of snakebite. Column chromatography of ethyl acetate extract yielded an isolate which was tested against purified phospholipase A_2 of *Naja nigricollis* venom. The ^{1}HNMR spectra of the isolate revealed present of eight quaternary methyl while the ^{13}CNMR indicate carboxylic acid and carbonyl ester signals, by comparison with literature the isolate was found to be oleanolic acid acetate which inhibit phospholipase A_2 in a dose dependent fashion with inhibition binding constant *ki* 1.7 µg/ml. The relevance of these finding could serve as bases for the development of antivenin.

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