Growth inhibitory activities of Triphala against HIV

The isolation of microbial agents less susceptible to regular antibiotics and the rising trend in the recovery rates of resistant bacteria highlights the need for newer alternative principles. Triphala has been used in traditional medicine practice against certain diseases such as jaundice, fever, cough, eye diseases, etc. The researchers at University of Madras, Tamil Nadu, India tested phytochemical (phenolic, flavonoid and carotenoid) and antibacterial activities of aqueous and ethanol extracts of Triphala and its individual components (Terminalia chebula Retz., Terminalia bellirica Roxb. and Emblica officinalis Gaertn.) against certain bacterial isolates (Pseudomonas aeruginosa, Klebsiella pneumoniae, Shigella sonnei, S. flexneri, Staphylococcus aureus, Salmonella paratyphi-B, S. typhi, Escherichia coli, Enterococcus faecalis) obtained from HIV infected patients using Kirby-Bauer's disk diffusion and minimum inhibitory concentration (MIC) methods. T. chebula was found to possess high phytochemical content followed by T. bellirica and E. officinalis in both aqueous and ethanol extracts. Further, most of the bacterial isolates were inhibited by the ethanol and aqueous extracts of T. chebula followed by T. bellirica and E. officinalis by both disk diffusion and MIC methods. The results revealed that both individual and combined aqueous and ethanol extracts of Triphala have antibacterial activity against the bacterial isolates tested [Srikumar R, Parthasarathy N Jeya, Shankar EM, Manikandan S, Vijayakumar R, Thangaraj R, Vijayananth K, Sheeladevi R and Rao Usha Anand, Evaluation of the growth inhibitory activities of triphala against common bacterial isolates from HIV infected patients, Phytother Res, 2007, 21(5), 476-480].

Curcumin for chemoprevention of colon cancer

The most practical approach to reduce the morbidity and mortality of cancer is to delay the process of carcinogenesis through the use of chemopreventive agents. This necessitates that safer compounds, especially those derived from natural sources must be critically examined for chemoprevention. Pre-clinical studies on curcumin, a constituent of turmeric (Curcuma longa Linn.), in a variety of cancer cell lines including breast, cervical, colon, gastric, hepatic, leukemia, oral epithelial, ovarian, pancreatic and prostate have consistently shown that curcumin possesses anti-cancer activity in vitro and in pre-clinical animal models. The robust activity of curcumin in colorectal cancer has led to five phase I clinical trials being completed showing the safety and tolerability of curcumin in colorectal cancer patients. To date clinical trials have not identified a maximum tolerated dose of curcumin in humans with clinical trials using doses up to 8000mg per day. The success of these trials has led to the development of phase II trials that are currently enrolling patients. According to a mini review published by researchers at University of Wisconsin, USA, in vitro evidence and completed clinical trials suggests that curcumin may prove to be useful for the chemoprevention of colon cancer in humans. In this review pre-clinical and clinical evidence of curcumin as a chemopreventive compound in colorectal cancer have also been discussed [Johnson Jeremy James and Mukhtar Hasan, Curcumin for chemoprevention of colon cancer, Cancer Lett, 2007, 255(2), 170-181].

Antibacterial, antisecretory and antihemorrhagic activity of Neem

Indigenous uses of Neem, Azadirachta indica A. Juss. leaves in different parts of India for curing gastrointestinal disorder such as diarrhoea and cholera is widespread. Therefore, the researchers at University of Calcutta, Kolkata, India evaluated the antibacterial and antisecretory activity of the methanol extract of Neem leaf against Vibrio cholerae, a causative agent of watery diarrhoea such as cholera. The extract had significant antibacterial activity against the multi-drug-resistant Vibrio cholerae of serotypes 01, 0139 and non-01, non-0139. The minimum inhibitory
Contraceptive activity of methanol extract of Dendrophthoe falcata Ettingsh stem

The researchers at Department of Zoology, University of Rajasthan, Jaipur, India evaluated the contraceptive efficacy of methanol extract of Dendrophthoe falcata Ettingsh (Family-Loranthaceae) stem in male albino rats as reported in folk remedies. Adult proven fertile male rats were gavaged methanol extract of stem at 50, 100 and 200mg/rat/day for 60 days. The activity was compared with standard drug, Lonidamine. On day 61 the animals were autopsied and the testes, epididymides, seminal vesicle and ventral prostate were dissected out and weighed. Sperm motility and density and serum testosterone level were assessed. The sperm motility and density were significantly reduced. The histoarchitecture of testes revealed degenerative changes in the seminiferous tubules, arrest of spermatogenesis at the stage of round spermatid. Serum testosterone levels were decreased significantly in all treatment groups. It is concluded that methanol stem extract of D. falcata possesses a significant effect on fertility in male rats as reported in folk remedies [Gupta RS and Kachhawa JBS, Evaluation of contraceptive activity of methanol extract of Dendrophthoe falcata stem in male albino rats, J Ethnopharmacol, 2007, 112(1), 215-218].

Anti-androgenic activities of the triterpenoids fraction of Ganoderma lucidum

Now-a-days androgen-mediated diseases such as prostate cancer, hirsutism, acne, androgenic alopecia and benign prostatic hyperplasia (BPH) are considered to be a serious problem. Above all, BPH is one of the most common symptoms seen in older men, and 40% of men 50-60 years of age and 90% of those 80-90 years of age are diagnosed with BPH. For thousand of years, mushrooms have been known to be a source of medicine. They are widely sold as nutritional supplements and touted as beneficial for health.

The fungi Ganoderma lucidum (Curtis) P. Karst. has been used for centuries in East Asia. Its fruiting body is called as Reishi in Japan and Lingzhi in China. In these areas, G. lucidum has been a popular folk or oriental medicine to cure various human diseases such as hepatitis, hypertension, hypercholesterolemia and gastric cancer. Therefore, scientists at Japan focused their research on edible and medicinal mushrooms as possible sources of 5α-reductase inhibitory ingredients. The ethanol extract of G. lucidum showed inhibitory activity on both isozymes (types 1 and 2) of 5α-reductase and suppression effects of ventral prostate growth induced by testosterone in castrated rat, but not induced by dihydrotestosterone. Activity-guided fractionation and TLC analysis suggested that the active principles in vivo were triterpenoids. These results indicate that the triterpenoids fraction of G. lucidum might be a useful ingredient in the treatment of benign prostatic hyperplasia [Liu Jie, Shimizu Kuniyoshi, Fumiko Konishi, Noda Kiyoshi, Kumamoto Shouichiro, Kurashiki Kenji and Kondo Ryuichiro, Anti-androgenic activities of the triterpenoids fraction of Ganoderma lucidum, Food Chem, 2007, 100 (4), 1691-1696].
Antifertility activity of *Ailanthus excelsa* Roxb. stem bark

The practice of traditional medicine for the control of fertility in Nilgris is based on the use of plant medicine for many years. Therefore, the researchers of Department of Pharmacognosy and Phytochemistry, Jaya College of Paramedical Sciences, Thiruninravur, Chennai and J.S.S. College of Pharmacy, Ooty, Tamil Nadu, India evaluated the effect of hydroalcoholic extract of stem bark of *Ailanthus excelsa* Roxb. (Family—Simaroubaceae) (HEA) in rats to explore its antifertility activity. A strong antiimplantation (72%) and abortifacient activity (56%) was observed at the tested dose levels (200 and 400mg/kg, p.o.). The extract shows further more significant ($P<0.05$) increase in uterine weight in immature ovariectomised rats. Simultaneous administration of extract with ethinyl estradiol cause significant antiestrogenic activity. All these observations suggested that hydroalcoholic extract of *A. excelsa* has antifertility effect [Ravichandran V, Suresh B, Sathishkumar MN, Elango K and Srinivasan R, Antifertility activity of hydroalcoholic extract of *Ailanthus excelsa* (Roxb): An ethnomedicines used by tribals of Nilgiris region in Tamilnadu, *J Ethnopharmacol*, 2007, 112(1), 189-191].

Indian wormseed oil used for treatment of leishmaniasis

The World Health Organization has classified the leishmaniasis as a major tropical disease. Current therapy is toxic, expensive and cause several adverse effects. The majority of people in endemic areas of leishmaniasis depend on natural and traditional medicine. *Chenopodium ambrosioides* Linn. has been reported for its potential antiparasitic properties, including antiprotozoal activity against *Trypanosoma cruzi* and *Plasmodium falciparum*. Antihelmintic effect against *Ancilostoma duodenale*, *Trichuris trichuria* and *Ascaris lumbricoides* has also been reported.

Researchers at Cuba conducted a study to examine the activity of the essential oil from *C. ambrosioides* (Indian wormseed) in BALB/c mice infected with *Leishmania amazonensis*. The infected animals received two cycle of treatment by different routes (intraperitoneal, oral or intralesional route). The intraperitoneal administration of the essential oil at dose of 30mg/kg prevented lesion development and decrease the parasite burden. Oral administration retarded the infection in the experimental model compared with untreated mice, although it was less effective than the intraperitoneal route. The administration by intralesional route did not show activity. Intraperitoneal and oral treatment at 30mg/kg with the essential oil had better antileishmanial effect than treatment with the reference drug, amphotericin B at 1mg/kg. Preliminarily, the toxicity and the resistance after treatment were examined. Signs of toxicity were evident only in the animals treated by intraperitoneal route. No resistance was detected in *L. amazonensis* isolates obtained from treated mice. These data clearly demonstrated that this natural product could be an alternative for the development of a new drug against cutaneous leishmaniasis [Monzote Lianet, Montalvo Ana M, Scull Ramón, Miranda Migdalía and Abreu Juan. Activity, toxicity and analysis of resistance of essential oil from *Chenopodium ambrosioides* after intraperitoneal, oral and intralesional administration in BALB/c mice infected with *Leishmania amazonensis*: A preliminary study, *Biomed Pharmacother*, 2007, 61(2-3), 148-153].

Betel extract protects photo-induced damages to lipids and proteins

The generation of free radicals in skin by solar ultra-violet light (UV) accelerates skin cancer and photo ageing. Cellular exposure to UV light also leads to iron release, resulting in excessive production of ROS and ultimately to pathogenesis. Therefore, there is a need to develop suitable formulations that can prevent photo-induced biological damage. To this end, exploration of herbs/plants that are credited with various medicinal attributes in Ayurveda might be useful from the point of view of low cost and reduced toxicity. Therefore, researchers at India studied the protective activity of *Piper betle* Linn. (Betel, Hindi — *Pan*) ethanolic extract (PE) against the photosensitization-induced damage to
lipids and proteins of rat liver mitochondria. PE could effectively prevent lipid peroxidation, as assessed by measuring thiobarbituric acid reactive substances, lipid hydroperoxide and conjugated diene. In addition, it prevented photo-induced oxidation of proteins in a concentration-dependent manner. Furthermore, its preventive capacity against iron-mediated lipid peroxidation was also confirmed. The protective activity of PE could be attributed to its free radical and singlet oxygen scavenging properties. The activity of PE was primarily due to its phenolic constituents, which were identified as chavibetol and 4-allylpyrocatechol [Bhattacharya S, Mula S, Gamre S, Kamat JP, Bandopadhyay SK and Chattopadhyay S, Inhibitory property of Piper betel extract against photosensitization-induced damages to lipids and proteins, Food Chem, 2007, 100 (4), 1474-1480].

Anti-diarrhoeal activity of Litsea polyantha Juss. bark

The people in developing countries are very prone to suffer from diarrhoea, especially children, which eventually leads to malnutrition. The World Health Organization launched a diarrhoeal disease control program in order to eradicate this problem. The programme includes studies of traditional medicinal practices together with the evaluation of health education and prevention approaches. Litsea polyantha Juss. (Family — Lauraceae) is a big tree, which is abundant in the hilly area of Chotanagpur region in the State of Jharkhand (India). The bark of this plant has a long history of traditional medicine use among the traditional healers of Oraon and Munda community in Jharkhand, to treat dysentery and diarrhoea as well as the other gastrointestinal disorders.

Therefore, the anti-diarrhoeal activity of methanol extract of dried bark and aerial parts of L. polyantha (MELP) has been evaluated by researchers at Division of Pharmacology, Department of Pharmaceutical Sciences, Birla Institute of Technology, Mesra, Ranchi, Jharkhand, India in mice using different models (castor oil-induced diarrhoea and propulsive gut motility in mice). MELP (50, 75 and 100mg/kg, p.o.) significantly (P<0.01) reduced the onset of diarrhoea, fecal excretion and also showed a significant (P<0.001) reduction in gastrointestinal motility. The results of the study support the folklore use of the plant for diarrhoeal remedies [Poonia Brijendra Singh, Sasmal D and Mazumdar PM, Anti-diarrheal activity of methanol extract of Litsea polyantha bark in mice, Fitoterapia, 2007, 78 (3), 171-174].

Cardiovascular effects of Hyptis fruticosa Salzm. ex Benth. essential oil

Hyptis fruticosa Salzm. ex Benth. (Family — Lamiaceae) an aromatic sub-bush plant which grows up to 1.5m is found on the Brazilian northeast coast. Previous studies have demonstrated that the aqueous extract, the ethanolic extract and the essential oil of the plant presented analgesic and anticonvulsive activities. Researchers at Brazil aimed to evaluate the cardiovascular effects of H. fruticosa essential oil (HFEO) in rats using in vivo and in vitro studies.

In non-anesthetized normotensive rats, HFEO (5, 10, 20 and 40mg/kg; i.v.) induced hypotension is associated with tachycardia. In intact and isolated rings of rat superior mesenteric artery (control), HFEO (1-1000µg/ml, n=6, cumulatively) induced concentration-dependent relaxations of tonus induced by 10µM phenylephrine (Phe) (pD2=2.6±0.27; Emax =64±8.3%). In denuded endothelium pre-contracted rings with Phe or K+-depolarizing solution (80mM), the concentration-response curves to HFEO were not shifted (pD2 =2.3±0.25 and 2.3±0.28, respectively), but their maximal responses were significantly (P<0.05 vs control) increased (Emax =122.3±18.2% and 92±3.6%, respectively). HFEO was also capable of antagonizing the concentration-response curves to CaCl2 (3µM-30mM) in a dose-dependent manner. It is concluded that HFEO induces hypotensive effect with a contemporaneous increase in heart rate probably of reflex origin. This hypotensive effect may probably be due to a direct vasodilatation and a consequent decrease in the peripheral vascular resistance. This vasodilatation seems to be due to an inhibition of the Ca2+ influx through voltage-operated Ca2+ channels [Santos MRV, Carvalho AA, Medeiros IA, Alves PB, Marchioro M and Antoniolli AR, Cardiovascular effects of Hyptis fruticosa essential oil in rats, Fitoterapia, 2007, 78 (3), 186-191].
Antidiabetic activity of flavone from Sweet potato leaf

Diabetes mellitus is a major health problem. Recently, the increasing interest has been attracted for development and utilisation of antidiabetic plants because they have less side effects and are more economic, especially in developing countries. *Ipomoea batatas* (Linn.) Lam. (Sweet potato) is extensively grown in many countries, especially in China and in Southeast Asian countries. The juice of the plant was used for diabetic patients in Sikkim and Darjeeling. The leaves, the by-product of sweet potato, possess accelerating metabolism, preventing arteriosclerosis, protecting eyesight and antimutation activities and flavone is considered to be one of main components. Flavone material has various biological effects such as immunomodulating activity, antioxidant properties, hypolipidaemic, soften the blood vessel and hypoglycaemic. At present, a small part of leaves has been used for forage for birds and livestock, but a majority of leaves has been thrown away.

Therefore, effects of flavone extracted from *I. batatas* leaf (FIBL) on body weight, blood glucose, serum lipid profiles, serum insulin and free radicals in rats with non-insulin dependent diabetes mellitus (NIDDM) were studied by researchers at China. FIBL treatment (25, 50, 100mg/kg) for 2 weeks resulted in a significant decrease in the concentration of plasma triglyceride, plasma cholesterol and weight in NIDDM rats. Furthermore, FIBL markedly decreased fasting plasma insulin level, blood glucose level, low-density lipoprotein cholesterol, and malondialdehyde levels and significantly increased the Insulin Sensitive Index and superoxide dismutase level in NIDDM rats. In addition, flavone extracted from *I. batatas* leaf did not show any physical or behavioural signs of toxicity. More significantly, our data demonstrate the FIBL at the dose of 50mg/kg body weight exhibited the optimal effect. The results suggest that flavone extracted from *I. batatas* leaf could control blood glucose and modulate the metabolism of glucose and blood lipids, and decrease outputs of lipid peroxidation and scavenge the free radicals in non-insulin dependent diabetic rats [Zhao Rui, Li Qingwang, Long Ling, Li Jian, Yang Runjun and Gao Dawei, Antidiabetic activity of flavone from *Ipomoea batatas* leaf in non-insulin dependent diabetic rats, *Int J Food Sci Technol*, 2007, **42** (1), 80-85].

Terminalia chebula Retz oils for managing Type-2 diabetes

Indigenous to Pakistan and India, *Terminalia chebula* Retz (Chebulic Myrobalan, Hindi — Harra) of Combretaceae family is a popular folk medicine. Researchers at China and Japan investigated mammalian α-glucosidase inhibitory activity of *T. chebula* fruits. The aqueous methanolic extract was found to have potent rat intestinal maltase inhibitory activity, whereas neither intestinal sucrase nor isomaltase activity was inhibited by this extract. Using bioassay-guided separation, three active ellagitannins were identified as chebulanin (1), chebulagic acid (2) and chebulinic acid (3) and were shown to possess potent intestinal maltase inhibitory activity, with the IC₅₀ values of 690µM, 97µM and 36µM, respectively. The intestinal maltase inhibitory activities of 2 and 3 were even higher than that of 1,2,3,4,6-penta-O-galloyl-β-d-glucose (PGG) (4, IC₅₀=140µM), which is a known potent α-glucosidase inhibitor. Comparison of the activities of 1-4, 1,2,3- O-trigalloyl-β-d-glucose (5), neochebulagic acid (6) and corilagin (7) suggested that the positions of chebulloyl and galloyl groups mostly affected the potency. Kinetic studies revealed that 2, 3 and 4 inhibited maltose-hydrolyzing activity of intestinal α-glucosidase, noncompetitively. Thus, *T. chebula* fruits extract can be used for managing Type 2 diabetes [Gao Hong, Huang Yi-Na, Xu Pei-Yu and Kawabata Jun, Inhibitory effect on α-glucosidase by the fruits of *Terminalia chebula* Retz., *Food Chem*, 2007, **105** (2), 628-634].
Antioxidant potential of pressing residues from evening primrose

Agro-industrial plant by-products have been widely investigated for their antioxidant potential. The recycling of plant wastes has focused on their uses as radical scavengers in dietary supplements, or anti-ageing ingredients in cosmetics, as well as natural preservatives in food and health products. The common starting materials for these products have been olive and vegetable wastes, fruit pomaces and peels, but increasingly seeds have gained popularity. The seeds of oil crops, particularly those containing high percentage of polyunsaturated fatty acids (PUFA) are thought to be predominantly rich in antioxidants. An interesting niche among PUFA oil crops with a steadily increasing market are γ-linolenic acid (GLA) containing plants. The biggest “GLA-market” exists for evening primrose (Oenothera biennis Linn.).

Evening primrose is increasingly cultivated for medicinal use of the γ-linolenic acid rich oil. The seed cake (EPSC) - the remaining industrial residue from cold pressing - was extracted with polar solvents in order to investigate a profitable polyphenolic recovery by researchers at Germany and United Kingdom. The aim of the study was to elucidate the antioxidant potential of an industrial EPSC left from cold oil pressing using cultivars introduced to German pilot cultivation in the late nineties. Considering the elevated amount of theoretically exploitable antioxidants reported from by-products already, the authors focused on critical issues associated with a realistic transfer into industrial application: (i) an efficient and simple extraction method with common non-toxic solvents without further pre-treatment of the waste, (ii) a comparable antioxidant profile versus already established antioxidants and (iii) the temperature stability of the extracts. The extractable matter and the total phenolic content (Folin-Ciocalteu) have been compared to a black currant residue from juice production (Ribes nigrum Linn.) and seed cakes from sesame, woad (Isatis tinctoria Linn.) and burdock (Arctium lappa Linn.). The EPSC crude extracts yielded the high total phenolic content (min. 228.2±11.6 to max. 696.4±29.0mgGAE/g dry extract) within the range of already commercialized antioxidant extracts from rosemary (RO, 142.1±1.9mg/g), green tea (GT, 446.8±27.4mg/g) and grape seed (GS 790.0±53.1mg/g). All extracts exhibited free radical scavenging activity (DPPH assay) with the order of potency: EPSC>GS>GT>burdock=black currant>RO>butylated hydroxytoluene (BHT)>>woad>sesame. Accordingly EPSC extracts where very effective in scavenging superoxide anion radicals (neotetrazolium assay: GS>EPSC>GT>BHT>burdock>woad>sesame) and inhibition of lipid oxidation (Rancimat assay: BHT>GT>EPSC>burdock>woad>RO>sesame>GS) Decreasing Rancimat activity from 80°C upwards might indicate heat sensitiveness and limited usability. However, an efficient exploitation of polyphenols from evening primrose seed cakes in terms of an uncomplicated extraction procedure, the yield and the competitive profile as a strong radical scavenger is concluded [Peschel Wieland, Dieckmann Wilfried, Sonnenschein Marlies and Plescher Andreas, High antioxidant potential of pressing residues from evening primrose in comparison to other oilseed cakes and plant antioxidants, Ind Crops Prod, 2007, 25 (1), 44-54].

Effect of Garcinia mangostana Linn. on inflammation caused by Propionibacterium acnes

Researchers at Faculty of Pharmacy, Mahidol University, Bangkok, Thailand conducted study to investigate the activity of Thai medicinal plants on inflammation caused by Propionibacterium acnes in terms of free radical scavenging and cytokine reducing properties. P. acnes have been recognized as pus-forming bacteria triggering an inflammation in acne. Antioxidant activity was determined by DPPH scavenging and NBT reduction assay. The result showed that Garcinia mangostana Linn. (Mangosteen) possessed the most significant antioxidant activity and reduced reactive oxygen species production. Houttuynia cordata Thunb., Eupatorium odoratum Linn., and Cassia alata Linn. [syn. Senna alata (Linn.) Roxb.] had a moderate antioxidant effect. This study has identified the promising source of anti-inflammatory agent which could be useful in treatment of acne vulgaris [Chomnawang Mullika Traidej, Surassmo Savimol, Nukoolkarn Veena S and Gritsanapan Wandee, Effect of Garcinia mangostana on inflammation caused by Propionibacterium acnes, Fitoterapia, 2007, 78(6), 401-408].
Effect of Mitragyna speciosa Korth on ethanol withdrawal symptoms

*Mitragyna speciosa Korth* (Family — Rubiaceae) has been used in traditional medicine for decades in many Southeast Asian countries, especially southern Thailand. Originally, local people used it to alleviate pain, coughing or diarrhoea. It is also used to counter fatigue. Recently, it has gained much attention because of the claim that it may inhibit the withdrawal symptoms that follow cessation from long-term ethanol consumption and prevent ethanol patients from relapsing. Therefore, scientists at Thailand designed their study to determine the effect of an aqueous extract of its leaves on ethanol withdrawal symptoms. Administration of the aqueous extract at a dose of 300mg/kg significantly inhibited ethanol withdrawal-induced behaviours that included rearing, displacement and head weaving. The results also revealed that at doses of 100, 300 and 500mg/kg it possess antidepressant activity without affecting the spontaneous motor activity [Kumarnsit Ekkasit, Keawpradub Niwat and Nuankaew Watcharin, Effect of Mitragyna speciosa aqueous extract on ethanol withdrawal symptoms in mice, *Fitoterapia*, 2007, 78(3), 182-185].

Antimicrobial activity of some Indian mosses

The scientists at Pharmacognosy and Ethnopharmacology Division, National Botanical Research Institute, Lucknow, Uttar Pradesh, India conducted study to evaluate the antimicrobial activity of ethanolic extracts of 15 Indian mosses. The antibacterial activity of ethanolic extracts was investigated against five Gram positive and six Gram negative bacterial strains. Antimycotic activity was assayed against 8 fungi. *Sphagnum junghuhnianum Doz. et Molk.*, *Barbula arcuata Griff.*, *B. javanica Doz. et Molk.*, *Brachythecium populeum*(Hedw.) B.S.G., *B. rutabulum* (Hedw.) B.S.G., *Mnium marginatum* (With.) P . Beauv. and *Entodon cf rubicundus* (Mitt.) Jeag. were found to be most active against all the organisms. Hence, bryophytes including mosses may prove to be a very good and new source of antimicrobial agents [Singh Meenakshi, Rawat AKS and Govindarajan R, Antimicrobial activity of some Indian mosses, *Fitoterapia*, 2007, 78 (2), 156-158].

Radical scavenging activity and composition of raspberry leaves

Raspberry (*Rubus idaeus Linn.*) leaves, collected in different locations of Lithuania were extracted with ethanol and the extracts were tested by researchers at Lithuania for their antioxidant activity by using ABTS’ decolourization and DPPH scavenging methods. All extracts were active, with radical scavenging capacity at the used concentrations from 20.5 to 82.5% in DPPH reaction system and from 8.0 to 42.7% in ABTS reaction. The total amount of phenolic compounds in the leaves varied from 4.8 to 12.0mg of gallic acid equivalents (GAE) in 1g of plant extract. Three flavonoids, namely quercetin glucuronide, quercetin-3-O-glucoside and quercetin glucosylrhamnoside (rutin) were identified by HPLC/UV/MS in the extracts. Remarkable variations in the concentration of the identified and other unidentified flavonoid components also indicate that herbal preparations containing *R. idaeus* leaves should be comprehensively evaluated for more precise assessment of their functional and/or pharmacological properties [Venskutonis PR, Dvaranauskaitė A and Labokas J, Radical scavenging activity and composition of raspberry (*Rubus idaeus*) leaves from different locations in Lithuania, *Fitoterapia*, 2007, 78(2), 162-165].

Antibacterial activity of *Abies webbiana* Lindl.

Scientists at India evaluated the antimicrobial activity of methanol extract of the dried leaves of *Abies webbiana* Lindl. (Family — Pinaceae). Earlier, the leaves are reported to be effective against hyperglycemia, conception, rheumatism and high temperature. The methanol extract of leaves exhibited antibacterial activity against *Staphylococcus aureus* and *Salmonella typhi* [Vishnoi Satya Prakash, Ghosh Ashoke Kumar, Debnath Bikash, Samanta Soma, Gayen Shovanlal and Jha Tarun, Antibacterial activity of *Abies webbiana*, *Fitoterapia*, 2007, 78(2), 153-155].
Radical scavenging capacity of *Agrimonia* spp.

Scientists at Lithuania assessed the antioxidant activity of *Agrimonia eupatoria* Linn. (Agrimony) and *A. procera* Wallr. (Fragrant agrimony) extracts. The extracts, isolated from the over ground parts of the plants, were able to scavenge free radicals, however, radical scavenging capacity (RSC) varied in a wide range (9.1-97.5% in DPPH* reaction and 6.7-79.5% in ABTS*+ reaction) depending on the polarity of the solvent used to obtain the extract. In general, the extracts isolated with polar solvents were characterized as possessing higher RSC. Taking into account the results of preliminary assessment of antioxidant properties and the concentration of bioactive components it is concluded that *A. eupatoria* and *A. procera* are promising plant sources for the development of functional ingredients for various applications. Further studies may be focused on the analysis of individual bioactive constituents of agrimony species [Venskutonis PR, Škėmaštė M and Ragazinskienė O, Radical scavenging capacity of *Agrimonia eupatoria* and *Agrimonia procera*, Fitoterapia, 2007, 78(2), 166-168].

Rosemary extracts effective in dental caries

Oral disease, including dental caries, gingival inflammation, periodontal disease, and tooth loss, may significantly affect overall health. Among these, dental caries is a multifactorial infectious disease and *Streptococcus sobrinus* is one of the most cariogenic bacteria of mutans streptococci. Rosemary (*Rosmarinus officinalis* Linn.) is a spice and medicinal herb widely used around the world. The aqueous infusion of dried rosemary leaves has gained popularity in Taiwan for its claimed health benefits in recent years. Therefore, researchers at Taiwan investigated in vitro effects of rosemary extracts on *S. sobrinus* growth and on its extracellular glucosyltransferase activity. The antibacterial activities of rosemary extracts were determined by the microdilution broth method. The minimum inhibitory concentrations of aqueous and methanolic rosemary extracts against *S. sobrinus* were 16 and 4mg/ml, respectively. Glucosyltransferase activity was tested by incubating a crude enzyme preparation with sucrose and determining the amount of water-insoluble glucan formed. Both aqueous and methanolic extracts of rosemary markedly inhibited the formation of water-insoluble glucan. The 50% inhibitory doses of aqueous and methanolic extracts against the glucosyltransferases of *S. sobrinus* were 1.42mg/ml and 0.34mg/ml, respectively. The results suggested that rosemary extract might prove effective for the inhibition of the growth of cariogenic oral streptococci [Tsai Po-Jung, Tsai Tzung-Hsun and Ho Su-Chen, *In vitro* inhibitory effects of rosemary extracts on growth and glucosyltransferase activity of *Streptococcus sobrinus*, Food Chem, 2007, 105 (1), 311-316].

Antioxidant potential of *Pueraria tuberosa* Linn. tubers

Indian Kudzu, *Pueraria tuberosa* Linn. (Hindi — Bidaarikand) of Fabaceae family is a perennial climber, growing throughout tropical parts of India. In the Ayurvedic system of medicine, it is used as a drug of choice to manage pain, inflammation and other related diseases. The antioxidant potency of *P. tuberosa* was investigated by scientists of Department of Medicinal Chemistry, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India. Total antioxidant capacity was determined using an ABTS*+ assay. Lipid peroxidation was assessed in terms of thiobarbituric acid-reactive substances by using egg-yolk homogenates as lipid-rich media. Superoxide radical scavenging was measured using riboflavin-light-nitro blue tetrazolium assay. Hydroxyl radical trapping potential was determined by evaluating hydroxyl radical induced deoxyribose degradation using thiobarbituric acid method. In order to assess the metal chelation property, hydroxyl radical induced deoxyribose degradation was evaluated in the absence of ethylenediaminetetraacetic acid. Both hexane and methanol fractions inhibited lipid peroxidation and also chelated the iron, showing potent antioxidant property [Pandey Nidhi, Chaurasia JK, Tiwari OP and Tripathi Yamini B, Antioxidant properties of different fractions of tubers from *Pueraria tuberosa* Linn., Food Chem, 2007, 105 (1), 219-222].
Antioxidants activity of *Spirulina platensis* extracts

*Spirulina platensis* is a high quality health food with high levels of protein, vitamins, minerals, polyunsaturated fatty acids, zeaxanthin and myxoxanthophyll and has been reported to have pharmaceutical potential. Researchers of Key Laboratory of Food Processing and Quality Control, College of Food Science and Technology, Nanjing Agricultural University, Nanjing, PR China using response surface methodology optimized supercritical CO₂ extraction of antioxidants from *S. platensis*. About 10.26g/kg of extracts from *S. platensis* could be obtained under the optimum conditions of 48°C at 20MPa over a 4h period. The antioxidant activity of the extracts prepared under the optimized condition, determined by linoleic acid peroxidation inhibition method, was lower compared with BHT and Trolox, but significantly higher than α-tocopherol in 300min and after that became similar to α-tocopherol. The components of the extracts were further analyzed and the results showed that the extracts contained 85.1g/kg of flavonoids, 77.8g/kg of β-carotene, 113.2g/kg of vitamin A and 3.4g/kg of α-tocopherol, which may contribute greatly to their high antioxidant activity. The main fatty acids in the extracts were palmitic acid (35.32%), linolenic acid (21.66%) and linoleic acid (20.58%). Additional work is necessary to fractionate and identify the extracts further to elicit a better understanding of how each chemical fraction contributes to the overall antioxidant activity and whether the mixture of extracts contributes to a synergistic antioxidant activity [Wang Lin, Pan Bishu, Sheng Jianchun, Xu Juan and Hu Quihui, Antioxidant activity of *Spirulina platensis* extracts by supercritical carbon dioxide extraction, *Food Chem*, 2007, 105 (1), 36-41].

Neuroprotective mechanisms

**Bacopa monnieri** (Linn.) Penn.

Alzheimer’s disease is a neurodegenerative disorder characterized by progressive dementia. *Bacopa monnieri* (Linn.) Penn. is known as a therapeutically useful herb for the treatment of cognitive impairment, thus supporting its possible anti-Alzheimer’s properties. The studies carried out jointly by researchers at various institutes in USA have shown that *B. monnieri* reduces beta-amyloid deposits in the brain of an Alzheimer’s disease animal model. The objective of their study was to establish the presence of endogenous substances in *B. monnieri* extract (BmE) that will impact components of the oxidative stress cascade such as the reduction of divalent metals, scavenging of reactive oxygen species, alterations of lipoxygenase activity and hydrogen peroxide-induced lipid peroxidation. The extract contained polyphenols and sulfhydryl contents, suggestive of endogenous antioxidant activity. The results demonstrated that BmE reduced divalent metals, dose-dependently scavenged reactive oxygen species, decreased the formation of lipid peroxides and inhibited lipoxygenase activity. Thus, BmE treatment reduces beta-amyloid levels in the brain of an Alzheimer’s disease doubly transgenic mouse model of rapid amyloid deposition (PSAPP mice) suggesting mechanisms of action relevant to the treatment of Alzheimer’s disease [Dhanasekaran Muralikrishnan, Tharakan Binu, Holcomb Leigh A, Hitt Angie R, Young Keith A and Manyam Bala V, Neuroprotective mechanisms of ayurvedic antidementia botanical *Bacopa monnieri*, *Phytother Res*, 2007, 21 (10), 965-969].
Antipromastigote activity of the malabaricones of *Rampatri*

A major problem in the management of visceral leishmaniasis, especially in the Indian subcontinent, is the growing unresponsiveness to conventional antimonial therapy, indicating the urgent need to identify new antileishmanial compounds. The scientists at Department of Pharmacology, Institute of Postgraduate Medical Education and Research, Kolkata and Bio-Organic Division, Bhaba Atomic Research Centre, Mumbai, India, undertaken study to evaluate the antileishmanial activity of the fruit rind of *Myristica malabarica* Lam. (Hindi– Rampatri) that is used as a spice and is also credited with medicinal properties. The antipromastigote activity of different extracts/fractions and its constituent diarylnonanoids were evaluated in *Leishmania donovani* promastigotes (MHOM/IN/83/AG83) using the MTS-PMS assay. Preliminary screening of the ether extract (R1) with its crude methanol fraction (R2) and two fractions (R3 and R4) revealed that R2 had potent leishmanicidal activity (IC$_{50}$ 31.0 µg/mL), whereas R3 and R4 showed poor activity. Fractionation of R2 yielded four diarylnonanoids (malabaricones A-D, designated as Mal A, Mal B, Mal C and Mal D, respectively). The IC$_{50}$ values of Mal A-D were 16, 22, 27 and >50 µg/ml, respectively. The data suggested that the methanol extract of fruit rind, especially its constituent compounds, Mal A and Mal B, have promising antileishmanial activity meriting further investigations regarding the underlying molecular mechanism(s) of action with a view towards future drug development [Sen Rupashree, Bauri Ajay Kumar, Chattopadhyay Subrata and Chatterjee Mitali, Antipromastigote activity of the malabaricones of *Myristica malabarica* (rampatri), Phytother Res, 2007, 21(6), 592-595].

Antihypertensive effect of *Hibiscus sabdariffa* Linn. calyx

In West African folk medicine *Hibiscus sabdariffa* Linn. is used as an antihypertensive. Therefore, researchers working at various departments of Usman Danfodio University, Sokoto, Nigeria investigated the efficacy of an aqueous calyx extract of *H. sabdariffa* (HS) in two forms of experimental hypertension: salt-induced and l-NAME (N-l-arginine methyl ester)-induced and in normotensive controls. The blood pressure and heart rate fell dose-dependently in both the hypertensive and normotensive rats after intravenous injection of 1-125mg/kg of HS, suggesting that HS possesses antihypertensive, hypotensive and negative chronotropic effects. The fall in mean arterial pressure was significantly pronounced in the hypertensive rats (salt-induced: 94.4±8.6mm Hg; l-NAME-induced: 136.5±10.3mm Hg) than in the normotensive controls (50.2±5.1mm Hg; P<0.05). Thus, it provides further experimental evidence that justifies the folkloric use of this plant in the treatment of hypertension [Mojiminiyi FBO, Dikko M, Muhammad BY, Ojobor PD, Ajagbonna OP, Okolo RU, Igbokwe UV, Mojiminiyi UE, Fagbemi MA, Bello SO and Anga TJ, Antihypertensive effect of an aqueous extract of the calyx of *Hibiscus sabdariffa*, Fitoterapia, 2007, 78 (4), 292-297].
Adaptogenic and safety evaluation of Seabuckthorn leaf extract

The herbal formulations claimed to enhance physical endurance; mental functions and non-specific resistance of the body have been termed as adaptogens. During the stressful situations supplementation of various nutrients and single and poly-herbal preparation have been shown to increase stress tolerance. It has been hypothesized that plants growing in adverse climatic conditions of high altitude acquire bio-molecules which help them to sustain in such environment and supplementation of such plant products to the animals increase their performance during exposure to stressful cold and hypoxic environment. *Hippophae rhamnoides* Linn., commonly known as Seabuckthorn (Family—Elaeagnaceae) growing in North-West Himalayas at high altitude, 2100-4500m, is a dwarf to tall (90cm-4.5m), branched and thorny nitrogen fixing deciduous shrub, native to Europe and Asia. All parts of the plant are considered to be good source of a large number of bioactive substances.

The researchers at Department of Biochemical Pharmacology, Defence Institute of Physiology and Allied Sciences (DIPAS), Delhi, India examined the effects of seabuckthorn leaf aqueous extract in rats for its adaptogenic activity and toxicity. Dose dependent adaptogenic study of extract was carried out at different doses administered orally, 30min prior to cold (5°C)-hypoxia (428mmHg)-restraint (C-H-R) exposure. After sub-acute toxicity studies on 10 and 20 times doses of maximal effective dose administered for 14 days (single oral dose of 1g/kg and 2g/kg body weight doses, respectively), and biochemical and haematological parameters of the sub-acute drug treated animals in comparison to control rats. In acute toxicity study LD$_{50}$ of the extract was observed to be >10g/kg when given orally. These results indicated that seabuckthorn leaf aqueous extract possess potent adaptogenic activity with no toxicity even after sub-acute (30 days) maximal effective dose administration [Saggu S, Divekar HM, Gupta V, Sawhney RC, Banerjee PK and Kumar R, Adaptogenic and safety evaluation of seabuckthorn (*Hippophae rhamnoides*) leaf extract: A dose dependent study, *Food Chem Toxicol*, 2007, 45 (4), 609-617].

Antinociceptive activity of *Helicteres isora* Linn.

Scientists at G Pulla Reddy College of Pharmacy, Mehdipatnam, Hyderabad and University College of Pharmaceutical Sciences, Kakatiya University, Warangal, India studied *Helicteres isora* Linn. (Family — Sterculiaceae) root extracts for antinociceptive activity on acetic acid-induced writhing test in mice, at a dose of 250mg/kg. The aqueous ethanol, petroleum ether and chloroform extracts showed significant antinociceptive activity. Phytochemical analysis of the active extracts indicated that their major constituents are sterol, triterpenoids (petroleum ether extract) and their glycosides (chloroform and aqueous ethanol extracts), which may be responsible for observed pharmacological activity [Venkatesh Sama, Laxmi K Sai, Reddy B Madhava and Ramesh M, Antinociceptive activity of *Helicteres isora*, *Fitoterapia*, 2007, 78 (2), 146-148].
Anti-diabetic effects of Cichorium intybus Linn. in rats

The scientists at National University of Singapore, Singapore investigated the hypoglycaemic and hypolipidaemic properties of an ethanolic extract of Chicory, Cichorium intybus Linn. (CIE) which is widely used in India as a traditional treatment for diabetes mellitus. Male Sprague-Dawley rats aged 9 weeks (160-200g) were administered with streptozotocin (STZ, 50mg/kg) intraperitoneally to induce experimental diabetes. The Chicory whole plant was exhaustively extracted with 80% ethanol, concentrated at 40ºC using a rotavapor and freeze dried to get powder. Hypoglycaemic effects of CIE were observed in an oral glucose tolerance test in which, a dose of 125mg of plant extract/kg body weight exhibited the most potent hypoglycaemic effect. Moreover, daily administration of CIE (125mg/kg) for 14 days to diabetic rats attenuated serum glucose by 20%, triglycerides by 91% and total cholesterol by 16%. However, there was no change in serum insulin levels, which ruled out the possibility that CIE induces insulin secretion from pancreatic β-cells. In addition, hepatic glucose-6-phosphatase activity (Glc-6-Pase) was markedly reduced by CIE when compared to the control group. The reduction in the hepatic Glc-6-Pase activity could decrease hepatic glucose production, which in turn results in lower concentration of blood glucose in CIE-treated diabetic rats. Thus, the results support the traditional belief that C. intybus could ameliorate diabetic state [Pushparaj PN, Low HK, Manikandan J, Tan BKH and Tan CH, Anti-diabetic effects of Cichorium intybus in streptozotocin-induced diabetic rats, J Ethnopharmacol, 2007, 111(2), 430-434].

Physico-chemical, rheological and structural properties of fractionated potato starches

In an attempt to reveal whether behaviour differs between various granule size classes of potato starches, small (SGF), medium (MGF) and large (LGF) granule fractions were separated from the native starches of three potato cultivars and some of their physico-chemical and functional properties were studied by the scientists at Massey University, New Zealand and California State University, Los Angeles, USA. There was a significant variation in the granule size distribution of the native starches and their separated fractions, when studied using particle size analysis and scanning electron microscopy. The granule size ranges for LGF, MGF and SGF were 40-65, 20-40, and 1-20µm, respectively. The granule sizes in the fractions separated from the native starch of the cultivar ‘Kufri Ashoka’ were larger than in the corresponding fractions separated from the other two cultivars (‘Kufri Kunden’ and ‘Kufri Dewa’). For all three cultivars, LGF had higher amylose content and a lower swelling power than the corresponding MGF and SGF. The light transmittance and solubility of the native starches and their three fractions increased, while enzymatic digestibility decreased with the increase in granule size. Among the three fractions, pasting properties such as peak and final viscosities were observed to be lower for SGF, while peak viscosity temperatures were lower for LGF. The breakdown and setback in viscosity were observed to be highest for LGF and lowest for SGF, for all three cultivars. The lowest values of dynamic mechanical properties such as $G''$, $G'$, $\eta''$ and $\eta'$ were recorded for gels of native ‘Kufri Dewa’ starch and its fractions during frequency sweep testing on a dynamic rheometer. The textural attributes of the gels obtained from the