Hypoglycaemic Neem leaves

The hypoglycaemic activity of aqueous extract of Neem (Azadirachta indica A. Juss.) leaves showed moderate decrease in activity (11-24%) in albino male alloxan induced diabetic mice of 25-30g. In continuation of this finding recently the leaves have been examined for hypoglycaemic activity in streptozotocin induced glycaemia (diabetes) using animal models taking chlorpropamide (sulphonyl urea derivative) as a standard drug.

To evaluate the hypoglycaemic activity of leaf extract suspended in 2% w/v acacia solution studies were carried out on the variation of blood glucose level after the administration of streptozotocin in aqueous citrate buffer (pH 4.5) prepared just before the administration, injected intraperitoneally at a dose of 70 mg/kg body weight in white albino rats. A rest period of 2 days was observed after administration of streptozotocin.

At a dose of 300 mg/kg, the extract significantly lowered the blood glucose concentration in rats within 2 hours by 6% (P<0.01) with peak activity at 12 hours by 41% (P<0.001). However, the extract was more potent with maximum decrease of blood glucose level of 49% at a dose of 600 mg/kg body weight. The hypoglycaemic potential of the extract is found to be comparable to that of chlorpropamide in diabetic rats [Pal, Sci & Cult, 2001, 67(5-6), 173-174].

Hepatoprotective ethnomedicinal herbs

Achyranthes aspera Linn. and Tinospora cordifolia (Willd.)Miers. are used for hepatoprotective activity in Aravalli hills of Rajasthan, therefore, these have been scientifically evaluated by the scientists of M.L. Sukhadia University, Udaipur. The experiment has been done on Swiss albino mice (25 ± 5g body weight). The animals were divided into six groups of 5 each. Group I (control) was given liquid paraffin (1 ml/kg body weight). Group II received a single dose of CCl₄ (1 ml/kg body weight); group III-VI were given a single dose of CCl₄ (1 mg/kg body weight) followed by three doses of aqueous extract of whole plants at an interval of 8 hours. The first dose was administered after 30 minutes of CCl₄ treatment. Animals were sacrificed after 24 hours of last injection. Concentration of glutamate oxaloacetate transaminase (GOT), glutamate pyruvate transaminase (GPT) and alkaline phosphate (ALP) in blood serum was found reduced significantly in the groups treated with either of the plant extracts. Thus these two herbs could be useful for the treatment of liver disorders caused by hepatotoxic agents (Katewa & Arora, Indian Drugs, 2001, 38, 332-334).
Antihistaminic and mast cell stabilizing Striga

The ethanolic extract of the whole plant of *Striga gesneroides* Vatke is known to possess antidiabetic, anti-implantation, estrogenic, antiandrogenic and antibacterial activity. The plant contains flavonoids, apigenin and luteolin which are reported to inhibit basophil histamine release and neutrophil betaglucuronidase release and thereby possess *in vivo* antiallergic activity. Hence, the ethanolic and aqueous extracts of the plant have been screened for antihistaminic and mast cell degranulation properties. Both extracts inhibited histamine-induced contractions of the guinea-pig ileum at the concentration range of 2.5-25 mg/ml in a dose-related manner. At 25 mg/ml, both extracts inhibited the response of histamine (0.5 mg/ml) almost completely. The ethanolic extract at 100 and 200mg/kg body weight was found to significantly inhibit degranulation of mast cells to an extent of 52.14 ± 3.24 and 67.96 ± 3.70%, respectively. At the same doses, the aqueous extract showed 42.09 ± 2.91 and 60.67 ± 3.50% reduction in degranulation of mast cells, respectively (Harish et al., *J Ethnopharmacology*, 2001, 76, 197-200).

Anticonvulsant property of traditional medicine for epilepsy

The rhizomes of *Cyperus articulatus* Linn. are used as traditional medicine for epilepsy in Africa. Anticonvulsant property of the rhizome extract (methanolic) has recently been studied by scientists to explain its use in traditional medicine. The extract protected mice against maximal electroshock (MES)- and pentylenetetrazol (PTZ)-induced seizures. It also delayed the onset of seizures induced by isonicotinic acid hydrazide and strongly antagonized N-methyl-D-aspartate-induced turning behaviour. The ED₅₀ for protection against seizures was 306 (154-541) mg/kg intraperitoneally (i.p.) for the PTZ test; 1005 (797-1200) mg/kg i.p. for the MES test and for N-methyl-D-aspartate-induced turning behaviour was 875 (623-1123) mg/kg i.p. The methanolic extract also protected 54% of mice from seizures induced by strychnine at the dose of 1000 mg/kg i.p. These findings showed effect of this plant on central nervous system and validated its use in epilepsy (Burn et al., *J Ethnopharmacology* 2001, 76, 145-150).
Potent antifertility herb

In search of herbal antifertility agent, investigations were made on various solvent extracts of aerial parts of \textit{Rivea hypocrateriformis} Choisy which is found throughout India. Since ancient time this plant is used to prevent fertility in women, hence to confirm its antimplantation and pregnancy interruption efficacy study was done on female albino rats of wistar strain. The ethanol extract @400 mg/kg body weight has been found to be most effective in causing significant antimplantation and interruption of early pregnancy. The antifertility activity of ethanol extract was reversible on exogenous administration of hydroxyprogesterone. However, the same ethanol extract was found to be ineffective in interruption of late pregnancy (Shivalingappa, \textit{J Ethnopharmacology}, 2001, 74, 245-249).

Pharmacological activity of \textit{Cassia nigricans} leaves

The roots and leaves of \textit{Cassia nigricans} Vahl. have been used medicinally in Senegal and Guinea as a substitute for quinine for many years. The pulverized leaves are employed as appetizers and febrifuge, while the leaf decoction is used in treating fevers. A pinch of the ground leaves is taken with water for the treatment of peptic ulcers. Chidume and others from Nigeria evaluated the pharmacological effects of methanolic extract of the leaves in rabbits, mice and rats. The extract markedly protected rats against cold-stress and aspirin-induced gastric mucosal damage. The extract exhibited significant anti-inflammatory and anti-nociceptive activities in rats and mice, respectively. Furthermore, the extract decreased the amplitude of contraction of the isolated rabbit jejunum and inhibited histamine-induced contractions, but did not affect ACh induced responses. The intraperitoneal LD50 values of the extract was 210± 4.5 mg/kg in mice.


Hepatoprotective activity of \textit{Platycodon} roots

\textit{Platycodi Radix}, the root of \textit{Platycodon grandiflorum} A.DC. is commonly used as a traditional medicine. Extracts from the roots have wide ranging health benefits. In Korea, the root is used as a food and employed as a folk remedy for adult diseases such as, bronchitis, asthma and pulmonary tuberculosis, hyperlipidemia, diabetes, and inflammatory diseases, and as a sedative. It is also observed that the root helped prevent hypercholesterolemia and hyperlipidemia.

Lee and others from South Korea studied the \textit{Changkil} (the aqueous extract from the root, CK) on acetaminophen (APAP)-induced hepatotoxicity and the mechanism(s) underlying these protective effects in mice. The parameters analysed included the serum levels of alanine aminotransferase (ALT) and aspartate aminotransferase (AST) activity, hepatic glutathione (GSH) content, and histopathology of liver damage. The inhibition of P450 by \textit{Changkil} and the mechanisms of its protective action were also investigated.

The results indicate that CK pretreatment significantly protected against APAP induced hepatotoxities. The protection might be due to the blocking of the bioactivation of APAP by the inhibition of P450 IIA2 and P450 2E1 [Lee \textit{et al}, \textit{Cancer Letters}, 2001, 174(1), 73-81].

Antioxidative compound from a weed

\textit{Leonotis nepetefolia} Linn, a native to West Indies, South America and Africa is found as a weed in India and elsewhere. It has several medicinal properties including antimalarial and anticancer. The methanolic extract of the plant yielded acylated iridoids. Out of them 10-ol - (trans-caffeoyl) geniposidic acid showed a strong antioxidative activity [Narukawa \textit{et al}, \textit{Natural Med}, 2001, 55(2), 79-82].
**Prickly leaves heal wounds**

Prickly Poppy, *Argemone mexicana* Linn. is found throughout India as a weed chiefly in the fields of mustard. The seeds are toxic and the seed oil is adulterated with edible oils. The milky juice of the whole plant is used to relieve blisters, heal excoriations and indolent ulcers. To evaluate these properties scientifically, phytochemical investigation was done. Wound healing activity of the ethanolic crude extract of leaves was also studied on albino rats. The doses selected were the ED\(_{50}\) as determined in the acute toxicity studies, administered orally. Ethanol extract and its petroleum ether and butanol fractions exhibited significant wound healing activity. The enhanced wound healing activity may be attributed to the presence of sterols (Patil et al, *Indian Drugs*, 2001, 38, 288-293).

**Mint has male antifertility activity**

Mint, *Mentha arvensis* Linn. is known to be used as an abortifacient by tribal women. It is also known to be effective in the prevention and interruption of pregnancy in the experimental mammals. The effect of mint on male fertility was also studied and it is reported that the aqueous extract of the leaves possesses antispermatic activity. Recently investigation on the effect of petroleum ether extract of Mint leaves on fertility and toxicity in male albino mice has been done by Sharma and Jacob at University of Rajasthan. It is reported that at the doses of 10 and 20 mg/mouse per day for 20, 40 and 60 days, when administered orally, showed a dose and duration dependent reduction in the number of offspring of the treated male mated with normal females. Negative fertility was observed in both regimens after 60 days of treatment. The body weight and libido of the treated animals remained unaffected. However, a significant decrease in the weight of testis, epididymis, cauda epididymal sperm count, motility, viability and normal morphology of the spermatozoa was observed. The levels of serum protein, bilirubin, GOT, GPT and acid phosphatase, blood urea and haematological indices were unaltered throughout the course of investigation. All the altered parameters were reversible following withdrawal of treatment. Thus crude petroleum ether extract of Mint leaves possibly exerts a reversible antifertility (Sharma & Jacob, *J Ethnopharmacology*, 2001, 75, 5-12).

**Antioxidants from Sage**

Sage, *Salvia officinalis* Linn. is a common herb widely cultivated for culinary purposes; its well-known antioxidant properties are attributed mainly to the presence of carnosic acid and rosmarinic acid. Lu and Foo from New Zealand studied further antioxidants from sage. They isolated a rosmarinic acid dimer, salvianolic acid L and its two novel hydrolytic products. Salvianolic acid L showed potent antioxidant activity as assessed by its capacity to scavenge DPPH and superoxide anion radicals. A comparison of its potency with trolox with its activity expressed as EC\(_{50}\) and SOD (superoxide dismutase) equivalent activity (units/mg) was made.

Salvianolic acid L was a significantly better scavenger of these free radicals than trolox, caffeic acid and rosmarinic acid, the latter being the major phenolic antioxidant in sage [Lu & Foo, *Tetrahedron Letters*, 2001, 42(46), 8223-25].
Protective effect of *Cassia occidentalis* Linn. in cancer treatment

The aqueous extract of *Cassia occidentalis* Linn. is known to possess many medicinal properties including anti-mutagenic activity against benzo[a]pyrene (BaP) and cyclophosphamide (CP)-induced mutagenicity in mice. Recently a study has been done to find out its protective effect on cyclophosphamide-induced suppression of humoral immunity in mice. Cyclophosphamide was given intraperitoneally in a single dose of 50 mg/kg body weight. The administration of plant extract to CP-exposed animals resulted in improved humoral responses. *C. occidentalis* treatment significantly (P<0.01) enhanced plaque forming cell response in cyclophosphamide-treated animals. In quantitative hemolysis (QHS) assay also the plant showed protection in CP-treated animals. Bone marrow cell counts which were reduced in CP-treated animals were reversed significantly (P<0.01) to normal levels in CP+ plant extract group animals. Immunosuppression particularly of humoral immunity is known to be a common side effect of long-term CP-chemotherapy in cancer patients. Reduction of immunosuppressive effects may thus become beneficial to patients undergoing CP-chemotherapy. Therefore, in future this plant extract can be used to develop a protective agent for cancer patients (Bin-Hafeez et al, J Ethnopharmacology, 2001, 75, 13-18).

Cytotoxic constituents of *Psoralea*

The plant, *Psoralea corylifolia* Linn. is included in formulations of traditional medicine in the Southeast Asia as a prophylactic against osteoporosis caused by senescence, and for the treatment of impotence, premature ejaculation, cold, painful lower back, enuresis, alopecia, psoriasis, and vitiligo. As a part of research programme to discover potential anticancer agents of plant origin, Mar and others from South Korea investigated the ethyl acetate extract of seeds. The extract showed significant cytotoxic activity against the HT-29 and MCF-7 cancer cell line. Bioassay-guided fractionation led to the isolation of compound psoralidin as an active principle along with a marginally active compound angelicin. Psoralidin exhibited potent cytotoxic activity against the HT-29 (colon) and MCF-7 (breast) cancer cell lines with the IC$_{50}$ values of 0.3 and 0.4 µg/ml, respectively. Angelicin showed weak cytotoxicity against HT-29 (colon) and MCF-7 (breast) cancer cell lines with the IC$_{50}$ values of 17.7 and 11.9 µg/ml, respectively [Mar et al, Arch Pharm Res, 2001, 24(3), 211-13].
Antiviral activity of glucosides from Glossy privet

Ma and others studied the antiviral activity of the secoiridoid glucosides from the fruits of Glossy Privet *Ligustrum lucidum* Ait. Six secoiridoid glucosides, lucidumoside C, oleoside dimethylester, neonuezhenide, oleuopein, ligustroside and lucidumoside A are isolated.

The glucosides were examined in vitro for their activities against four strains of pathogenic viruses, namely herpes simplex type 1 virus (HSV-1), influenza type Avirus (Flu A), respiratory syncytial virus (RSV) and parainfluenza type 3 virus (Para 3). Antiviral activities were evaluated by the cytopathic effect (CPE) inhibitory assay.

Oleuropein showed significant antiviral activities against RSV and Para 3 with IC<sub>50</sub> value of 23.4 and 11.7 mg/ml respectively. Lucidumoside C, Oleoside dimethyl ester and ligustroside showed potent or moderate antiviral activities against Para 3 with IC<sub>50</sub> values of 15.6-20.8 mg/ml. None of the glucosides had any significant activity against HSV-1 and Flu A [Ma et al, Chem Pharm Bull, 2001, 49(11), 1471-73].

### Antimicrobial activity of Symplocus

The plant, *Symplocos cochinensis* (Louriero) S. Moore is used locally in Papua New Guinea to treat diarrhoea, dysentery, women's diseases, skin and general infections. Khan and others from Papua New Guinea studied the antimicrobial activity of the plant. The methanol extract of leaves, roots and stem bark and their petrol, dichloromethane, ethyl acetate fractions were screened for antimicrobial activity. All the crude extracts and fractions showed a broad-spectrum activity against all the tested bacteria and protozoan. Fractionation improved the level of activity in all cases [Khan et al, Fitoterapia, 2001, 72(7), 825-828].

### Anticholinesterase activity of alkaloids from Buxus

The plant, *Buxus papillosa* Schneid. finds extensive use in the treatment of various ailments such as rheumatism, skin disorders and venereal diseases. Rahman and others from Pakistan isolated triterpenoid alkaloids from the leaves of this plant.

These alkaloids were tested for acetyl cholinesterase and butyryl cholinesterase inhibitory activity. Inhibition of acetyl cholinesterase is considered as a promising approach for the treatment of Alzheimer’s disease and for therapeutic applications in the treatment of Parkinson's disease, ageing, and myasthenia gravis. Most of the alkaloids exhibited anticholinesterase activity [Rahman et al, Phytochemistry, 2001, 58(6), 963-68].

### Antiproliferative activity of Nam Ginseng

Ginseng refers to the roots and rhizomes of *Panax* species. They are widely used in Asian countries as a tonic for increasing mental efficiency, recovering physical balance, and stimulating metabolic function.

In Vietnam, Nam Ginseng (*Dracaena angustifolia* Roxb.) is used for same purpose. Its underground parts are used as a tonic and for treatment of leukaemia.

Tran and others isolated steroids and saponins from the plant and studied their antiproliferative activity. From the roots and rhizomes of Nam Ginseng three spirostanol steroids and fourteen steroidal saponins were isolated. All the compounds were tested for antiproliferative activity against human HT-1080 fibrosarcoma, murine colon 26-L5 carcinoma, and B-16 BL6 melanoma cell lines. The results suggest that the spirostanol saponins possess more potent antiproliferative activity than their furostanol counterparts. Four compounds showed potent antiproliferative activities against HT-1080 fibrosarcoma cells with IC<sub>50</sub> values of 0.2, 0.3, 0.6 and 3.8 mM, comparable to that of the positive control doxorubicin (IC<sub>50</sub>, 0.2 mM) [Tran et al, J Nat Prod, 2001, 64(9), 1127-32].
Antioxidant activity of the compounds from Deodar

Free radicals induce oxidative damage in biomolecules and play an important role in cardiovascular diseases, aging, cancer, inflammatory diseases, and a variety of other disorders. Antioxidants that scavenge free radicals are now known to possess preventive as well as therapeutic potential in free radical mediated disease conditions. Use of Deodar (Cedrus deodara (Roxb.) Loud.) is recommended in the Ayurvedic system of medicine for treatment of various ailments. The alcoholic extract of deodar is known to possess a variety of biological effects, such as anticancer, anti-inflammatory, diuretic, and spasmolytic activities. Tiwari and others from Indian Institute of Chemical Technology, Hyderabad studied free radical scavenging activities and constituents from deodar. The chloroform extract of heartwood powder showed strong antioxidant activity (Cedrus deodara Roxb.) on 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical. From this fraction three compounds with potent antioxidant activity were isolated in significant yields and were identified as (-)-matairesinol, (-)-nortrachelogenin, and a dibenzylbutyrolactol lignan [Tiwari et al., J Agric Food Chem, 2001, 49(10), 4642-45].

Antimalarial activity of ARTEMISINIC ACID derivatives

Malaria, an epidemic disease, has been the major cause of death in tropical regions of the world and new strains of drug-resistant Plasmodium falciparum are causing substantial deterioration in clinical situations. Artemisinin is a clinically important drug against chloroquine resistant strains of P. falciparum.

The biological activity and the challenging structure of artemisinin have prompted extensive synthetic efforts to disclose analogous that have more potency and better pharmacokinetic properties compared to the parent molecule, while retaining its biologically crucial endoperoxide functionality. In parallel with the efforts on the total synthesis of artemisinin via several routes a semisynthetic approach from artemisinic acid has recently gained attention due to the simplicity in promoting the conversion into artemisinin and its abundance in the plant compared to artemisinin.

Han and others modified artemisinic acid to afford 12 methyl artemisinate derivatives. Photo-oxidation of the derivatives yielded eight new artemisinin analogues. They also reported in vitro bioactivity of the derivatives against chloroquine-resistant Plasmodium strains.

The antimalarial activity of 13-nitromethylartemisinin was comparable to that of artemisinin among the prepared analogues. The compound also showed activity against the vinblastine-resistant KB-V cell-line with IC50 values of 5.1 and 5.4 ng/ml, with or without vinblastine, respectively [Han et al., J Nat Prod, 2001, 64(9), 1201-1205].

Anticancer activity of alkaloids from climbing Ylang-ylang

Climbing Ylang-ylang, Artabotrys uncinatus (Lam.) Merr. is used for treatment of human nasopharyngeal carcinoma in Taiwan. Hsieh and others from Taiwan isolated various alkaloids from the roots, stems and leaves of this plant and studied their cytotoxicity. The alkaloids isolated include an α,β-butenolide alkaloid, uncinine, two oxoaporphines, artabonatine C and artabonatine D, an oxazoaporphine, artabonatine E and a 7,7'-bisdehydro aporphine, artabonatine F along with some known alkaloids including atherospermidine and squamolone. Alkaloids were evaluated for their cytotoxicity against hepatocarcinoma cancer cell lines (Hep G2, and 2,2,15) and for antithrombin activity.

Among the alkaloids evaluated, atherospermidine and squamolone showed significant activity against both Hep G2 and 2,2,15 cell lines [Hsieh et al., J Nat Prod, 2001, 64(9), 1157-1161].
Biological activity of triterpenoid acids from red or yellow sentol

Red or yellow sentol (Sandoricum indicum Cav.) is used against colic and diarrhoea. Decoction of the bark drunk after childbirth. Tanaka and others isolated triterpenoid acids from the stem bark of this plant and studied their biological activities.

The triterpenoid acids were sandorinic acids A-C (1-3), koetjapic acid (4), 20-epikoetjapic acid (5), katonic acid (6), 3-oxoolean-12-en-29-oic acid (7) and 3-epikatonic acid (8). Among the isolated triterpenoid acids, sandorinic acids A-C were identified for the first time. All the compounds were evaluated for their inhibiting activity against several tumour cell lines and for their effects on lymphocyte proliferation. The triterpenoids (1, 2 and 6-8) showed inhibitory activity against lymphocyte proliferation (IC$_{50}$: 25-50 µg/ml for 1, 6, and 7; 50-75 µg/ml for 2 and 8). Compounds 1 and 7 exhibited cytotoxicity against human leukaemia HL-60 cells with an IC$_{50}$ value of 15 µg/ml for both compounds.

The cytotoxic activity of these compounds was also examined against murine leukaemia P388 cells. The compounds 6 and 7 exhibited selective toxicity against vincristine resistant P388 cells, while compound 1 was cytotoxic against all studied cell lines and compound 2 showed more cytotoxic potency against adriamycin and vincristine resistant P388 cells than against sensitive P388 strain [Tanaka et al., J Nat Prod, 2001, 64(9), 1243-45].

Cytotoxicity of Rhamnus nepalensis

Ethyl acetate extract of the fruits of Rhamnus nepalensis Wall. ex M. Laws. collected from Vietnam was found to be cytotoxic to the KB cell line. Mai and others studied further the extract and the bioassay-guided fractionation of an extract of the fruit led to the isolation of 21 anthraquinones and anthrones. They studied the cytotoxicity of these compounds. The isolated compounds include rhamnosylanthaquinone, 3'-O-acetyllfrangulin A, rhamnosylanthrones, the prinoidin-emodin bianthrones, the prinoidin bianthrones, and the rhamnepalins.

Among the compounds tested for cytotoxicity prinoidin was 4 times more potent than the standard, doxorubicin. Chrysophanol bianthrone was as active as doxorubicin, whereas its isomer was six times less active. When evaluated in vivo, prinoidin was toxic when administered as a single intraperitoneal dose of 10 mg/kg to two mice grafted i.v. with P388 leukaemia cells, with mice dying 2 days early after the injection. The medium dose of 5 mg/kg allowed the two mice to survive for 4 days, and the lower dose of 2.5 mg/kg proved inactive, the mice surviving 7 days [Mai et al., J Nat Prod, 2001, 64(9), 1162-68].

Immunomodulatory activity of glycosides from Dendrobium

Stems of Dendrobium nobile Lindl. are a renowned traditional Chinese medicine used as a tonic, and extracts of the plant have been reported to possess immunostimulant activity. Zhao and others isolated three sesquiterpene glycosides, named dendroside A, dendronobilosides A and -B from the stems of this plant and evaluated their immunomodulatory activities.

In a pharmacological evaluation it was found that dendroside A stimulated significantly the proliferation of T lymphocytes of mice at concentrations of 1×10$^{-7}$M. Dendroside A and dendronobiloside A stimulated significantly the proliferation of B lymphocytes of mice at concentrations of 1×10$^{-5}$ and 1×10$^{-6}$ M, respectively. In contrast, dendronobiloside B was found to inhibit the proliferation of T lymphocytes of mice at concentrations of 1×10$^{-5}$, 1×10$^{-6}$, and 1×10$^{-5}$ M. Astragaloside I was used as a positive control and exhibited stimulant activity toward the proliferation of T and B lymphocytes at concentrations of 1×10$^{-5}$ and 1×10$^{-6}$ M [Zhao et al., J Nat Prod, 2001, 64(9), 1196-1200].