Hypercholesterolemia, low HDL-C and oxygen radicals have been implicated in the development of atherosclerosis. Lignan complex isolated from Flaxseed (*Linum usitatissimum* Linn., Linseed, Hindi — *Alsi*) contains secoisolariciresinol diglucoside (SDG), 3-hydroxy-3-methylglutaric acid (HMGA) and cinnamic acids. SDG and cinnamic acids are antioxidants and HMGA is a hypocholesterolemic agent. Antioxidants are known to reduce hypercholesterolemic atherosclerosis. Researchers at Department of Physiology, College of Medicine, University of Saskatchewan, Saskatoon, Sask, Canada carried out studies to determine if lignan complex reduces (i) serum cholesterol, (ii) oxidative stress, and (iii) atherosclerosis in hypercholesterolemic rabbits. Rabbits were assigned to four groups: Group I, control; Group II, lignan complex control (lignan complex, 40mg/kg body wt daily orally); Group III, 0.5% cholesterol; Group IV, 0.5% cholesterol diet+lignan complex, (40mg/kg body wt daily orally). Blood samples were collected before (time 0) and after 1 and 2 months of experimental diets for measurement of serum triglycerides (TG), total cholesterol (TC), LDL-C, HDL-C and serum malondialdehyde (MDA), a lipid peroxidation product. At the end of the protocol, the aorta was removed for measurement of atherosclerotic plaques, MDA and aortic tissue chemiluminescence (Aortic CL), a marker of antioxidant reserve. Rabbits in Group III developed atherosclerosis (50.84±6.23% of the intimal surface of the aorta was covered with atherosclerotic changes) which was associated with an increase in the serum TG, TC, LDL-C, HDL-C, MDA and aortic MDA and antioxidant reserve. Lignan complex reduced the development of atherosclerosis by 34.37% and this was associated with a decrease in serum TC by 20%, LDL-C by 14%, TC/HDL-C by 34%, serum MDA by 35% and aortic MDA by 58%. Serum HDL-C was elevated by 30% in hypercholesterolemic rabbits and by 25% in normocholesterolemic rabbits with lignan complex. Lignan complex did not affect the TC and LDL-C and serum MDA in the normocholesterolemic rabbits. However, it increased the aortic MDA in the normocholesterolemic rabbits. 

The results suggest that diet-induced hypercholesterolemic atherosclerosis is associated with an increase in the oxidative stress and that lignan complex reduced the extent of atherosclerosis by reducing oxidative stress and serum total cholesterol, LDL-C and TC/HDL-C ratio, and raising serum HDL-C. Lignan complex isolated from flaxseed may, therefore, be beneficial in preventing hypercholesterolemic, atherosclerosis and reducing risk factors for coronary artery disease [Prasad Kailash, *Hypocholesterolemic and antiatherosclerotic effect of flax lignan complex isolated from flaxseed*, *Atherosclerosis*, 2005, 179(2), 269-275].

A flavonoid from *Phyllanthus urinaria* blocks hepatitis B virus-e antigen

Infection with hepatitis B virus (HBV) is a major worldwide health problem with over 300 million individuals chronically infected with HBV. A continuous development of new antiviral drugs to eradicate HBV in chronic carriers is still urgently needed. It has been reported that the water extract of *Phyllanthus urinaria* Linn. (Hindi — *Lal-bhuin anvalah*), which grows in Korea and China, showed an anti-HBV effect. In this study, researchers at Bioscience Research Division, Korea Research Institute of Bioscience and Biotechnology, Taejon, Republic of Korea isolated and characterized a functionally unique anti-HBV substance, ellagic acid isolated from *P. urinaria*. Ellagic acid showed a strong inhibitory effect on HBeAg secretion in the HepG2 2.2.15 cell line. This is the first report of the isolation of the active anti-HBV substance, ellagic acid, isolated from *P. urinaria*, an inhibitor of HBeAg secretion. It may be used as a therapeutic in immune tolerance, which causes hepatitis and HCC in HBV-chronic carriers. The newly identified functionally active anti-HBV substance ellagic acid might be used as a therapeutic in immune tolerance phenomena occurring in HBV-chronic carriers. The finding suggests that host immune tolerance induced by HBeAg during HBV infection might be overcome by ellagic acid and thus this compound as a therapeutic could be explored [Shin Min Soo, Kang Eun Hwa and Lee Young Ik, *A flavonoid from medicinal plants blocks hepatitis B virus-e antigen secretion in HBV-infected hepatocytes*, *Antiviral Res*, 2005, 67(3), 163-168].
Mushrooms have been used as food and food-flavouring material in soups and sauces for centuries, due to their unique and subtle flavour. Mushrooms have recently become attractive as functional foods and as a source of physiologically beneficial medicine. Three species of mushroom mycelia are commercially available in Taiwan, namely Grifola frondosa (Dickson: Fries) Gray (Maitake), Morchella esculenta (Linn.: Fries) Persoon (Morel), and Termitomyces albuminosus (Berkeley & Broome) Hein (Termite mushroom). Researchers from Taiwan conducted studies to evaluate the antioxidant properties of methanolic extracts from these three mycelia, including antioxidant activity, reducing power, scavenging effects on radicals, and chelating effects on ferrous ions. The contents of potential antioxidant components in methanolic extracts from these mycelia were also determined.

Methanolic extracts from the three mycelia showed high antioxidant activities (85.4-94.7%) at 25 mg/ml. Reducing powers of the three methanolic extracts were 0.97-1.02 at 25 mg/ml. Scavenging effects on 1,1-diphenol-2-picrylhydrazyl radicals were 78.8-94.1% at 10 mg/ml. These three mycelia showed no scavenging effect on hydroxyl radicals. Chelating effects on ferrous ions were high (90.3-94.4%) at 10 mg/ml. Total phenols were the major naturally occurring antioxidant components found in methanolic extracts. Contents of ascorbic acid and tocopherols were similar for these three mycelia. All EC_{50} values were below 10 mg/ml, indicating that the three mycelia had good antioxidant properties except for the scavenging effect on hydroxyl radicals. On the basis of the results obtained, these three mycelia might be somewhat beneficial to the antioxidant protection system of the human body. For application in the food industry, the fractionation of methanolic extracts and further identification are areas of further investigation.

The leaf of Bryophyllum pinnatum (Lam.) Kurz (Hindi — Zakham-haiyat) is popularly extracted with cold water and used to reduce the blood pressure and heart rate in Southwestern Nigeria. Moreover, neurosedative effects are being claimed for the aqueous leaf extract of this plant. Thus, saline leaf extract of B. pinnatum was investigated by Scientists of Lagos State University College of Medicine, Ikeja, Lagos, Nigeria on neuro-pharmacological activities to ascertain claims of local use. When tested in mice, it produced a dose-dependent prolongation of onset and duration of pentobarbitone-induced hypnosis, reduction of exploratory activities in the head-dip and evasion tests. Moreover, a dose-dependent muscle incoordination was observed in the inclined screen, traction and climbing tests. It delayed onset to convulsion in both Strychnine- and Picrotoxin-induced seizures in addition to minimal protection against Picrotoxin seizures. These results suggest that B. pinnatum extract possesses remarkable central depressant, skeletal muscle and minor anticonvulsant actions with an acute toxicity higher than 500 mg/kg and 2000 mg/kg when given intraperitoneally and orally, respectively [Yemitan OK and Salahdeen HM, Neurosedative and muscle relaxant activities of aqueous extract of Bryophyllum pinnatum, Fitoterapia, 2005, 76(2), 187-193].
Therapeutics

Hepatoprotective activity of vasaka leaf extract

Vasaka, _Adhatoda zeylanica_ Medic. syn. _A. vasica_ Nees grows in most parts of India, especially in the lower Himalayan area, and has been commonly used in Indian traditional medicine for thousands of years. Its leaves are used in cough and asthma, bronchitis, tuberculosis, inflammation, allergy and as an antitussive. Bhattacharya and others investigated hepatoprotective activity of its leaves. Acute hepatotoxicity was induced in rats by intraperitoneal injection of D-galactosamine at a dose of 200 mg/kg. Aqueous extracts of leaves showed significant hepatoprotective effect at doses of 50-100 mg/kg, p.o., on liver damage induced by D-galactosamine in rats. The results support the use of the plant as a hepatoprotective element in traditional medicine [Bhattacharyya Dipankar, Pandit Srikanta, Utpalendu Jana, Sen Suva and Sur Tapas K, Hepatoprotective activity of _Adhatoda vasica_ aqueous leaf extract on D-galactosamine-induced liver damage in rats, _Fitoterapia_, 2005, 76 (2), 223-225].

Antioxidant activity of water extract of _Scoparia dulcis_

Sweet Broomweed, _Scoparia dulcis_ Linn. is used as an analgesic and antipyretic, and in the treatment of diabetes mellitus, gastric disorders, bronchitis, hypertension, hemorrhoids, unspecified urinary ailments and insect bites. It also showed antidiuretic activity in rats with no adverse effects. Researchers of Sri Lanka studied the antioxidative potentiality of plant. An aqueous extract of _S. dulcis_ showed marked antioxidative activity in vitro. These results suggest that at least some of its therapeutic indications claimed by traditional physicians may be mediated via its antioxidant activity [Ratnasooriya WD, Jayakody JRC, Premakumara GAS and Edirweera ERHSS, Antioxidant activity of water extract of _Scoparia dulcis_, _Fitoterapia_, 2005, 76 (2), 220-222].

Antifilarial activity of neem on cattle filarial parasite _Setaria cervi_

_Azadirachta indica_ A. Juss. (Neem) is a large evergreen tree, 12 to 15 m in height, common throughout the greater parts of India and Burma. Almost every part of this tree is used for medicinal purposes in India. Leaves, roots, stem have been used as antimalarial, antioxidant, antifungal, antiinflammatory, antibacterial, antiviral and for several other medicinal purposes in Ayurvedic system of medicine.

Alcohol and aqueous extracts of the flowers of _A. indica_ were tested in vitro by researchers at Aligarh Muslim University, Aligarh, India for their potential antifilarial activity against whole worm, nerve muscle (n.m.) preparation and microfilariae of _Setaria cervi_. The effects of alcohol and aqueous extracts were similar in nature on the spontaneous movements of whole worm and nerve muscle preparation. On the whole worm, the response was characterized by initial increase in tone, rate and amplitude of contractions followed by reversible paralysis. The initial stimulant effect is likely to be due to irritant effect on the cuticle. Nerve muscle preparation responded to both extracts by inhibition of spontaneous movements followed by reversible paralysis; initial stimulation phase was absent. The inhibition was concentration related. Alcohol and aqueous extracts had almost similar lethal effect on the microfilariae of _S. cervi_, the LC_{50} being 15 and 18 ng/ml, respectively [Mishra Vandna, Parveen Nazneen, Singhal KC and Khan Nizam U, Antifilarial activity of _Azadirachta indica_ on cattle filarial parasite _Setaria cervi_, _Fitoterapia_, 2005, 76 (1), 54-61].
Vasodilator activity of the aqueous extract of *Viscum album*

*Viscum album* Linn., commonly known as Mistletoe, is an evergreen parasitic plant widely distributed throughout the globe. It was firstly used for the treatment of epilepsy and dermatitis in Europe. Later, it was believed to have hypotensive, vasodilator, cardiac depressive, sedative, antispasmodic, anticancer and antidiabetic activities. This study conducted by scientists at Department of Pharmacology, National Institute of Cardiology “Ignacio Chávez”, Mexico is an attempt to elucidate the vasodilating activity and a possible mechanism using the Langendorff’s isolated and perfused heart model.

The aqueous extract of leaves showed a significant coronary vasodilator activity on the Langendorff’s isolated and perfused heart model. The data obtained suggest that the aqueous extract of leaves contains some biologically active principles that may act as inducers of the nitric oxide/soluble guanylate cyclase pathway.

It is observed that the aqueous extract of leaves, at a dose 0.8 mg/kg of guinea pig heart, possesses significant vasodilator activity on the Langendorff’s isolated and perfused heart model. The result of this study seems to support that the vasodilator effect of the aqueous extract is due to the increase in nitric oxide [Tenorio FA, Valle L del, González A and Pastelin G, Vasodilator activity of the aqueous extract of *Viscum album*, *Fitoterapia*, 2005, 76 (2), 204-209].

Antispasmodic and hypotensive effects of *Asafoetida* gum extract

The scientists at Department of Physiology and Pharmacology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran performed studies for examining the folkloric claims regarding the beneficial effects of gum (Hindi — *Hing*) obtained from *Asafoetida, Ferula asafoetida* Linn. in gastrointestinal and haemodynamic disorders. The effects of the gum extract on the contractile responses of guinea-pig ileum induced by various stimuli (*in vitro*), and on blood pressure recorded from the anaesthetised rats (*in vivo*) have been reported. The results demonstrated that *Asafoetida* gum extract is effective in reducing blood pressure in anaesthetised normotensive rats. This effect is shown to be dose-related and rapid in onset. At higher doses, the duration of the depressor response to the gum extract was long-lasting. Taken together, the relaxatory effects of the gum extract on vascular smooth muscle as well as on ileum smooth muscle may suggest that, this natural product reduce the cytosolic Ca²⁺ in a non-specific manner [Fatehi Mohammad, Farifteh Freshteh and Fatehi-Hassanabad Zahra, Antispasmodic and hypotensive effects of *Ferula asafoetida* gum extract, *J Ethnopharmacol*, 2004, 91 (2-3), 321-324].
Antidiabetic and antihyperlipidaemic potential of Jamun seeds

Syzigium cumini (Linn.) Skeels (Hindi — Jamun) seeds have been used by natives in the treatment of diabetes. The hypoglycaemic and antioxidant properties of an aqueous extract of seeds in experimental diabetic rats have already been reported by the scientists at Department of Biochemistry, Annamalai University, Annamalai Nagar, Tamil Nadu, India. An attempt to evaluate the antidiabetic and antihyperlipidaemic actions of alcoholic extract of Jamun seed extract at different doses on blood glucose, serum and tissue lipids in alloxan diabetic rats was made by the same group of researchers. During experiment diabetes was induced by single intraperitoneal injection of alloxan (150mg/kg body wt). Oral administration of alcoholic seed extract to diabetic rats at a dose of 100mg/kg body wt resulted in a significant reduction in blood glucose and urine sugar and lipids in serum and tissues in alloxan diabetic rats. The extract also increases total haemoglobin. The extract brought back all the parameters to normal levels. The effect of alcoholic seed extract was similar to that of insulin [Stanely Mainzen Prince P, Kamalakkanan N and Menon Venugopal P, Antidiabetic and antihyperlipidaemic effect of alcoholic Syzygium cumini seeds in alloxan induced diabetic albino rats, J Ethnopharmacol, 2004, 91(2-3), 209-213].

Antiulcer activity of Utleria salicifolia rhizome extract

Utleria salicifolia Bedd. ex. Hook. f. (Family — Periplocaceae) is a branched shrub endemic to South Western Ghats of peninsular India. The Malasar and Kadar tribes of the region use the tuber chips boiled in water for the preparation of pickles which are said to be good for intestinal ailments like colic and bleeding due to ulcer. To support this traditional claim scientifically, the scientists at National Botanical Research Institute, Lucknow and Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, Kerala, India evaluated the effect of the extract of tubers of this plant (USE) on physical and chemical factors induced gastric ulceration in rats.

The effect of 50% ethanolic extract was assessed in different acute and chronic gastric ulcer models in rats. 50-200mg/kg extract administered orally, twice daily for 5 days showed dose-dependent ulcer protective effect in pylorus ligation (14.48-51.03% protection, P<0.5 to P<0.01), aspirin (28.80-56.52% protection, P<0.5 to P<0.05), ethanol (13.22-60.74% protection, P<0.05 to P<0.001), cold-restraint stress (21.22-77.14% protection, P<0.05 to P<0.001), and acetic acid (20.0-84.37% protection, P<0.5 to P<0.001)-induced acute and chronic ulcers. The extract also significantly (P<0.001) reduced the ulcer incidence (50 and 10%) and severity (67.83 and 91.34% protection) of duodenal ulcer, induced by cysteamine. Besides it offered protection (53.52 and 60.58%) against ethanol-induced depletion of gastric wall mucus [Rao Ch V, Ojha SK, Radhakrishnan K, Govindarajan R, Rastogi S, Mehrotra S and Pushpangadan P, Antiulcer activity of Utleria salicifolia rhizome extract, J Ethnopharmacol, 2004, 91(2-3), 243-249].

Antihepatotoxic effect of Phyllanthus maderaspatensis Linn.

Antihepatotoxic and choleretic activities of Phyllanthus maderaspatensis Linn. (whole plant extracts) was evaluated by the researchers at Division of Molecular Ethnopharmacology, Rajiv Gandhi Centre for Biotechnology, Kerala, India in rats. The plant extracts (200mg/kg, n-hexane, ethyl alcohol or water) showed a remarkable hepatoprotective activity against acetaminophen-induced hepatotoxicity as judged from the serum marker enzymes. The effect of n-hexane extract was found to be concentration-dependent. This extract also exhibited choleretic activity in normal rats, and in vitro hydroxyl radical scavenging activity and inhibition of lipid peroxidation [Asha VV, Akhila S, Wills PJ and Subramoniam A, Further studies on the antihepatotoxic activity of Phyllanthus maderaspatensis Linn., J Ethnopharmacol, 2004, 92(1), 67-70].
The antioxidant effect of aqueous extract of the bark of Banyan tree, *Ficus bengalensis* Linn. (Hindi — Bar or Vat) has been evaluated by the researchers at Department of Biochemistry, University College of Medical Sciences and G.T.B. Hospital, Shahdara, Delhi, India in hypercholesterolaemic rabbits. Rabbits were divided into three groups, Group I served as healthy control; Groups II and III were made hypercholesterolaemic by feeding cholesterol suspended in groundnut oil (100mg/kg body wt per day) for 6 weeks. Rabbits of Group III received water extract of the bark at a dose of 50mg/kg body wt per day in addition to cholesterol suspended in oil. Feeding cholesterol increased serum cholesterol, triacylglycerol and LDL+VLDL-cholesterol significantly in Group II as compared to Group I (\(P=0.001\)). Treatment with water extract decreased the serum cholesterol level by 59%, triacylglycerol by 54% and LDL+VLDL-cholesterol by 60% in Group III as compared to Group II. In addition, treatment with this extract led to a decrease in lipid peroxidation as evidenced by fall in thiobarbituric acid reactive substances with a corresponding increase in blood glutathione content (\(P=0.001\)). Further, there was significant increase in the activities of antioxidant enzymes; superoxide dismutase (\(P<0.001\)), catalase (\(P<0.03\)), glutathione peroxidase (\(P=0.03\)) and glutathione reductase (\(P<0.01\)); which were depressed in Group II rabbits after cholesterol feeding. Thus, the water extract of the bark of Banyan tree has significant antioxidant effect, in addition to hypolipidaemic effect [Shukla Rimi, Gupta Shweta, Gambhir JK, Prabhu KM and Murthy PS, Antioxidant effect of aqueous extract of the bark of *Ficus bengalensis* in hypercholesterolaemic rabbits, *J Ethnopharmacol*, 2004, *92*(1), 47-51].

The scientists at France evaluated the pharmacological effects of *Fraxinus excelsior* and *Silybum marianum* on blood glucose levels in both normal and streptozotocin (STZ) diabetic rats. The effects of FE and SM were compared with sodium-vanadate as a reference hypoglycaemic drug. Since there is no standard therapeutic dose of any hypoglycaemic drug in the streptozotocin rat model used for analysis of hypoglycaemic effect of medicinal plants, the dose of sodium-vanadate used in this study was selected to be between low doses without significant hypoglycaemic effects and very high doses which caused severe hypoglycaemia in diabetic rats. The effect of *F. excelsior* and *S. marianum* on basal plasma insulin concentrations was also analysed in order to determine a probable mechanism of action of these plants. Finally, the eventual changes of rat body weight were followed after long term *F. excelsior* or *S. marianum* administration. After a single dose or 15 daily doses, oral administration of the aqueous extracts (20mg/kg) produced a significant decrease of blood glucose levels in both normal and STZ diabetic rats (\(P<0.001\)). From the first week, the body weight was increased in normal rats (\(P<0.05\)) and decreased in STZ rats (\(P<0.01\)) after *F. excelsior* administration. In addition, no changes were observed in basal plasma insulin concentrations after both *F. excelsior* seed and *S. marianum* treatments in either normal and STZ diabetic rats indicating that these plants exert their pharmacological activity without affecting insulin secretion. In conclusion, the aqueous extracts of *F. excelsior* seed and *S. marianum* aerial part are potent hypoglycaemic agents in normal rats and anti-hyperglycaemic solutions in STZ diabetic rats without affecting insulin secretion [Maghrani M, Zeggwagh NA, Lemhadri A, El Amraoui M, Michel JB and Eddouks M, Study of the hypoglycaemic activity of *Fraxinus excelsior* and *Silybum marianum* in an animal model of type 1 diabetes mellitus, *J Ethnopharmacol*, 2004, *91*(2-3), 309-316].

**Hypoglycaemic activity of *Fraxinus excelsior* Linn. and *Silybum marianum* Gaertn.**
Pomegranate extract improves a depressive state and bone properties in menopausal syndrome

Administration of pomegranate extract (juice and seed extract) for 2 weeks to ovariectomized mice prevented the loss of uterus weight and shortened the immobility time compared with 5% glucose-dosed mice (control). In addition, ovariectomy-induced decrease of BMD was normalized by administration of the pomegranate extract. The bone volume and the trabecular number were significantly increased and the trabecular separation was decreased in the pomegranate-dosed group compared with the control group. Some histological bone formation/resorption parameters were significantly increased by ovariectomy but were normalized by administration of the pomegranate extract. These changes suggest that the pomegranate extract inhibits ovariectomy-stimulated bone turnover. It is thus conceivable that pomegranate is clinically effective on a depressive state and bone loss in menopausal syndrome in women [Mori-Okamoto Junko, Otawara-Hamamoto Yoko, Yamato Hideyuki and Yoshimura Hiroyuki, Pomegranate extract improves a depressive state and bone properties in menopausal syndrome model ovariectomized mice, *J Ethnopharmacol*, 2004, **92** (1), 93-101].