

Insecticide/Pesticide

Pesticidal potential of congress grass

The pesticidal properties of crude petroleum ether extract of the aerial parts of Congress Grass, *Parthenium hysterophorus* Linn. has been evaluated by the scientist of Guru Nanak Dev University, Amritsar. The experiment conducted on the adults of mustard aphid, *Lipaphis erysimi* showed that the extract possess significant activity and decreased the life span of mustard aphid and progeny production. Among the plant parts tested, the leaf extract exhibit maximum effect in causing dose dependent reduction in both the life span and progeny production [Sohal *et al*, *J Envir Biol*, 2002, 23(1), 15-18].

Oil/Fats

Oil extraction from watermelon seeds

The scientists at Tamil Nadu Agricultural University, Coimbatore, attempted to extract oil from watermelon seeds with and without hulls using hydraulic press. Highest yield of 85.8% of the available oil was obtained when the melon seed was pressed with hulls at a pressure of 30 mPa at temperature of 120°C having 10% moisture content. The properties like FFA content (2.24%), specific gravity (0.934) and refractive index (1.623) were not affected by the process conditions [Varadharaju & Sreenarayanan, *J Instn Engrs India* (pt AG), 2001, 82(Dec), 38-40].

Therapeutics

Free radical scavenging properties of resveratrol

Resveratrol (3,4', 5-trihydroxystilbene) is reported to give protection against atherosclerosis, inhibits copper ion-induced and azo compound-initiated oxidative modification of human LDL and has cancer chemopreventive potential.

The natural resveratrol has been isolated from many plants which are included in the human diet, such as mulberries,

peanuts and grapes. In grapevine it is found in higher quantity.

On the basis of the reported uses of resveratrol, Acquaviva and his team in Italy investigated the free radical scavenging capacity of resveratrol isolated from redwine (*Vitis vinifera* Linn.) on male wistar rats. They also studied its effects on xanthine oxidase (XO) activity, spontaneous membrane lipid oxidation and DNA cleavage. Resveratrol

showed a dose-dependent free radical scavenging activity, significant inhibition of XO activity, an anti-lipoperoxidative capacity and a protective effect on DNA cleavage. The antioxidant capacity of resveratrol is ascribed to the concomitant activities of scavenging free radicals, metal chelating, and inhibition of some enzymes involved in free radical generation [Acquaviva *et al*, *J Food Sci*, 2002, 67(1), 137-141].

***Lansium domesticum*: extracts are active towards a chloroquine-resistant strain of *Plasmodium falciparum* parasite**



The development of new, potent, and cheap antimalarials from natural products should be a global priority today if malaria is to be controlled in the near future. With the exception of the artemisinins and new combinations of existing drugs, there are few new antimalarial drugs being developed that are both cost-effective and have potent activity towards the drug-resistant variants of the parasite. The identification of natural product preparations used against malaria in traditional medicine is also likely to lead to compounds or classes of compounds that can be developed as new antiplasmodials.

Seed, leaf, and fruit skin extracts of *Lansium domesticum* Correa, a common fruit tree in South-East Asia, are used by indigenous tribes of Sabah, Malaysia for treating malaria. The fruit skin and aqueous leaf extracts of the tree were found to reduce parasite populations of the drug sensitive strain (3D7) and the chloroquine-resistant strain (T9) of *P. falciparum* equally well. The skin extracts were also found to interrupt the lifecycle of the parasite.

The fruit are acidic or sweet depending on the variety and local growing conditions, and are generally eaten directly. The dried peel is burnt as a mosquito repellent in parts of Java. Researchers at the Institute of Health and Community Medicine, Malaysia examined the antimalarial activity of the extracts *in vitro* to determine if these extracts had activity against the CQ-resistant strain of *P. falciparum*, T9. The results revealed that these extracts possess activity against the parasite (Yapp & Yap, *J Ethnopharmacology*, 2003, **85**, 145-150).

Chemopreventive ability of *Calumbae Radix*

Colorectal cancer is the third most common malignant neoplasm in the world. Primary prevention including chemoprevention against this malignant neoplasm is important. It is well known that dietary factors can modulate the development of certain types of human cancer including colorectal cancer. Several traditional medicines and their constituents could inhibit chemical carcinogenesis.

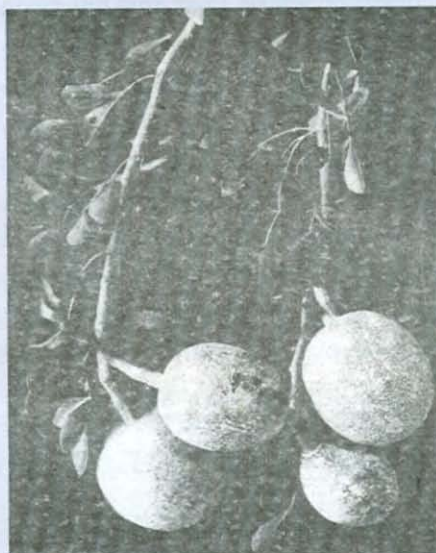
Kohno and others from Japan investigated the possible modifying effect of columbin isolated from root of *Jateorhiza columba* Miers on the development of azoxymethane (AOM)-induced colon carcinogenesis in male F344 rats. The expression of biomarkers such as the number of AgNORs per nucleus in the colonic mucosa and the blood polyamine level were also assayed.

Animals were initiated with AOM (three weekly subcutaneous injections of 15 mg/kg body weight) to induce colonic neoplasms. They were fed the experimental diets mixed with columbin (4, 20, and 100 ppm) for 4 weeks, starting 1 week, before the first dosing of AOM and thereafter maintained on the basal diet without columbin. Additional experimental groups included the AOM alone group, the columbin alone group (100 ppm in diet for 4 weeks), and the untreated control group. Dietary feeding of columbin (4, 20, and 100 ppm) during the initiation phase of AOM-induced colon carcinogenesis reduced the incidence and multiplicity of colonic adenocarcinoma and the inhibition by feeding of 20 ppm and 100 ppm columbin was significant when compared with the AOM alone group. Also, columbin administration in diet lowered the number of argyrophilic nucleolar organizer regions protein per nucleus in non-lesional colonic crypts and the blood polyamine content, which are reflected in cell proliferation activity. These results indicate chemopreventive ability of dietary columbin against chemically induced colon tumorigenesis when fed during the initiation phase, providing a scientific basis for chemopreventive ability of columbin against human colon cancer (Kohno *et al*, *Cancer Lett*, 2002, **183**, 131-139).

Antimicrobial activity of elephant apple

Elephant apple [*Feronia limonia* (Linn.) Swingle] is a moderate-sized tree widely distributed throughout Bangladesh, India, Sri Lanka and Java (Indonesia). The fruits are edible and considered to be a stomachic, astringent, diuretic, cardi tonic and tonic to the liver and lungs; the leaves are aromatic and carminative and are used for the treatment of indigestion and minor bowel infections of children; the roots are sometimes given as antidote to snake-bites.

Rahman and Gray from Department of Pharmaceutical Sciences, Glasgow, UK isolated the antimicrobial constituents from the stem bark of this plant. From the stem bark pyranoflavanone (1), diprenylated flavanone (2), 7-



hydroxy coumarin (3), acridone alkaloid (4), epidioxy sterol (5) and a lignan (6) were isolated. Microdilution titre technique was used to determine the

antimicrobial activities as well as MICs of the metabolites against *Staphylococcus aureus* NCTC 10788, *Escherichia coli* NCTC 9001, *Enterobacter eloacae* NCTC 9238, *Klebsiella aerogenes* CM345, *Candida albicans* IMI 149007 and *Aspergillus niger* NCPF 3149. In terms of molar concentrations, the lignan (6) was the most potent against all test organisms with the diprenylated flavanone (2) showing slightly less potency. The new flavanone (1) was active against both Gram-positive and Gram-negative bacteria, but did not show any antifungal activity. The epidioxy steroid (5) was active against *Staphylococcus aureus* and *Aspergillus niger*, but less so against the remaining organisms (Rahman & Gray, *Phytochemistry*, 2002, 59, 73-77).

Antimutagenic activity of Triphala

A combination of the fruits of three plants, namely *Terminalia chebula*, *T. bellerica* and *Embblica officinalis* is known as *triphala*. It has been used extensively as a drug against a number of diseases. Kaur and others from Amritsar studied the antimutagenic effect of the polyphenolic fractions isolated from *Triphala*.

A study to evaluate an antimutagenic potential of water, chloroform and acetone extracts of *Triphala* has been made in an Ames histidine reversion assay using TA98 and TA100 tester strains of *Salmonella*

typhimurium against the direct-acting mutagens, 4-nitro-*O*-phenylenediamine (NPD) and sodium azide, and the indirect-acting promutagen, 2-aminofluorene (2AF), in the presence of phenobarbitone-induced rat hepatic S9. The drug was sequentially extracted with water, acetone and chloroform at room temperature. The study revealed that water extract was ineffective in reducing the revertants induced by the mutagens. The results with chloroform and acetone extracts showed inhibition of mutagenicity induced by both direct and S9-dependent mutagens. A significant inhibition of 98.7% was

observed with acetone extract against the revertants induced by S9-dependent mutagen, 2AF, in co-incubation mode of treatment.

The study supports the contention that traditional medicines remain a valuable resource in the potential discovery of natural product pharmaceuticals. A remarkable antimutagenic activity exhibited by *Triphala* provides a scientific validation for the popular use of this drug (Kaur *et al*, *Food Chem Toxicol*, 2002, 40, 527-534).

Therapeutics

Terminalia pallida fruit possess antidiabetic activity

Maceration of fruit powder of *Terminalia pallida* Brandis is given orally as a drink twice a day for 25 days for the treatment of diabetes by tribal people in Andhra Pradesh where locally it is known as *Tellakaraka*.

As the fruits of the other species of the same genus viz., *T. arjuna* Wight & Arn., *T. belerica* Roxb. and *T. chebula* Retz are found to have

antidiabetic activity an attempt was made to investigate the antidiabetic activity of this plant by researchers at S.V. University, Tirupathi.

During experiments ethanolic extract of fruits at a dose of 0.5 g/kg b.w. could produce a significant fall in blood glucose levels by about 24% in diabetic rats, after 5 hour of treatment. But none of these extracts could produce any

hypoglycaemic effect in normal rats. Hence the ethanolic extracts may be considered to have good antihyperglycaemic active principles without causing any hypoglycaemic effect unlike insulin and other synthetic drugs (Rao *et al*, *J Ethnopharmacology*, 2003, **85**, 169-172).

Lethal neurotoxic protein from Indian king cobra venom

A lethal neurotoxin protein (Toxin CM36) was isolated and purified from the Indian King Cobra (*Ophiophagus hannah*) venom by CM-Sephadex ion exchange chromatography and HPLC. The purified toxin had a SDS- molecular weight of 15 ± 0.5 kD. The UV absorption spectra of Toxin CM36

showed a peak at 280 nm and an E_{max} at 343.8 nm, when excited at 280nm fluorescence. Toxin CM36 had an LD_{50} of 3.5 $\mu\text{g}/20$ g (iv) in male albino mice. It exhibited neurotoxicity and produced irreversible blockade of isolated chick biventer cervicis and rat phrenic nerve diaphragm. The neurotoxicity was found

to be Ca^{2+} dependent. Toxin CM36 had no significant effect on isolated guineapig heart and auricle. It also had no effect on blood pressure of cat and rat but produced respiratory apnoea in rat and guineapig. Toxin CM36 lacked phospholipase activity (Pallabi *et al*, *Indian J Exp Biol*, 2002, **40**, 1365-1372).

Tissue culture

Regeneration of *Quercus floribunda* Lindl.

Oak trees are important plants of Himalayas but due to many reasons their regeneration is deteriorating. Tissue culture technique is the only method to conserve and regenerate them. Scientists at G. B. Pant Institute of Himalayan Environment and Development, Almora developed a regeneration protocol for *Quercus floribunda* Lindl. using cotyledonary nodes (with attached

cotyledons but without radicle and primary shoot) as explants. Multiple shoots were induced on woody plant or MS medium supplemented with 6-benzyladenine (BA), either alone or in combination with gibberellic acid (GA_3). BA (22.19 μM) was much more effective in WP medium for induction of multiple shoots; addition of GA_3 (2.89 μM) resulted in thinner but slightly longer shoots.

Rooting (83.3%) of regenerated shoots involved a two-step procedure where the microshoots were treated with indole-3-butyric acid (100 μM) for 24 hours followed by transfer to plant growth regulator-free half-strength WP medium. Ninety per cent plantlets were successfully established in earthen pots containing soil and farmyard manure (3:1) (Purohit *et al*, *Curr Sci*, 2002, **83**, 312-315).