Anti-oxidation activity of natural *Cordyceps sinensis* and cultured *Cordyceps* mycelia

*Cordyceps*, one of the well-known traditional Chinese medicines, consists of the dried fungus *Cordyceps sinensis* growing on the larva of the caterpillar. It is commonly used for the replenishment of body health. One of the known pharmacological effects is its anti-oxidation activity. However, there is a great variation of the quality in different sources of Cordyceps. Scientists at Department of Biology and Biotechnology Research Institute, The Hong Kong University of Science and Technology, China analyzed the antioxidant properties of the water extracts of various sources of natural *C. sinensis* and cultured *Cordyceps* mycelia by using three different assay methods such as the xanthine oxidase assay, the induction of hemolysis assay and the lipid peroxidation assay. The results showed that *Cordyceps*, in general, possesses a strong anti-oxidation activity in all assays tested. However, both natural and cultured *Cordyceps* showed the lowest inhibition in the lipid peroxidation when compared with the other two assay methods. The cultured *Cordyceps* mycelia had equally strong anti-oxidation activity as compared to the natural *Cordyceps*. Besides, the anti-oxidation activities were increased to 10-30 folds in the partially purified polysaccharide fractions from the cultured *Cordyceps* mycelia, which suggested that the activity could be derived partly from *Cordyceps* polysaccharides [Li *et al*, *Phytomedicine*, 2001, 8(3), 207-212].

Chemopreventive action of *Phyllanthus* sp.

*Phyllanthus urinaria* Linn. (Hindi - Lal-bhuin anvalah) found commonly in central and southern India up to Sri Lanka and throughout the plains from Punjab to Assam is used as a medicinal plant for liver problems, dropsy, stomachic, urogenital disorders and skin diseases. Scientists at Biochemistry Division, Gauhati University, Guwahati, studied the chemopreventive action of this whole herb including roots on DMBA-induced skin carcinogenesis in mice.

The inhibition of tumour incidence by hydro-alcoholic extract was evaluated in 6-7 weeks old female albino mice on two-stage process of skin carcinogenesis induced by a single application of 7,12-dimethylbenz(a)anthracene (50 mg/50ml of acetone), and 2 weeks later, promoted by repeated application of croton oil (1% in acetone/ three times a week) till the end of the experiment (15 weeks). Topical application of the extract at a dose of 5mg/kg body weight/day for 15 weeks at the peri-initiational stage (i.e. 7 days before and 7 days after DMBA application), promotional stage (i.e. from the time of croton oil application) and both peri and post-initiational stages (i.e. 7 days prior to DMBA application and continued till the end of the experiment) on the shaven backs of the mice recorded a significant reduction in tumour incidence to 50, 33.3 and 16.7%, respectively in comparison to the control (i.e. the mice treated with DMBA and croton oil only) where tumour incidence was found to be 81.8%. The average number of papillomas per mouse was also significantly reduced. The results suggest a possible chemopreventive property of *P. urinaria* against DMBA-induced skin papillomagenesis in mice [Bharali *et al*, *Indian J Exp Biol*, 2003, 41(11), 1325-1328].

Antibacterial Ashoka bark

*Saraca asoca* (Roxb.) de Wilde, commonly known as *Ashoka* is an evergreen tree cultivated in gardens. Its bark is well-known for various medicinal properties. For the validation of *in vitro* antibacterial properties of its bark researchers at Gulbarga University, Gulbarga investigated the petroleum ether, butanol, ethanol and distilled water extracts against various Gram-positive and Gram-negative bacteria.

The results revealed that methanol and water extracts of leaves possess antibacterial activity against *Bacillus aureus*, *Pseudomonas aeruginosa* and *Staphylococcus typhimurium* [Seetharam *et al*, *Indian J Pharm Sci*, 2003, 65(6), 658-659].
Antihepatotoxic effect of Nilkamal

Indian Blue Water Lily, *Nymphaea stellata* Willd. (Hindi—Nilkamal) is a medicinal plant used in Indian systems of medicine since ancient time. Bhandarkar and Aqueel Khan at Department of Biochemistry, Nagpur University, Nagpur studied antihepatotoxic effect of its flowers against carbon tetrachloride-induced hepatic damage in albino rats. Male albino rats of Wistar strain of 8–10 weeks of age weighing between 100 and 120g were used for the study. The oral administration of varying dosage of extract to rats for 10 days afforded the good hepatoprotection against carbon tetrachloride-induced elevation in serum marker enzymes, serum bilirubin, liver lipid peroxidation and reduction in liver glutathione, liver glutathione peroxidase, glycogen, superoxide dismutase and catalase activity.

The mode of action of the extract in affording the hepatoprotective activity against carbon tetrachloride may be due to the cell membrane stabilization, hepatic cell regeneration and activation of antioxidative enzymes such as glutathione reductase, glutathione peroxidase, superoxide dismutase and catalase [Bhandarkar & Khan, *J Ethnopharmacol*, 2004, 91(1), 61-64].

Antihepatotoxic effect of aqueous onion extract

*Leishmania* spp. are intracellular parasitic haemoflagellates that infect macrophages of the skin and viscera to produce disease in their vertebrate hosts. Three major clinical manifestations of *leishmaniasis* are recognized: visceral, cutaneous and mucocutaneous *leishmaniasis*. The disease usually presents as fever, weight loss and hepato-splenomegaly with biochemical abnormalities of hyper-γ-globulinemia and pancytopenia. It has received increasing attention in developed countries because of the growing number of cases seen in AIDS patients and the occurrence of viescerotropic *L. tropica* disease among Persian Gulf war participants.

Pentavalent antimonial drugs, have remained standard treatment for visceral leishmaniasis since the 1940s. These drugs not only have several adverse effects but drug resistance and treatment failures are becoming increasingly common especially in immunocompromised patients who often fail to respond or relapse. Amphotericin B and its new lipid formulations are used as second line of treatment. However, these are severely limited due to prolonged length of therapy and adverse reactions. Thus, there is still a need for development of new and safe drugs. Onion has had an important dietary and medicinal role for centuries, hence, Saleheen and others at The Aga Khan University, Karachi, Pakistan and Institute of Biochemistry, University of Balochistan, Quetta, Pakistan studied the anti-leishmanial effect of aqueous onion (*Allium cepa* Linn.) extract (AOE) on *leishmanial* promastigotes in vitro. Five *leishmanial* strains in the promastigote stage were studied in vitro. Seventy-two hours inoculation of AOE gave an IC100 and average IC50 values of 1.25 mg/ml and 0.376 mg/ml, respectively, against all *leishmanial* strains tested.

During experiment fresh onions were peeled, cut into small pieces, crushed in a blender pre-cooled at 4 °C and onion extract was prepared. Concentrations of AOE ranging from 10 to 0.07 mg/ml were tested for its anti-leishmanial activity. The concentration of 1.25 mg/ml was found to be leishmanicidal for all the *leishmanial* strains tested, whereas 50% parasites of all strains were found to be dead at an average value of 0.376 mg/ml after 72 hrs of treatment [Saleheen et al, *Fitoterapia*, 2004, 75(1), 9-13].
Hypoglycemic and antihyperglycemic effects of *Datura* seeds

There is an increased demand to use natural products with antidiabetic activity due to the side effects associated with the use of insulin and oral hypoglycemic agents. There are more than 400 plant species showing hypoglycemic and many remain to be scientifically evaluated.

Though the whole plant of *Datura metel* Linn. (Hindi - *Dhatura*) is considered as narcotic, its bark, leaves and seeds are used in various Ayurvedic medicines. Pharmacologists at Pharmacology Division, Department of Pharmaceutical Sciences, Andhra University, Visakhapatnam evaluated hypoglycemic and antihyperglycemic effects of its seeds in normal and alloxan-induced diabetic rats. The seed powder was tested at the doses of 25, 50 and 75 mg/kg, p.o. When given to both normal and diabetic rats produced significant reduction in blood glucose at the 8 hr. The effect was found to be dose dependent with all treatments at the doses administered. Thus, the folk use of the seeds for the control of diabetes may be validated by this study. The seeds seem to have a promising value for the development of potent phytomedicine for diabetes. Further comprehensive pharmacological investigations are needed [Krishna Murthy et al, *J Ethnopharmacol*, 2004, 91(1), 95-98].

Antibacterial and antifungal activity of *Jamun* seeds

The water and methanolic extracts of Black Plum, *Syzygium cumini* (Linn.) Skeels syn. *Eugenia jambolana* Lam., *Syzygium jambolanum* DC. (Hindi- *Jamun*) seeds were examined by M. Chandrasekaran and V. Venkatesalu at Department of Botany, Annamalai University, Annamalainagar, Tamil Nadu, for antibacterial and antifungal activity *in vitro* using the disc diffusion method, minimum inhibitory concentration, minimum bactericidal concentration and minimum fungicidal concentration.

Results showed that methanol and aqueous seed extracts of *Jamun* gave favourable results against all the tested microorganisms with MIC values between 31.25 and 500µg/ml. The present study reveals that the seed extracts is very effective against *Candida albicans*, *Aspergillus flavus*, *A. fumigatus*, *A. niger*, *Bacillus subtilis* and *Staphylococcus aureus* than the other strains tested. In the present study, Gram positive bacteria such as *Bacillus subtilis* and *Staphylococcus aureus* were more susceptible than Gram negative bacteria such as *Salmonella typhimurium*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Escherichia coli* [Chandrasekaran & Venkatesalu, *J Ethnopharmacol*, 2004, 91(1), 105-108].

Free radical scavenging action of *Tulsi*

The leaves of Holy Basil, *Ocimum sanctum* Linn., commonly known as *tulsi* is traditionally used for many health problems. Current research works have reported strong protective effect of aqueous extract of leaves against radiation injury. Flavonoids isolated from aqueous extract namely orientin and vicenin have been found to be very effective in protecting against radiation induced lipid peroxidation in mouse liver. Flavonoids also scavenged free radicals *in vitro* and showed antilipoperoxidant activity *in vivo* at a very low concentration. In view of these reports Geetha and others at Kasturba Medical College, Manipal, Karnataka investigated superoxide and hydrogen peroxide scavenging action of leaf extracts and their fractions and compared with known antioxidant ascorbic acid.

The results revealed that both extracts and their fractions are good scavengers of superoxide and hydrogen peroxide comparable to ascorbic acid. Thus *tulsi* leaves can be exploited for its impressive free radical scavenging activities [Geetha et al, *Nat Prod Sci*, 2003, 9(4), 223-225].
**Alginate wound dressing**

Alginate obtained from Algae has been reported as an ideal healing material for wounds. Keeping in view the moist healing concept Lin at Department of Raw Materials and Yarn Formation, China Textile Institute, Taipei, Taiwan evaluated the effect of alginate hydrogel dressing in wound healing in rats.

Results revealed that alginate wound dressing has a unique natural ability to assist in healing process. Alginate wound dressing could keep wound moist and provide an ideal healing environment. Because dressing does not adhere to the wound, pain is consequently reduced while the dressing is placed or removed [Lin, J China Textile Inst, 2004, 14(1), 22-33].

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**Celosia argentea** Linn. possesses anti-inflammatory activity

In literature the leaves of *Celosia argentea* Linn. (Hindi – *Sufaid murgha*) are reported to reduce inflammation but non-availability of any scientific report led the researchers to study the anti-inflammatory activity of its leaves extracts on carrageenan-induced rat paw oedema. Amongst other extracts used during study only ethanolic extract exhibited significant anti-inflammatory activity when given at a dose of 100 mg/kg i.p. to rats. The activity was comparable to that of standard drug Aspirin [Patil et al, Indian J Pharm Sci, 2003, 65(6), 645-47].

**Neuropharmacological effects of Aparajit root**

*Clitoria ternatea* Linn., commonly known as *Aparajit* is a perennial herb used in Indian traditional medicine. The roots are bitter in taste, cooling, enhance learning and memory, laxative, diuretic, anthelmintic, analgesic, anti-inflammatory and antipyretic. The root juice is given in cold milk to remove phlegm in chronic bronchitis. Boominathan and others at Department of Pharmaceutical Technology, Jadavpur University, Kolkata and Regional Institute of Pharmaceutical Science & Technology, Agartala studied neuropharmacological effects of the ethanol extract of the roots on rats and mice.

During experiment neuropharmacological actions, such as general behaviour, exploratory behaviour, muscle relaxant activity and phenobarbitone induced sleeping time were evaluated to study the effects of root extract. The extract was found to cause reduction in spontaneous activity, decrease in exploratory behavioural pattern by the head dip and Y-maze test, reduction in the muscle relaxant by rotarod, 30° inclined screen and traction tests. In addition the extract significantly potentiated the phenobarbitone-induced sleeping time in mice at doses of 100 and 150 mg/kg and above as compared to control [Boominathan et al, Nat Prod Sci, 2003, 9(4), 260-263].

**Momordica dioica** fruit pulp possesses analgesic and anti-inflammatory properties

The fruits of *Momordica dioica* Roxb. ex Willd. are known to be used in the treatment of inflammation caused by lizard excretion, mental and digestive disorders. Pharmacological evaluation of its medicinal properties has been done by Ilango and others at Tamil Nadu and Pondicherry. Both hexane and ethylacetate soluble portion were used to evaluate the analgesic and anti-inflammatory activities in a dose of 50 and 100 mg/kg in mice and rats. Results revealed significant activities when compared to standard drugs (Ilango et al, Nat Prod Sci, 2003, 9(4), 210-212).
Hypoglycemic activity of mangrove plant

The crushed leaves of *Rhizophora apiculata* Blume are taken by people of Sunderbans, West Bengal for the treatment of diabetes. Therefore, to establish its efficacy a team of pharmacologists at Kolkata undertaken studies on male Wistar rats and male Swiss mice. The ethanol extract of the leaves was prepared to evaluate and hypoglycemic/anti-hyperglycemic activity on glucose loaded and streptozotocin induced rats. The results revealed that this plant possess potential hypoglycemic action. The extract was also evaluated for biological toxicity. The lethal dose of the extract was higher than 4g/kg body weight, which meant it is practically non-toxic in the dose it is being used by local people [Sur et al, Nat Prod Sci, 2004, 10(1), 11-15].

Revalidation of antifertility activity of Guaiacum

*Guaiacum officinale* Linn., commonly known as *Lignum vitae* is a small evergreen tree. The aerial parts of the tree are commonly used in folk medicine as an antifertility agent, particularly for abortion in early pregnancy.

Scientists at Department of Paraclinical Sciences, Faculty of Medical Sciences, The University of the West Indies, St. Augustine, Trinidad & Tobago investigated scientifically the folklore claim of its antifertility activity on whole animal and on isolated guinea-pig ileum, gravid and non-gravid uteri of mice and rats.

In about 50 trials, the hot aqueous extract of aerial parts (leaves, flowers, fruits and tender branches) caused abortion in mice and rats in second and third trimesters only. The abortion ED\textsubscript{50} in pregnant mice was 320.50±20.00mg/kg, while the LD\textsubscript{50} was 1280.13 ± 9.03 mg/kg. At a dose of 480.75 mg/kg, the extract significantly reduced the litter size in mice when given during the first trimester of pregnancy. The extract did not produce contraction of either the primed or gravid uteri or guinea-pig ileum. The findings support the utility of the hot water extract of the Guaiacum in folk medicine for antifertility purposes [Offiah & Ezenwaka, Pharm Biol, 2003, 41 (6), 454-457].

Anti-inflammatory effect of Henna in rats

Henna, *Lawsonia inermis* Linn. leaves are widely known for their cosmetic properties. Sahni and others at College of Veterinary Science and Animal Husbandry, Jabalpur evaluated the folk medicinal claims for applications of henna in skin diseases.

The experiment was conducted on adult albino rats (125-150 g). Alcoholic extracts of shade dried leaves was prepared. Anti-inflammatory activity of henna leaves was evaluated on acute inflammatory reaction induced by carrageenan paw oedema and subacute inflammatory reaction induced by cotton pellet granuloma in rat.

Both aqueous and alcoholic extracts produced 55.34 and 61.90 per cent anti-inflammatory effect, respectively on cotton pellet induced granuloma, which is comparable to the effect of Piroxicam and Diclofenac sodium [Sahni et al, Indian Vet Med J, 2003, 27 (2), 177-180].