VEGETABLES

NPARR 4(1), 2013-0102 Anti-arthritic activity of the Indian leafy vegetable Cardiospermum halicacabum in Wistar rats and UPLC-QTOF-MS/MS identification of the putative active phenolic components

The present work was carried out to investigate the free radical scavenging activity of the ethanol extract of C. halicacabum leaves (EECH), to study its antioxidant properties and anti-rheumatic effects in Wistar rats with CFA-induced arthritis, and to profile the phenolic components thereof by LC-MS/MS. The free radical scavenging activities of the extract was evaluated by NO and superoxide anion scavenging assays. Arthritis was induced to the albino Wistar rats by CFA. Fifteen days after CFA induction, arthritic rats received EECH orally at the doses of 250 and 500 mg/kg daily for 20 days. Diclofenac sodium was used as reference standard. EECH is subjected to LC-MS/MS analysis for the identification of phenolic compounds. The IC50 value of the EECH to scavenge the NO and superoxide radicals are 83 and 60 μg/ml, respectively. Ultrasonography and histology images of hind limb in EECH treated groups confirmed the complete cartilage regeneration. The LC/MS/MS analysis indicated the presence of anti-inflammatory compounds luteolin-7-O-glucuronide, apigenin-7-O-glucuronide and chrysoeriol. These findings lend pharmacological support to the reported folkloric use of C. halicacabum in the treatment and management of painful, arthritic inflammatory conditions [Jeyadevi, R.*, Sivasudha, T., Rameshkumar, A. and Kumar, L.D. (Department of Environmental Biotechnology, Bharathidasan University, Tiruchirappalli 620024, Tamil Nadu, India ), Inflammation Research, 2012, 62(1), 115-126].

NPARR 4(1), 2013-0103 Studies on different genotypes of Indian bathua (Chenopodium album) for thier yield, quality and antioxidant activities

Sixteen genotypes of Chenopodium (Chenopodium album) were evaluated for desired horticultural traits, viz. plant height (cm), leaf colour, leaf length and width, days to bolting, dry matter (%) and yield/plant (g); and their important quality traits, total carotene, ascorbic acid, total phenolic content, Cuprac ion Reducing Antioxidant Capacity (CUPRAC) and Ferric Reducing Antioxidant Power (FRAP) were also estimated during rabi/winter season of 2010 and 2011 at Division of Vegetable Science, IARI, New Delhi. Among the genotypes plant height ranged from 54.7 cm (Desi bathua) to 223 cm (Bathua 2). Yield/plant was recorded maximum in Bathua 13 (280 g) followed by Bathua 12 (277 g). Local Bathua (Desi type) recorded lowest yield 45.1 g/plant; however, it recorded maximum and significantly high dry matter content (16.5 %). Considerable variability was recorded in total carotenoids which ranged from 30.7 mg/100 g (Bathua 7) to 89.2 mg/100 g (Bathua 10). Bathua 10 also recorded maximum value of ascorbic acid (157.8 mg/100g) which was significantly higher than other genotype. High variability was recorded in total phenolic content, which ranged from 276.87 μg gallic acid equivalent (GAE)/g (Bathua 6) to 893.83 μg GAE/g (Bathua 13). Antioxidant activities recorded by both CUPRAC and FRAP method was found high in Bathua 13, Bathua 12 and Desi Bathua. On overall basis, it was concluded that Bathua 13, Bathua 12 and Bathua 14 could be the desirable genotypes for increasing yield and quality of Chenopodium. However, Bathua 10 was found rich source of carotene and ascorbic acid and Desi Bathua for high antioxidant activity. These genotypes can be further utilized to develop nutritionally rich leafy vegetables [Yadav, R.K.*, Joshi, S., Kumar, R., Kalia, P., Varshney, R. and Jain, V. (India Agricultural
Amaranth: a new millennium crop of nutraceutical values

The major staple food crops production is not able to fulfill food requirement of the global population due to relatively higher population growth rate in developing countries. The research on these crops for exploring their ultimate yield potential is currently at a plateau level. To replace the existing pressure on these major crops there is an urgent need to explore other alternative crops having the potential to replace and fulfill the available food demand. FAO statistics reveal that there is a high frequency of low birth weight children in the developing countries, which is primarily due to deficiency of micronutrients in the mother's diet. Amaranth, an underutilized crop and a cheap source of proteins, minerals, vitamin A and C, seems to be a future crop which can substantiate this demand due to its tremendous yield potential and nutritional qualities, also recently gained worldwide attention. Recently, current interest in amaranth also resides in the fact that it has a great amount of genetic diversity, phenotypic plasticity, and is extremely adaptable to adverse growing conditions, resists heat and drought, has no major disease problem, and is among the easiest of plants to grow in agriculturally marginal lands. The present review is an effort to gather the available knowledge on various diversified fields of sciences for the future exploitation of the crop [Rastogi, A.*, and Shukla, S. (National Botanical Research Institute, Lucknow, India), Critical Reviews in Food Science and Nutrition, 2013, 53(2), 109-125].

Phytochemical and therapeutic potential of cucumber (Review)

Cucumber (Cucumis sativus L.) is a member of the Cucurbitaceae family like melon, squash and pumpkins. It is a popular vegetable crop used in Indian traditional medicine since ancient times. This vegetable is very high in water content and very low in calories. It has potential antidiabetic, lipid lowering and antioxidant activity. Cucumber has a cleansing action within the body by removing accumulated pockets of old waste materials and chemical toxins. Fresh fruit juice is used for nourishing the skin. It gives a soothing effect against skin irritations and reduces swelling. Cucumber also has the power to relax and alleviate the sunburn's pain. The fruit is refrigerant, haemostatic, tonic and useful in hyperdipsia, thermoplegia, etc. The seeds also have a cooling effect on the body and they are used to prevent constipation. Several bioactive compounds have been isolated from cucumber including cucurbitacins, cucumegastigmanes I and II, cucumerin A and B, vitexin, orientin, isoscoparin 2″-O-(6â′-(E)-p-coumaroyl) glucoside, apigenin 7-O-(6″-O-p-coumaroylglucoside) etc. Despite huge exploration of cucumber in agricultural field, comparatively very few studies have been published about its chemical profile and its therapeutic potential. This article reviews the therapeutic application, pharmacological and phytochemical profile of different parts of C. sativus. In this review we have explored the current phytochemical and pharmacological knowledge available with this well known plant and several promising aspects for research on cucumber [Mukherjee, P.K.*, Nema, N.K., Maity, N. and Sarkar, B.K. ( School of Natural Product Studies, Department of Pharmaceutical Technology, Jadavpur University, Kolkata-700 032, India ), Fitoterapia, 2013, 84(1), 227-236].

Harvest time residues of pendimethalin in tomato, cauliflower, and radish under field conditions

Herbicides applied to vegetables play an important role in higher production of vegetables due to effective and timely control of weeds but at the same time herbicides residue may produce numerous environmental problems. The aim of
this study was to determine whether application of herbicide for control of annual weeds in vegetable growing areas at recommended levels resulted in residues at the time of harvest. Thus, terminal residues of pendimethalin in vegetables such as tomato, cauliflower, and radishes were studies under field conditions. Pendimethalin was applied as pre-emergence herbicides at 1 kg a.i. ha\(^{-1}\) to tomato, cauliflower, and radish crops. Soil and vegetables samples were collected from pendimethalin-treated plots at maturity to determine harvest time residues of pendimethalin. At harvest, 0.008, 0.001, and 0.014 µg/g residues of pendimethalin were found in tomato, cauliflower, and radishes, respectively [Sondhia, S. (Directorate of Weed Science Research, Jabalpur, India), Toxicological and Environmental Chemistry, 2013, 95(2), 254-259].

NPARR 4(1), 2013-0107 Evaluation of antioxidant potential in selected leafy vegetables of Odisha, India

Generally vegetables represent a class of under exploited plants that are stipulated to be rich source of natural antioxidant. Seven edible widely used leafy vegetables of Odisha have been analyzed for their DPPH radical scavenging activity, namely *Amaranthus tricolor*, *Amaranthus viridis*, *Brassica oleracea*, *Brassica campestris*, *Basella alba*, *Cucurbita maxima*, *Cicer arietinum* using methanol, ethanol, petroleum ether as solvent. Their total phenolic content was measured by Folin-ciocalteu reagent. The plant extracts were found to have different levels of antioxidant properties in the system tested. Correlation analysis established a positive Correlation between the phenolic contents and the in vitro free radical scavenging activity of the plant extracts. In all the species methanolic and ethanolic extract gave maximum yield of crude extract, phenol content as well as antioxidant activity. Highest antioxidant activity was demonstrated in *Brassica campestris* followed by *Amaranthus tricolor* and *Cucurbita maxima*. Accordingly minimum IC50 values were obtained in the concentration of maximum antioxidant activity. These values are comparable with ascorbic acid as standard. The conclusions drawn from the study suggest that the rich phytochemical contents especially phenolics of the leafy vegetables and good antioxidant activity may be responsible for its wide and popular use in any balanced diet [Routray, R., Kar, M. and Sahu, R.K. (Department of Botany, B. J. B (A) College, Bhubaneswar-751014, Odisha, India), International Journal of Pharmacy and Pharmaceutical Sciences, 2013, 5(1), 232-235].