

7<sup>th</sup> Indo-Global Summit and Expo on  
**Food & Beverages**

October 08-10, 2015 New Delhi, India

***Lactuca sativa* protects kainic acid-induced neurotoxicity in mice: Evidence for neuroprotective effect**

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There are clinical evidences that neurodegeneration can be ameliorated upon dietary intake or supplementary intake of natural antioxidants. Dietary intake contains variety of antioxidant vitamin supplements which play a vital role in neuroprotection in variety of neurological disorders. The study using kainic acid (KA) was conducted with concomitant administration of the extract of *Lactuca sativa* (lettuce) to evaluate the possible protection against the chemically induced neuronal damage. Two doses viz., 200 and 400 mg/kg body weight of the plant extract were administered to mice and behavior and biochemical studies were conducted in the tissues after sacrifice. In the elevated plus maze test and open field test, the feeding of *Lactuca sativa* leaves extract at doses of 200 and 400 mg/kg body weight showed a significant increase in the time spent in the open arms and the open area. In the model of KA induced excitotoxic neuronal death *in vivo*, we observed a pronounced increase in neuronal degeneration marked by a sharp increase in lipid peroxidation and protein carbonyl after KA injection. These occurring as a result of excito-toxicology suggest the role of increased free radical production. Administration of plant extract with kainic acid treatment decreased the level of brain malondialdehyde, nitrite and protein carbonyl levels. Corresponding to development of seizures, KA in dose, 10 mg/kg body weight i.p, increased the brain glutamate levels when compared with control group. Pretreatment with *Lactuca sativa* extract significantly reduced brain glutamate elevated by KA treatment. The data revealed significant increase in the activity of AchE in brain homogenate of kainic acid treated mice. The administration of *Lactuca sativa* extract at 400 mg/kg body weight reversed the kainic acid induced reduction of lactate dehydrogenase activity. The plant extract rich in polyphenols and other secondary metabolites scavenges the free radicals/ROS; in-turn protects the cells from ROS attack. The neurotransmitters viz., epinephrine, nor epinephrine, DOPA and 5-HT levels in brain were decreased significantly with kainic acid treatment when compared to control group. The ingestion of *Lactuca sativa* extract increased the levels of neurotransmitters in brain. Kainic acid induced structural changes like oedema, necrosis and hemorrhages in brain tissues. These conditions were reversed by *Lactuca sativa* extract at 400 mg/kg body weight.

**Biography**

K R Anilakumar has 31 years of research experience in the field of Nutritional Biochemistry and Food Chemistry and presently Heading Applied Nutrition Division, Defense Food Research Laboratory, DRDO, Mysore. He has developed and evaluated functional foods and nutraceuticals to support hepato-protective, neuro-protective, anti-ulcer, anti-fatigue, anti-anxiety and anti-depression properties in experimental animals. He has guided more than 20 MSc/MD (Ayurveda) and 3 PhD students in the area of Food Science and Biochemistry. He is the recipient of several awards viz., Professor Tamhane Memorial Award from Bombay University (1991), Dr. (Mrs.) Vasundhara Memorial Award (2001 and 2003) from DRDO life science labs, Dr. Y Subbarao Memorial Award (2010) from Indian Association of Biomedical Scientists, Lab Scientist of the Year Award (2006) and Technology Group Award (2007), Defense Technology Spin-Off Award from DRDO (2011) and National Science Day Oration Award (2012). He has published 70 research papers, 9 review papers in national and international journals, 3 book chapters and filed/granted 13 patents.

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