

Action of pyrethroid deltamethrin on Na⁺/K⁺ ATPase and inorganic ions gradient in *H. fossilis*

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Deltamethrin is a synthetic pyrethroid and an alpha-cyano class of insecticide which is used in insect house hold pest control and antimalaria programs in several countries including India. Although various toxic causes of pyrethroid are reported in mammals, its ecotoxicologic dimensions are not adequately researched in ecologically and commercially important fishes. Deltamethrin, a synthetic pyrethroid contaminating aquatic ecosystems as a potential toxic pollutant, is investigated in the present study. The toxicity of synthetic pyrethroid deltamethrin to the fish is dependent on several factors, including toxicokinetics, target site (nervous system), sensitivity and possible secondary mechanisms of action, as well as chemical and physical properties of the aquatic medium. Pyrethroid act to increase the excitability of neuronal tissue outside of the functional range, causing erratic movement and thereby rendering creatures immobile. They act on the membrane ion channels that tightly control ionic gradients between cells and the extracellular matrix. By disrupting ions homeostasis, the foundation of neuronal signaling is disturbed, compromising the whole system. The impact of exposure of the freshwater fish *Heteropneustes fossilis* to two sub lethal concentrations (0.07 mg/L and 0.14 mg/L) of deltamethrin for 30 days on the activities of energy dependent molecules such as Na⁺/K⁺ ATPase, Ca²⁺ and Mg²⁺ ATPase with inorganic ions Na⁺, K⁺, Ca²⁺ and Mg²⁺ in brain, kidney, gills, muscle and intestine were assessed. Significant (p<0.01) decrease was found in Na⁺/K⁺ ATPase, Ca²⁺ and Mg²⁺ ATPase activities in fish exposed to higher concentration. Ionic levels in vital tissues were significantly decreased after exposure to the two sub lethal concentrations. Brain and intestine were the most affected tissues.

Biography

Suresh Kumar has completed his Ph.D. at the age of 26 years from Indian Institute of Toxicology Research-CSIR. He is a Professor and Head, Dept. of Zoology, CRM Jat (P.G) College, a premier institute of Kurukshetra University. He is fellow & Foreign Secretary of the Academy of Environmental Biology-India. He has worked as CSAP Expert of Commonwealth, London in Ministry of Environment, Port Louice, Mauritius and visited many countries. He has published 30 papers in reputed journals and serving as an editorial board member of repute.

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