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RESEARCH PAPER

Effect of azadirachtin on protein metabolic profiles in selected tissues of *Rana hexadactyla*

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ABSTRACT

Frogs exposed to sublethal concentration (40ppm) of Azadirachtin, free aminoacids, protease, AAT, ALAT, GDH, ammonia and urea levels were significantly ($p<0.05$) increased where as total protein content was significantly ($p<0.01$) decreased in liver and brain. Azadirachtin was more toxic in 15 days exposed animals than 7 days exposed animals. Depletion of cellular proteins might be due to the inhibition of amino acid incorporation into proteins. The increased and decreased alteration in protein profiles in frogs exposed to Azadirachtin resulted in impairment on protein synthetic machinery, indicating its toxic effects on cellular functioning.

Key words : Azadirachtin, Protein metabolism, Brain, Liver, *Rana hexadactyla*

Pesticides are described as economic poisons employed to regulate the impact of insects, other pests and plants, which affect our lives and economy. Pesticides enter the water bodies by several means, *i.e*. direct application for the control of aquatic weeds or aquatic insects, percolation and runoff from agricultural applications. Pesticides block enzymatic activity, interfere with neurotransmitters and disrupt membrane or cellular transport process.

Many pesticides are extremely toxic to mammals and other non-target organisms (Karaliedded *et al.*, 2003). The future of insect control looked very bright with new insecticides constantly coming into the market. There is urgent need for safer, naturally occurring, environmentally friendly pesticides and new strategies to reduce resistance problems (Manal and Frantisek, 2000). Azadirachtin is a complex compound with powerful insecticidal properties (Akudugus *et al.*, 2001; Andren *et al.*, 2000).

Neem based insecticides are likely to show a large increase in use in the near future. The toxicity of a neem insecticide, Nee-azal-TLS, was tested against the mosquito larvae, as well as against certain non - target organisms (el-Shazly and el-Sharnoubi, 2000).

Proteins also play a major role in the living cell structural components, hormones, bio-catalysts and receptors. The survival ability of animals exposed to stress majorly depends on their protein synthetic potentials. Hence, protein budget of a cell can be taken as an important diagnostic tool in the evaluation of its physiological standards (Young, 1970).

Protein is the chief organic macromolecule for aspects of cellular structure and its function is expected to react first upon pesticide exposure. Total protein content also decreased in non-target vertebrate fauna after pesticide treatment indicating pesticide-produced changes in the biochemical systems of non-target organisms. Studies on protein metabolism in animals exposed to OP compounds reported a decrease in protein moiety with an elevation in free amino acid levels (Westlake *et al.*, 1981; Pollak and Harsas, 1982).

The present study document the effect of Azadirachtin on some aspects of protein metabolism in the organs of frog, *Rana hexadactyla* on exposure to the sub-lethal concentrations of Azadirachtin.

MATERIALS AND METHODS

Test chemical:

Azadirachta insecticide was selected for the present study. Azadirachtin 0.15% EC, technical sample of "Achook" was obtained in the form of 1500 ppm formulation from the Godrej Agrovet Ltd., Mumbai, Maharashtra, India.

Animal model: Rana hexadactyla

Experimental design:

Healthy frogs weighing 50±3 g were collected from the pond and acclimated to the laboratory conditions in large glass aquaria with water temperature 27±2°C, pH 7.0±0.2 and light period of 12 h. They were exposed for 7 days and 15 days after stipulated period control and experimental animals were sacrificed. Tissues like brain and liver were isolated and stored in deep freezer at -80 °C for further analysis.