RESEARCH PAPER

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Effect of thiamethoxam alters serum biochemical parameters in C*hanna punctatus*(Bloch)

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On treatment with sublethal concentration of Thiamethoxam the serum biochemical parameters of fish,*Channa punctuatus* could be altered. The levels of glucose, lactate, amino acid nitrogen (AAN), creatine, urea, bilirubin, phospholipids, triglycerides and non-esterified fatty acids (NEFA) increased with decrease in the level of protein, non-protein nitrogen (NPN), pyruvate and albumin during the toxic exposure periods at different time intervals in the serum of the fish.There was increase in the level of glucose due to glycogenic activity and decrease in protein level due to enhanced proteolytic activity under stress condition. Low levels of pyruvate and high level of lactic acid indicated that fish can shift from aerobic to anaerobic condition. The elevated levels of creatine, bilirubin, urea and decrease in the albumin context under stress condition revealed renal failure and acute hepatic necrosis. The levels of serum phospholipids, triglycerides, non esterified fatty acids (NEFA) were increased due to elevation which might be due to increased esterification reactions under stress condition.

Key words : Thiamethoxam, Biochemical parameters, Blood, *Channa punctatus*

INTRODUCTION

The pesticides in aquatic ecosystems affect non target organisms such as fishes and prawns. Pesticide hazard on fish mortality, growth and tissue damage has been amply reported by Jackson (1976). These toxic chemicals change the quality of water that affect the fish and other aquatic organisms (Dhasarathan *et al.,* 2000). Among all insecticides the organochloride (OC) are widely used to control pests because of their rapid effectiveness and easy biodegradation (Mahboob and Siddiqui, 2002). According to other researches OC cause a number of subsidiary problems like effecting growth and the reproductive and immune systems by causing morphological, pathological and physiological changes and by altering biochemical constituents of fish and other animals (Singh *et al.,* 2004; Seth and Saxena, 2003).

A number of recent clinical studies revealed that most of the OC and other toxic chemicals could alter the immune system (Barcarolli and martinez, 2004; Thangavel *et al.*, 2004; Chen *et al.*, 2004). Blood being the medium of intercellular transport comes indirect contact with various organs and tissues of the body. The physiological state of an animal at particular time is reflected in its blood. Moreover, pesticides rapidly bind to blood proteins and induce the immune system.

In the present study, the toxic effect of thiamethoxam (1-(2-chloro-1, 3-thiazol-5-ylmethyl)-5-methyl-1, 3, 5-oxadiazinan-4-ylidene N-nitroamine) on kidney and liver function and on serum biochemical parameters of *Channa punctatus* was investigated. The effect of a sublethal concentration of thiamethoxam in short term experiments is studied to understand the nature of the toxicity exerted by this pesticide on the vital activities of this species.

MATERIALS AND METHODS

Channa punctatus a fresh water edible fish, weighing average of 82-120 g and 25.5 $\pm$ 1.21 cm in length, were procured from a local market, Warangal (AP). The collected fish were kept in a cement tank (6x3x3 feet) atleast for one month for acclimatization under continuous water flow. The average temperature of water was 22$\pm$1^{0}C. The fish were fed *ad libitum* with groundnut cake along with the commercial pellets (1-1.5% body weight). They were starved one day before experiment (Butlerworth, 1972). Without discrimination of sexes, both the sexes of fish were used for the experiment. The physiological parameters of water are given in Table 1. The LC 50 of commercial grade thiamethoxam (114.8 ppm) was determined for 48 hours by the method of Bayne *et al.*(1977).

Batches of six (6) fish were exposed to 24,48,72 and 96 hours for sublethal concentration (38.26 ppm) along with control fish in separate tanks consisting of six liters of water, at the room temperature. After the stipulated time intervals, the fish were removed and the blood was collected in the tubes by caudal puncture. For