

# Evaluation of tissue protein due to toxicity of kinadon in the fish *Channa Punctatus* (Bloch.)

## Abstract

The experiment was conducted on fresh water fish *Channa punctatus* (Bloch.) to the study of kinadon toxicity of biochemical parameters and tissue. *Channa punctatus* (Bloch.) exposed to sublethal concentration for various periods extending up to 1 day, 7, 14, 21, 28, and 45 days at 5ppm, 10ppm and 15ppm. Kinadon shows dose dependent mortality in *Channa punctatus* (Bloch.) exposed to sublethal concentration for various periods extending up to 96 hrs at 8ppm, 16ppm, 32ppm, and 64 ppm.

**Keywords:** Kinadon, Toxicity, Fish Organophosphorus, Tissues, Liver, Kidney, Protein.

## Introduction

With the modernization of agricultural operations and rapid growth of industrial activities, there has been tremendous increase in the manufacture and uses of pesticides. Incidents of fish mortality have been reported from different seven parts of the world due to insecticidal treatment of the agricultural crops. Insecticides reach to aquatic systems by direct application, aerial spraying, washing from the atmosphere, by precipitation, erosion of land and discharge of effluents from the factories. The concentration of these insecticides is increasing day by day in the ponds, streams and rivers, since they are more frequently used for control of insects, injurious to human being, agricultural fields and forest areas. Their accumulation in living and non-living spheres endangers the life by modifying various behavioural, structural and functional activities. Pesticides are being used globally on an increasingly scale. In India too, use of these chemicals is steadily increasing and is expected to be about 149-795 tons by the year 1999-2000 (Gupta & Gupta, 1976). However, their tendency to concentrate in the non-target organisms through the food chain, ultimately produce toxicity to fishes, birds, widely and men. The present study evaluates the toxicity of a common pesticide, kinadon, on the tissue protein in the fish *Channa punctatus* (Bloch.).

## Aim of the Study

The aim of the present study is investigate the changes in biochemical parameters and liver and kidney tissues of fresh water fish, *Channa punctatus* exposed to intoxicant kinadon.

## Material and Methods

Full grown specimens of *Channa punctatus*, measuring 12-15cm in length and 29-65 grams in weight, were selected for the experiments. The fishes were collected during April and May when room temperature ranging from 27°C to 31°C and water temperature from 20°C to 25°C. They were acclimated to the laboratory conditions for 10 days before starting the experiments. They were stored in large glass aquaria measuring 75cm x 37.5 x 37.5cm and fed on small pieces of liver and fishes dead and were fed with commercially available fish food. The median tolerance limit was evaluated by using short term static bioassay method (APHA, AWWA) and SPCR, 1971). The protein of (liver& kidney) content was estimated by the method of Lowry et.al. (1951).

## Observations

The homogenized tissue total protein in the control group ranged from 111.1 to 144.4 with an average of 128.65mg/dl, in the liver.

The homogenized tissue total protein in the control group ranged from 11.1 to 38.8 with an average of 24.95 mg/dl in the kidney.(Table).

The homogenized tissue total protein after intoxication of kinadon at 1 day ranged from 222.2 to 277.7 with an average of 245.316mg/dl,



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while after 7 days ranged from 166.6 to 377.7 with an average of 281.43mg/dl; while after 14 days ranged from 11.1 to 27.7 with an average of 19.4 mg/dl; while after 21 days ranged from 172.2 to 277.7 with an average of 222.183mg/dl; while after 28 days ranged from 277.7 to 777.7 with an average of 574.01mg/dl and after 45 days ranged from 183.3 to 388.8 with an average of 297.166 mg/dl. The increase in the homogenized tissue total protein is very highly significant ( $P < 0.001$ ) after exposure time of kinadon of 1 day, 14 days, 28 days, and 45 days but 14 days is decreasing while highly significant ( $P < 0.001$ ) after exposure time of kinadon of 7 days and 21 days, at the 15ppm sub-lethal concentration in the liver.

The homogenized tissue total protein after intoxication of kinadon at 1 day ranged from 83.3 to

116.6 with an average of 100.883mg/dl; while after 7 days ranged from 22.2 to 333.3 with an average of 274.96mg/dl; while after 14 days ranged from 38.8 to 122.2 with an average of 80.5mg/dl; while after 21 days ranged from 44.4 to 144.4 with an average of 99.95mg/dl; while after 28 days ranged from 411.1 to 777.7 with an average of 583.3mg/dl; and after 45 days ranged from 166.6 to 194.4 with an average of 180.5mg/dl.

The increase in the homogenized tissue total protein is very highly significant ( $P < 0.001$ ) after exposure time of kinadon of 1 day, 7 days, 28 days and 45 days, while significant ( $P < 0.05$ ) after exposure time of kinadon of 14 days and 21 days, at the 15 ppm sub-lethal concentration in the kidney.

**Table 1: Effect of 15 ppm Kinadon Toxicity on the Tissue Total Protein of *Channa Punctatus* (Bloch.)**

No. of Fishes	Tissues		Exposure time in days						
			Control	1 day	7 Days	14 Days	21 Days	28 Days	45 Days
6	Liver	Range	111.1-144.4	222.2 -277.7	166.6 – 377.7	11.1-27.7	172.2-277.7	277.7-777.7	183.3-388.8
		Mean± S.E.	128.65±5.250	*** 245.316± 9.115	** 281.43 ± 33.67	***19.40± 2.374	**222.183± 16.033	***574.01± 71.25	*** 297.166± 30.421
6	Kidney	Range	11.1 – 38.8	83.3 - 166.6	222.2 – 333.3	38.8-122.2	44.4-144.4	411.1-777.7	166.66 – 194.4
		Mean ± S.E	24.95 ± 4.23	*** 100.883 ± 5.256	*** 274.96 ± 18.24	* 80.5± 13.053	* 99.95± 16.54	*** 583.3± 58.287	*** 180.5± 4.243

Value are in mg/150 mg of body weight.

Value are mean ±S.E. of six observations.

Value are significant at \* $P < 0.05$ , \*\* $P < 0.01$  and \*\*\* $P < 0.001$

#### Discussion & Conclusion

The toxicity of kinadon showed direct correlation with the concentration and time exposure, similar observations have been made in paraquat and diquat exposed copepods and in DDT and malathion exposed *Sarotherodon mossambicus* (Ramalingam & Ramalingam, 1982).

The total plasma protein level decreased significantly after 96 hours in the liver (Shukla and Sastry, 1998). But in the present study homogenized tissue total protein is increasing with decreasing of exposure time of kinadon while the toxicity in the liver. The decrease in protein content suggests that the energy is substituted by protein degradation or that there may be depletion in protein synthesis (Chitra and Rao, 1990) is increasing with an exposure time of kinadon toxicity in the kidney.) In acute exposure the protein content of liver decreased by 26.9% (Shukla and Sastry, 1998) However, In the present, homogenized tissue total protein is increasing with exposure of kinadon acute toxicity in liver and kidney. Conclusion: The present study showed a significant decreasing trend in liver protein and kidney protein with the increasing time exposure of kinadon. Failure of secretory function of liver cell has been evaluated to be responsible for reduction in protein activity. The toxic effects of intoxicant in *Channa punctatus* and found that the sub-lethal concentration changed the behaviour of *Channa* and a decrease in liver protein

content. This change may be due to damage caused to the hepatic tissue and increased proteolysis.

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