Journal of the Indian Fisheries Association,
10 & 11, 1980-81, 45 - 47

TOXIC EFFECT OF CHALKONES AND ANTITOXIC ROLE OF ASCORBIC ACID*

A. M. KHAN AND S. M. ALI**

Department of Chemistry & Department of Zoology, Science College, Nanded-431 602.

ABSTRACT

One of the chalkone synthesised in this laboratory was selected to determine its toxicity to fish, *Lepidocephalicthys thermalis* (Bleeker) at different concentrations and time periods. Ascorbic acid contents were determined and it was found to be antioxic.

INTRODUCTION

Role of ascorbic acid in mediating collegen and bone formation in *Salmo gairdneri* have been reported, (Halver, 1957). Gould (1963) reported the accumulation of ascorbic acid at the site of wound healing while Dey (1967) reported the action of ascorbic acid as detoxicant against the lethal action of Strychinine in rats. McCann and Jasper (1972) reported vertibral injuries and haemorrhages in *Lepomis macrochirus* after exposure to higher levels of different pesticides. Various substituted flavones and flavonones have been studied for their toxicity to fish. Many chalkones have been reported to possess antifungal and antibacterial properties. It was thought of interest to study the toxic effect of chalkone (4-chloro-3-Bromo-4-Hydroxy-5-Methoxy) in fish (*L. thermalis*) in vivo and to study the protective action of ascorbic acid against the lethal action of chalkone.

MATERIALS AND METHOD

A fresh water fish, *Lepidocephalicthys thermalis* weighing about 0.5 gm and 5 cm in length was chosen to study the toxic effect of chalkones synthesised in this laboratory. The fishes were maintained in glass aquarium at 19 $\pm$ 1°C filled with aerated water for 24 hrs at laboratory conditions. Experiments were conducted in circular glass jars containing 20 litres of well water. The chemical analysis of water was found to be as pH 7.5, conductivity 3.8 x 10^{-4} dissolved oxygen 5.7

* Paper presented at the 69th Session of Indian Science Congress, at Mysore.

** Present address : Staff Forest College, Coimbatour, Tamil Nadu.

ppm, free chlorine 0.0, acidity (phenolphthalein) 4.3 ppm, total alkalinity (Bromo-cresol indicator) 47.3 ppm and total hardness as calcium carbonate as 25.5 ppm.

The substance under investigation (Table) was dissolved in dioxane and its desired concentrations were prepared by adding water.

Table : Effect of Chalkone on tissue ascorbic acid levels in *Lepidocephalicthys thermalis* (Values expressed as mg/gm wet tissues are mean ± S.E. from 8 fishes in each group)

*Chalkone	Exposure period (hrs)	Tissues	
		Liver	Kidney
Control	—	223 ± 2.59	200 ± 2.91
0.05%	24	250 ± 3.9 P < 0.001	217 ± 2.44 P < 0.001
0.035%	48	272 ± 3.11 P < 0.001	230 ± 3.27 P < 0.001
0.02%	72	290 ± 3.05 P < 0.001	338 ± 3.4 P < 0.001
0.015%	96	305 ± 2.1 P < 0.001	242 ± 3.11 P < 0.001

* 4'-Chloro-3-Bromo-4-Hydroxy-5-Methoxy.

The Lc50 values were calculated by Probit Analysis Method and desired Lc50 for different periods were determined (Table). The alive male fishes from treated and controlled were pithed and immediately their liver and kidney were isolated and their ascorbic acid content was estimated by the modified method of Roe (1957).

RESULTS AND DISCUSSIONS

It is observed from the Table that ascorbic acid contents of fishes exposed to chalkone at 24 hrs Lc50 was increased compared to the control. In liver $P < 0.001$ and in kidney $P < 0.001$; were significant. After 48 hrs, 72 hrs and 96 hrs Lc50 showed an increased level of ascorbic acid content of liver and kidney compared to 24 hrs Lc50 values. Shanta and Motelica (1962) considered that the content of ascorbic acid in the tissues depends on the physiological stage of the fish as studied in *Mugil dussumieri*. Bai and Kalyani (1960) reported that ascorbic acid involved in oxidation and reduction system as catalyst or co-enzyme in teleost fishes. Parvatheswararao (1967) suggested that ascorbic acid to be fatigue retardant in *Etroplus maculatus*. Hutterer *et al.* (1968) reported that organophosphorus pesticides enhances the development of smooth membrane in the endoplasmic reticulum, it is corraborated with the present findings. The authors opine that it may be due to

a part of generalised increased demand of energy of fatigue retardent and it may be shifted from other body tissues to the liver and kidney. Chalkone was also acting as other toxicant and pesticides thus drug metabolizing enzymes of liver and kidney of *L. thermalis* exposed to 48 hrs, 72 hrs and 96 hrs for respective concentration of chalkone showed significant increase of ascorbic acid content compared to 24 hrs Lc50 values (Table). It is identical with the finding of Dey (1967).

The induction of detoxifying enzymes were accompanied by increase in ascorbic acid content of liver and kidney which stimulated detoxification of chalkone. Somasundaram *et al* (1978) in guinea pigs reported that liver and kidney are the actual site of detoxification having larger amount of ascorbic acid. It agrees with the present findings.

ACKNOWLEDGEMENT

Authors are grateful to Dr. B. R. Keshavan, Principal Science College, Nanded for facilities.

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