

HISTOPATHOLOGICAL EVALUATION OF VISCERAL ORGANS AND BRAIN OF AFRICAN CATFISH (*CLARIAS GARIEPINUS*) EXPOSED TO SUBLETHAL CONCENTRATIONS OF MALATHION

**Izzati Ali, ¹Intan Shameha Abdul Razak, ^{2,3}Hassan Hj. Mohd Daud
& ²Mohd Fuad Matori**

¹*Department of Veterinary Preclinical Sciences*

²*Department of Veterinary Clinical Studies*

³*Wildlife Research & Conservation Centre*

Faculty of Veterinary Medicine

Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

Abstract

Organophosphate is a neurotoxin that inhibits acetylcholinesterase. Exposure to organophosphate toxicants can be through inhalation, absorption and ingestion of food treated with an organophosphate herbicide or insecticide. Malathion is among the most frequently used organophosphate insecticides. Malathion has been associated with reproductive malfunction, neurotoxicity, kidney and liver damage and birth defects. The objective of this study was to determine the effect of malathion on the catfish species *C. gariepinus*. One hundred and ten mature catfish, *C. gariepinus* with a body length of about 15cm were obtained from Taman Pertanian Universiti, Universiti Putra Malaysia. Prior to experimental trial, the fish were acclimatised for one week in a clean fibreglass tank provided with aeration, biophysical filtration and treated with Aqua-Med[®] to remove external bacteria and parasites. The fish were exposed to four different malathion concentrations of 1.6, 3.2, 6.4 and 8.5 ppm in a controlled laboratory condition. The LC₅₀ of malathion at 48 hours was determined to be 3.2 ppm. In the acute exposure study, 40 catfish with an average length of 18.0 ± 2 cm were divided equally into four tanks. Tank 1 contained the control group, where the fishes were bathed in dechlorinated water provided with aeration and biophysical water filter. The fish in the other three tanks were exposed to malathion concentrations of 0.8, 1.6 and 3.0 ppm for 48 hours. The fishes were then euthanized with an overdose of MS222 and their visceral organs viz., kidney and liver tissues were fixed in 10% buffered formalin and the brain tissue in Bouin's solution. All samples were histologically processed and stained with H & E stains. Histopathological evaluations were carried out using lesion scores of 0 to 3 and the significant differences were tested by one-way ANOVA. The kidneys of the malathion-treated group showed necrosis, infiltration of inflammatory cells, and capillary congestion while the controls did not. There was no difference (p>0.05) in kidney lesions between malathion-treated groups. Liver necrosis, infiltration of inflammatory cells, congestion and haemorrhage were evident in the malathion-treated group, which was greatest (p<0.05) in catfish treated with 1.6 ppm malathion. There was no difference (p>0.05) in other lesions among treated groups. The control catfish did not show any lesion. The malathion-treated catfish also showed brain necrosis, congestion and infiltration of inflammatory cell, which were not significantly (p>0.05) different among

treatment groups. The control group did not show any brain lesion. The study showed that at concentrations below LD₅₀ and exposure time of 48 hours, malathion is moderately toxic to *C. gariepinus*.

Keywords: malathion, visceral organs, histopathology, *Clarias gariepinus*