INHIBITION AND RECOVERY OF ACETYLCHOLINESTERASE ACTIVITY IN THE GILLS OF THE CARP, *CIRRHINUS MRIGALA* EXPOSED TO 'NUVAN®'

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ABSTRACT

The polymorphic nature of cholinesterases (ChEs) present in the gills of an Indian Major Carp, *Cirrhinus mrigala*, has been characterized and acetylcholinesterase (AChE) was found to be in greater proportion. A significant decline in the gill AChE activity of the fish was observed on exposure to different sublethal concentrations of 'Nuvan®'. At 4h of exposure, the AChE activity decreased up to 68.81% at 5mg/l and 77.88% at 15 mg/l. At 4d, the inhibition was 87.1% at 5mg/l and 90.38% at 15mg/l. The inhibition of AChE activity is associated with influence on transmission of nerve impulses, resulting in improper functioning of gills. A gradual increase in the activity of gill AChE at different durations of recovery i.e. 2dr to 16dr, compared to that at 4d is observed. During recovery, the activity of the enzyme in fish exposed to 5mg/l and 15mg/l of 'Nuvan®', compared to those in control fish, are 68.54% and 48.33% respectively.

The study shows that the activities of the enzyme in the gills remain significantly lower even after long periods of recovery than those at controls. This indicates that the gills are unable to attain their normal metabolism even after long recovery periods. Therefore, analysis of sensitive indicators of insecticide exposure could provide useful guidelines which may help in minimizing the level of environmental pollution protecting the viability of fish populations.

KEYWORDS: Gills, *Cirrhinus mrigala*, Acetylcholinesterase, 'Nuvan®', Organophosphosphate