

3.4 Monitoring anti-cholinesterase contamination in Bathalagoda reservoir, Sri Lanka

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ABSTRACT

Organophosphorus and carbamate pesticides are widely used in Sri Lanka for agricultural pest management. They may enter inland water bodies draining agricultural watersheds and affect aquatic fauna including fishery resources. These pesticides are considered as anti-cholinesterases as they could inhibit the cholinesterase enzymes including acetylcholinesterase which plays an important role in maintaining normal functioning of the nervous system. Hence monitoring of anticholinesterase contaminations in inland water bodies is important yet difficult due to low persistence of many of these pesticides. In the present study, anticholinesterase contaminations in Bathalagoda reservoir, located in the vicinity of agricultural lands in Kurunagala District were monitored bimonthly during the period September 2007 to June 2008 using brain and muscle cholinesterases (ChE) of feral Nile tilapia (*Oreochromis niloticus*), as a biomarker (n=10). ChE activities were measured using standard methods established for this fish. The results show that ChE activities in brain and muscle tissues in feral fish were depressed significantly in comparison to the laboratory reared control fish by 57-72% and 59-78% respectively in September 2007 and December 2007. There were no significant gender specific differences in the ChE levels of the feral fish at each sampling stage. The brain and muscle ChE activities in the fish collected from the reservoir at each sampling stage were negatively correlated ($p < 0.05$) with the rainfall in the area. The depression of ChE levels in the brain and muscle tissue of feral tilapia may indicate the exposure of fish to anti-cholinesterase contaminations present in the reservoir during rainy periods.