Biological factors affecting brain and muscle acetylcholinesterases in *Oreochromis niloticus* (Nile tilapia): Implications in biological monitoring of aquatic pollution

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Acetylcholinesterse (AChE) in Nile tilapia is a promising biomarker for detection of organophosphorus and carbamate insecticide contaminations in aquatic environments. In the present study, effects of body size and sex on brain and muscle AChE of Nile tilapia unexposed to anti-cholinesterase compounds were evaluated with a view to assess the influence of biological factors on baseline enzyme levels in the fish. Brain and muscle AChE activities in the fish ranged from 8.19 to 31.96 and from 2.86 to 27.78 μmoles min^{-1} mg^{-1} tissue respectively (n=38). Results revealed that significant relationships exist between body size and the AChE activities in both tissues of the fish.

AChE activities in both tissues were inversely correlated ($P < 0.0001$) with the body length (4.5 – 23.5 cm) and the body weight (1.05 - 182.15 g) of the fish. However there was no significant difference ($P > 0.05$) between the AChE levels in the sexually mature male and female fish. Results demonstrate that the body size of the fish should be taken into account when using brain and muscle AChE in Nile tilapia as biomarkers in monitoring anti-cholinesterse chemical pollution in the aquatic environments. If fish of similar size are not available, it is recommended to estimate the variations in AChE activities using the relationships between the AChE activities and body size of the fish.

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