

Histopathology of gills and liver tissues of Nile tilapia inhabiting Bolgoda North Lake, Sri Lanka

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Bolgoda North Lake, an urban water body located in the Western Province of Sri Lanka is becoming polluted with anthropogenic chemicals including heavy metals and toxic organic pollutants such as polycyclic aromatic hydrocarbons. Histopathological lesions can be used as indicators for the effects of various anthropogenic pollutants on fish and are a reflection of the overall health of the entire fish population in the aquatic ecosystem. The present study was carried out to investigate the histological structure of gill and liver tissues of Nile tilapia (*Oreochromis niloticus*), a food fish inhabiting Bolgoda North Lake to evaluate the general health status of the fish population. The tissue samples were taken from the fish inhabiting the Lake during September 2007 to July 2009 and histological sections of the gill and liver tissues were prepared according to the standard methodologies. In addition serum sorbitol dehydrogenase (SDH) enzyme activities in the fish were determined to evaluate the chemically induced liver damage.

Several histological alterations in gill tissues viz. hyperplasia in primary and secondary lamellae, fusion of primary and secondary lamellae, mucous cell proliferation, necrosis in lamellar epithelial cells, lamellar hypertrophy, clubbing at the tips of secondary lamellae, and telangiectasis were observed in most of the fish examined. Epithelial hyperplasia in secondary lamellae and mucous cell proliferation were the most abundant types of lesions in the gill tissues of sampled fish. In addition metacercarian parasitic cysts in the gill tissue were observed in some of the fish examined. The liver tissues of the fish showed prominent histological alterations including swelling of hepatocytes, pyknosis of hepatocytes nuclei, breakdown of liver cell walls, cytoplasmic vacuolation, focal and zonal necrosis, fibrosis in the hepatic tissue, melano macrophage aggregates, vacuoles in the pancreatic tissue and bile ducts, pancreatic cell necrosis, and sinusoidal congestion in the blood vessels & central veins. Cytoplasmic vacuolation, focal cell necrosis and melano macrophage aggregates were the most common types of liver lesions observed in the fish. Histopathological alterations in gill and liver tissues of Nile tilapia indicate that the fish population residing in Bolgoda North Lake is under threat due to chemical contamination. Elevated serum SDH enzyme activities in the blood of the examined fish confirmed chemically induced liver damage.