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Clinico-pathological changes caused by ammonia toxicity in cultured *Oreochromis niloticus* (NileTilapia)

S G P B Samarasinghe* and G S P de S Gunawardena
Department of Veterinary Pathobiology, University of Peradeniya, Peradeniya

Ammonia is the principal nitrogenous waste product of teleosts and many invertebrates in both freshwater and seawater. Since, high un-ionised ammonia concentrations are toxic to aquatic organisms, this study was carried out to determine the clinico-pathological changes caused by ammonia toxicity in cultured Nile Tilapia (*Oreochromis niloticus*).

A total of 300 *O. niloticus* fingerlings of both sexes weighing 2.1 g – 2.7 g and length of 3.5 cm –5.1 cm were randomly assigned to glass tanks (15 cm x 15 cm x 45 cm) in groups of 10 fish each. The fishes were hand-fed with commercial fish feed at the rate of 5 % of body weight per day. Water quality parameters except ammonia concentration were maintained at standard levels throughout the experiment. Of the 300 fingerlings, 270 were exposed to a series of un-ionised ammonia concentrations (8.06, 7.26, 6.45, 3.88, 3.32, 2.77, 1.48, 0.73, 0.20 and 0.01 mg/ L) in three replications. Treated fish in each tank were examined for clinical manifestations and mortality at 20 minute intervals during the first four hours and hourly intervals up to ten hours and subsequently at 12, 14, 16, 18, 24, 30, 36 and 48 hours. Dead and moribund fish were subjected to detailed post-mortem examination including histopathology.

The fingerlings exposed to higher concentrations of ammonia showed hyperventilation, violent abnormal movements including convulsions, swimming at the surface and loss of balance. Subsequently, they show body spasms and sank down to the bottom of the tank and died after a period of coma. Gross pathological changes included congestion, oedema and abundant secretion of mucus in the gills. Chronic exposure to sub-lethal levels of ammonia caused histopathological changes characterised by proliferation and thickening of the gill lamellae epithelium and degenerative changes in the blood vessels, spleen and haemopoietic tissue in the kidney.

The present findings indicate that high levels of un-ionised ammonia in water lead to clinical manifestations and pathological changes causing disease and death in *O. niloticus*.

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*bhavetpath@yahoo.com Tel: 081-23955727