

Effects of Chronic exposure to sublethal levels of
cadmium on Growth Performance, Food Conversion
Efficiency and Haematological profile of Nile Tilapia
(*Oreochromis niloticus*) fingerlings

by

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Abstract

Fish populations inhabiting some water bodies in Sri Lanka are continuously exposed to sublethal levels of cadmium. However, long term effects of cadmium exposure on food fish species inhabiting freshwater bodies in Sri Lanka are not known. The aim of the present study was to examine effects of chronic exposure to environmentally relevant levels of cadmium on survival, growth performance, food conversion efficiency and haematological profile of the fingerlings of Nile tilapia, *Oreochromis niloticus*, an economically important cultured food fish species in Sri Lanka. Exposure levels of cadmium (0.01mg l^{-1} , 0.1mg l^{-1} and 0.5mg l^{-1}) were chosen to reflect those conditions possibly experienced by fish in their natural habitats.

Chronic exposure to 0.1mg l^{-1} and 0.5mg l^{-1} concentration of cadmium drastically reduced the survival of *Oreochromis niloticus* fingerlings. None of the fish exposed to 0.5mg l^{-1} cadmium survived by the 12th week whereas only 25% of the fish exposed to 0.1mg l^{-1} cadmium survived at the end of the 18 weeks exposure period. Body weight gain and specific growth rate of the *Oreochromis niloticus* fingerlings exposed to 0.01mg l^{-1} and 0.1mg l^{-1} concentrations of cadmium for 18 weeks decreased significantly. Feed intake and Food conversion efficiency of the fish exposed to 0.1mg l^{-1} concentration of

cadmium was reduced significantly in comparison to that of the control fish and fish exposed to 0.01mg l^{-1} cadmium.

Haematological study showed that red blood cell count and haemetocrit level of the fish were not affected following 18 weeks exposure to 0.01mg l^{-1} or 0.1mg l^{-1} cadmium whereas haemoglobin level in fish exposed to 0.1mg l^{-1} cadmium was significantly decreased leading to anemia. White blood cell count of the fish exposed to cadmium concentrations decreased with the increase in cadmium concentrations resulting leucopenia. Long term exposure of fish to 0.01mg l^{-1} and 0.1mg l^{-1} concentration of cadmium lead to changes in distribution of different leucocytes in the circulating blood causing lymphocytopenia coupled with neutrophila and monocytosis.

The present study revealed that long term exposure to environmentally relevant levels of cadmium (0.01mg l^{-1} , 0.1mg l^{-1} and 0.5mg l^{-1}) adversely affect the survival, growth, food conversion efficiency and haematological profile of the exposed fish in a concentration dependent manner. In conclusion, long term exposure to even low levels of cadmium (0.01mg l^{-1}) could adversely affect health status of the populations of *Oreochromis niloticus* fingerlings inhabiting inland water bodies in Sri Lanka.