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Assessment of toxic effects of therapeutic levels of formalin on fingerling and sub-adult stages of a culturable fish species, Oreochromis niloticus (Nile tilapia)

Although formalin is commonly used as a therapeutant in fish culture, ill health conditions in some fish species at therapeutic levels have been reported. The present study was conducted to investigate the effects of short term formalin bath treatments on the health status of fingerlings and sub-adult stages of *Oreochromis niloticus*, a culturable food fish species in Sri Lanka.

Health status of the fish was assessed under the laboratory conditions by monitoring survival, respiratory rates, erythrocytic indices in blood and histopathology of gill and liver tissues after one hour exposure to 50 mg L-1 - 250 mg L-1 formalin and after returning the exposed fish to clean water for 7 days. No significant toxic effects with respect to the parameters studied were observed in the fsh exposed to 50 mg L-1 formalin. Formalin induced increase in opercular movement rates of the fish exposed to 150 mg L-1 and 250 mg L-1 levels returned to the control levels towards the end of the exposure. After one hour, oxygen consumption rates of the fish exposed to 150 mg L-1 or 250 mg L-1 formalin decreased whereas number of red blood cells, hematocrit values and haemoglobin content in the blood elevated significantly. Prominent histopathological changes in the gill tissues, hyperplasia and hypertrophy of cells, epithelial separation and club shaped deformities were observed in the fish after exposure to 250 mg L-1 formalin. Some vacuolated areas in the liver cells of the fingerlings exposed to 250 mg L-1 formalin were also observed. Formalin induced alterations in oxygen consumption rates and erythrocytic indices in the blood and histopathological changes in gill and liver tissues could be reparable to some degree on return to fresh water for 7 days.

Results revealed that formalin could be used at the level of 50 mg L^{-1} for 1 hour for therapeutic purposes in Nile tilapia culture without undue harm to fish but precautions should be taken when using high concentrations of formalin especially for the fingerling stage of the fish.