

# **An Experiment on the Behavioural, Morphometric, and Histopathological Effects of Paraquat Dichloride on Nile Tilapia Fingerlings**

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Integrated rice-fish farming has several ecological benefits, which include providing biological control of pests and weeds, and increasing rice yield from the additional nutrients derived from fish faecal matter. Unfortunately, the success of this venture is uncertain due to factors such as limited water availability for irrigation and the contamination of freshwater sources by pesticides like paraquat dichloride, which can cause chronic or acute toxicity of fishes. As a consequence of the latter, behavioural, histopathological and morphometric changes in fishes can occur. This study observed and compared the aforementioned changes in 1g and 5g Nile tilapia (*Oreochromis niloticus*) fingerlings when exposed to paraquat dichloride. This species was selected since there is an increase in consumer preference for freshwater fishes, and there is high economic potential for Nile tilapia. 1g and 5g Nile tilapia fingerlings with average total lengths of  $4.172 \pm 0.473$  cm and  $6.435 \pm 0.0844$  cm, respectively, were exposed to lethal concentrations of 1%, 5%, and 24% paraquat dichloride, along with a control in a static bioassay study. Erratic swimming, hyperactivity, loss of equilibrium, and reduced feeding were among the abnormal behaviours noted for the 1g and 5g exposed groups. The histopathological changes in the gills, muscles, and intestinal tissues of the exposed fingerlings included necrosis, lesions, and blood clots. The fingerlings were found to have a negative allometric growth pattern. Behavioural and histopathological effects were more severe as the concentration and exposure period increased, with the younger fingerlings more vulnerable to the effects of paraquat dichloride than the 5g fingerlings. There were mortalities in all treated groups for both 1g and 5g fingerlings. The results obtained from this study will add to existing knowledge and can be used to encourage farmers to adopt other pest control measures to reduce contamination of water sources.

**Keywords:** Integrated rice-fish farming; paraquat dichloride; Nile tilapia