

Histomorphometric analysis of gills in Nile tilapia (*Oreochromis niloticus*) exposed to different concentrations of ammonia

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Abstract

The rapid development of aquaculture resulted in modern methods such as intensive aquaculture or water circulation systems producing agricultural wastewater with high concentrations of nitrogen pollutants. However, these pollutants and urban, industrial, and agricultural wastewater are harmful to aquatic animals and increase damage in gills and energy loss. The present study aimed to evaluate the histomorphometry of the gills of Nile tilapia exposed to different ammonia concentrations. **Juvenile *Oreochromis niloticus*** were prepared and kept in the 100l **aquariums** for adaptation. After completing these steps, the test was conducted based on the increase in susceptibility of Nile tilapia on ammonia. Then, an acute toxicity test was performed in the experimental and control groups for 96 hours according to the standard instructions. For sub-lethal toxicity studies, 120 Nile tilapia were categorized into four groups, including three groups based on different percentages of (10, 20, and 30% LC50 96h) and a control group. The groups were exposed to ammonia for 14 days at a stable physicochemical conditions. Finally, histological analysis was carried out on fish gills. Then standard method of paraffin sections followed and tissue sections, 4-6 μ thick were cut and stained with hematoxylin and eosin methods. The data obtained demonstrate that high concentrations of ammonia caused various gills tissue damage as hyperemia, filament swelling, increase in the number of chloride cells, necrosis and cell death, hyperplasia, hypertrophy and changes in behavior such as decreased appetite and mobility. The obtained data showed that an increase in ammonia level could cause irreversible damage to gill structure, and other tissues. Therefore, the habitats of these aquatic animals must be continuously monitored for ammonia levels.

Key words: Ammonia, Nile tilapia, Histomorphometric, Lethal concentration

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