

Sublethal Effects of Industrial Effluents on Fish Fingerlings (*Clarias gariepinus*) from Ologe Lagoon Environs, Lagos, Nigeria

Authors : Akintade O. Adebeyejo, Edwin O. Clarke, Oluwatoyin Aderinola

Abstract : The present study is on the sub-lethal toxicity of industrial effluents (IE) from the environment of Ologe Lagoon, Lagos, Nigeria on the African catfish fingerlings *Clarias gariepinus*. The fish were cultured in varying concentrations of industrial effluents: 0% (control), 5%, 15%, 25%, and 35%. Trials were carried out in triplicates for twelve (12) weeks. The culture system was a static renewable bioassay and was carried out in the fisheries laboratory of the Lagos State University, Ojo-Lagos. Weekly physico-chemical parameters: Temperature (OC), pH, Conductivity (ppm) and Dissolved Oxygen (DO in mg/l) were measured in each treatment tank. Length (cm) and weight (g) data were obtained weekly and used to calculate various growth parameters: mean weight gain (MWG), percentage weight gain (PWG), daily weight gain (DWG), specific growth rate (SGR) and survival. Haematological (Packed Cell Volume (PCV), Red blood cells (RBC), White Blood Cell (WBC), Neutrophil and Lymphocytes etc) and histological alterations were measured after 12 weeks. The physico-chemical parameters showed that the pH ranged from 7.82 ± 0.25 - 8.07 ± 0.02 . DO range from 1.92 ± 0.66 - 4.43 ± 1.24 mg/l. The conductivity values increased with increase in concentration of I.E. While the temperature remained stable with mean value range between 26.08 ± 2.14 - 26.38 ± 2.28 . The DO showed significant differences at $P < 0.05$. There was progressive increase in length and weight of fish during the culture period. The fish placed in the control had highest increase in both weight and length while fish in 35% had the least. MWG ranged from 16.59-35.96, DWG is from 0.3-0.48, SGR varied from 1.0-1.86 and survival was 100%. Haematological results showed that *C. gariepinus* had PCV ranging from 13.0 ± 1.7 - 27.7 ± 0.6 , RBC ranged from 4.7 ± 0.6 - 9.1 ± 0.1 , and Neutrophil ranged from 26.7 ± 4.6 - 61.0 ± 1.0 amongst others. The highest values of these parameters were obtained in the control and lowest at 35%. While the reverse effects were observed for WBC and lymphocytes. This study has shown that effluents may affect the health status of the test organism and impair vital processes if exposure continues for a long period of time. The histological examination revealed several lesions as expressed by the gills and livers. The histopathology of the gills in the control tanks had normal tissues with no visible lesion, but at higher concentrations, there were: lifting of epithelium, swollen lamellae and gill arch infiltration, necrosis and gill arch destruction. While in the liver: control (0%) show normal liver cells, at higher toxic level, there were: vacoulation, destruction of the hepatic parenchyma, tissue becoming eosinophilic (i.e. tending towards Carcinogenicity) and severe disruption of the hepatic cord architecture. The study has shown that industrial effluents from the study area may affect fish health status and impair vital processes if exposure continues for a long period of time even at lower concentrations (Sublethal).

Keywords : sublethal toxicity, industrial effluents, *clarias gariepinus*, ologe lagoon

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