

## ABSTRACT

The study was carried out to investigate the genotoxic and histopathological activities of buprofezin on a freshwater African catfish, *Clarias gariepinus* under laboratory conditions. The 96 h LC<sub>50</sub> value of buprofezin to *C. gariepinus* was estimated using probit analysis method and was found to be 0.24 g/200 L. The experimental fishes were exposed to sublethal concentrations of the LC<sub>50</sub> buprofezin at 0.15 mg/200 L, 0.30 mg/200 L and 0.60 mg/200 L for a periods of 8 days. During sublethal treatment on the 2<sup>nd</sup>, 4<sup>th</sup> and 8<sup>th</sup> day, the fish species showed several abnormal behaviours which including restlessness, arena movements, loss of equilibrium, increased opercular activities, strong spasm, paralysis and sudden quick movements during the exposure. In micronucleus analysis on the 2<sup>nd</sup>, 4<sup>th</sup> and 8<sup>th</sup> day, amount of binucleus, blebbed nuclei, lobed nuclei, and notched nuclei increased throughout the study from control to higher concentrations of buprofezin for the periods of 8 days. Haematological changes have been observed, and the amount of white blood cell, neutrophil, lymphocyte, monocyte, eosinophil, basophil, mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), red cell Distribution width (RDW) and platelet decreased while the amount of lymphocyte increased from control to higher concentrations of buprofezin for the periods of 8 days. Amount of aspartate transaminase (AST), alkaline phosphatase (ALP), alanine transaminase (ALT) and total protein level were declined and amount of total glucose was increased from control to the higher concentrations of treatment for the periods of 8 days. Histopathological changes were noted in gill, liver and kidney of *C. gariepinus* when exposed to sublethal concentration of buprofezin. Histological changes including significant decreases in the mean lengths of primary and secondary lamellae also occurred when *C. gariepinus* was exposed to buprofezin. In gills epithelia, we observed cellular proliferation that developed because of lamellae fusion, ballooning degenerations, or

club deformation of secondary lamellae and their cystic structures. In the affected liver, necrosis, vacuolization, haemorrhage, sac formation, and enlargement and rupturing of hepatocytes were observed. Structural damages such as desquamation of tubule, degeneration of tubular epithelium, necrosis, shrinkage of glomerulus and vacuolization were noted in the kidney such for the 8 days of exposure to buprofezin. Through this study we managed to conclude that the pesticide, buprofezin had induced biochemical, haematological, histological and micronucleus alterations. These biochemical, haematological, histological and micronucleus parameters offer a rapid and sensitive means of monitoring towards the impact of buprofezin on *C. gariepinus*.