

Acute phenanthrene toxicity to juvenile diploid and triploid African catfish (*Clarias gariepinus*): molecular, biochemical, and histopathological alterations

ABSTRACT

Information on the biological responses of polyploid animals towards environmental contaminants is scarce. This study aimed to compare reproductive axis-related gene expressions in the brain, plasma biochemical responses, and the liver and gill histopathological alterations in diploid and triploid full-sibling juvenile African catfish (*Clarias gariepinus*). Fish were exposed for 96 h to one of the two waterborne phenanthrene (Phe) concentrations [mean measured (SD): 6.2 (2.4) and 76 (4.2) g/L]. In triploids, exposure to 76 g/L Phe increased mRNA level of fushi tarazu-factor 1 (ftz-f1). Expression of tryptophan hydroxylase2 (tph2) was also elevated in both ploidies following the exposure to 76 g/L Phe compared to the solvent control. In triploids, 76 g/L Phe increased plasma alkaline phosphatase (ALP) and lactate dehydrogenase (LDH) levels compared to the other Phe-exposed group. It also elevated lactate and glucose contents relative to the other groups. In diploids, however, biochemical biomarkers did not change. Phenanthrene exposures elevated glycogen contents and the prevalence of histopathological lesions in the liver and gills of both ploidies. This study showed substantial differences between diploids and triploids on biochemical and molecular biomarker responses, but similar histopathological alterations following acute Phe exposures.

Keyword: Polyploidy; Fish; Biomarkers; Biochemical; Gene expressions; Histopathology