

Abstract

Moringa oleifera is renowned as a vegetable, source of vegetable oil and a medicinal plant that is responsible to provide therapeutic effects against toxins. The aim of present study is to explain protective properties of *Moringa oleifera* leaves powder against acute arsenic exposure (1mg) in grass carp, *Ctenopharyngodon idella*. For analysis, a total of 72 fish were divided in 6 groups (control group, arsenic group, arsenic+5% *Moringa*, arsenic +10% *Moringa*, 5% *Moringa* and 10% *Moringa*) in replicates (6 fish/ tank of 60L) for 45 days. After dissection liver and kidney samples were homogenized and centrifuged for enzyme analysis. Oxidative stress is evaluated through antioxidants activity i.e. GSH, GST and Lipid peroxidation (LPO). The lipid peroxidation (LPO) results revealed that the level of thio-barbituric acid reactive substances (TBARS) increases ($p < 0.05$) after arsenic exposure while decreases in *Moringa* treated groups and is normal in control group. In liver, level of GSH alleviates due to rise in ROS but an increase is observed in kidney. However, *Moringa* treated groups have shown significant increase ($p < 0.05$) in GSH level. Arsenic exposure lowers the GST level in both liver and kidney and increases in fish kidney in *Moringa* groups when compared to control. But in case of liver, a decrease in GST level in *Moringa* groups is due to anti-nutritional components present in this plant. Administration of *Moringa oleifera* as a dietary supplement induces ameliorative effects in liver, kidney and gills histology against arsenic exposure. Through current study, histopathological examination of gills show hypertrophy, crumpled secondary lamella, epithelial lifting, necrosis and hyperplasia in arsenic exposed fish. Damage in hepatocytes includes peliosis, patchy degeneration, blood hemorrhage and patchy degeneration. Likewise, examination of fish kidney in arsenic treated groups reveals change in glomerulus and Bowman's capsule size, vacuolation, and change in podocyte number and in distal and proximal convoluted tubules. *Moringa* seems to rectify the damage caused by arsenic. Among growth parameters, significant reduction ($p < 0.05$) in weight of arsenic exposed fish and significant increase ($p < 0.01$) in fish of *Moringa* treated groups is observed. These results explain that supplementation of *Moringa* is responsible to combat and reduce the arsenic induced damage in liver, gills and kidney through alterations in antioxidant activity, change in tissue organization and also as growth enhancer in fish.