**Abstract**

Bisphenol A (BPA), an organic compound which is widely used in the production of synthetic polymers, has been detected in surface water, sediments and biota and emerged as a ubiquitous contaminant in the aquatic environment. In the present study, *Labeo rohita* was exposed to sublethal concentration of BPA and hematological and biochemical responses were studied. The median lethal concentration of BPA to *L. rohita* was evaluated by probit analysis method and the value was calculated as 7.3 mg/L for 24 h. Fish were exposed to a sublethal concentration of 0.73 mg/L (1/10th of the 24 h LC50 value) of BPA for 35 days and hemato-biochemical and marker enzyme assays was performed at the end of 7, 14, 21, 28 and 35 days. The results revealed that there was a significant (P < 0.05) decrease in hematological (hemoglobin, hematocrit, mean corpuscular volume, mean corpuscular hemoglobin) and biochemical (protein) parameters in the BPA treated fish compared to control groups. White blood cells, glucose, aspartate aminotransferase, alanine aminotransferase and lactate dehydrogenase parameters were enhanced in experimental fish relative to control groups. However, the response of red blood cells, mean corpuscular hemoglobin concentration and gill Na+/K+-ATPase activity were found to be biphasic. In conclusion, the present investigation showed that analysis of hematological and biochemical parameters can be used as biomarkers for monitoring of BPA in the aquatic ecosystem.