**Abstract**

The fate and effect of nanomaterials in the environment has raised concern about their environmental risk to aquatic organisms. Silica nanoparticles (SiO2-NPs) find its uses in various fields and are inevitably released into the environment. However, the ecotoxicological effects of SiO2-NPs on the freshwater fish remain poorly understood. The aim of this study was to evaluate the effect of different concentrations (1, 5 and25mgL\_1) of SiO2-NPs on certain hematological, ionoregulatory and enzymological profiles of a freshwater teleost fish *Labeo rohita*. Hematological parameters such as hemoglobin(Hb), hematocrit (Hct), red blood cells (RBC), white blood cells (WBC), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) values were altered in SiO2-NPs treated groups. Likewise, plasma electrolytes such as plasma sodium (Na+), potassium (K+) and chloride (Cl-) levels and Na+/K+ATPase activity in gill of SiO2-NPs treated groups were altered in all concentrations throughout the study period (96h). The alterations of these parameters were found to be dependent on dose and exposure period. The results of the present study indicate that the alterations of these parameters may relate to physiological stress system to SiO2-NPs toxicity and also demonstrate that manufactured metaloxide NPs in aquatic environment may affect the health condition of the aquatic organisms.