**Abstract**

Plants comprise a large portion of our biosphere and constitute a vital link in the food chain. Due to the highly conserved structure of the genetic material, it is possible to use a broad variety of species in genotoxicity tests. In this present study an attempt to analysis the Physico-Chemical Parameters, toxicity and Growth Inhibition test (Shoot and Root Length), Cytotoxicity and potential toxicity in Allium cepa root meristem cells were grown in Orathupalayam Dam Water. The Physico-Chemical Parameters of Dam water was found to be permissible limit when compared to the World Health Organization (WHO) Standards. Dissolved Oxygen, Total Hardness, Sodium, Potassium, Chloride, was found to be excess of permissible limit when compound to the WHO standards. Allium cepa root meristem cells were grown in the Orathupalayam Dam water sample shows a cytological damage. The two different leaf extracts in onion root tips grown in Orathupalayam Dam water, increasing the concentration of Ocimum sanctum leaf extract which inhibit the cytotoxic effect where as in case of Azadirachta indica leaf extracts, increasing the concentration of a leaf extract induces the cytotoxic effect. Key words: Genotoxicity, cytotoxicity, Allium cepa root, Ocimum sanctum,