

Research Group: Aquatox and Sustainable Fisheries

Research Team

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Research Description: This research group interested to work on genotoxic effects of metals on fish and other animals. Heavy metals are the major environmental pollutants entering the ecosystem through agricultural runoff, industrial effluents, mining activities etc. The metals cause oxidative stress mediated genotoxic damage in exposed animals. Thus understanding the time and concentration dependant DNA damage in fish due to heavy metals is important for sustainability of fisheries and aquaculture in Pakistan. I am interested in **environment** with special reference to pollutants (heavy metals, pesticides) and it monitoring. We are also interested in sustainable **fisheries and aquaculture** especially related to developing possibilities of **integration of aquaculture with hydroponics (Aquaponics)** in Pakistan. We are working since five years on aquaponics also. This focus on water conservation, protection of water sources from fertilizers, pesticides etc, energy conservation and reduced pressure on land as it is soilless system.

Aquatic ecosystems are subjected to multiple toxicants, including pollutant cocktails. Evaluating the combined effects of these toxicants on organisms is a great challenge in environmental sciences. Synergistic / additive effects between compounds in metals mixtures may lead to a dangerous underestimation of their impacts on aquatic vertebrates. During the last few decades, the mammalian species were used as models for the study of molecular biomarkers of oxidative stress caused by pollutants to elucidate the mechanisms underlying cellular oxidative damage and to study their adverse effects. The assessment of genotoxicity of heavy metals in aquatic ecosystems has been an area of current research for detecting genotoxicity in aquatic animals.

Through the food chain these metals will reach to the humans and will cause similar effects in them. An understanding about the deleterious effects of the metals in fish and their safe permissible concentrations in the aquatic environment would be highly essential for fish conservation and fisheries development.

Research Projects:

1. Comparative analysis of oxidative stress biomarkers associated with DNA instability as a function of metal pollution in fish from Ravi and Chenab River, Punjab (Funded by HEC worth 2.307383/- million rupees) (NRPU, Project Ongoing))
2. In vivo induction of oxidative stress associated with genotoxicity in *Cyprinus carpio* and *Oreochromis niloticus* under metals mixtures exposure (SRGP, Project Completed)
(No: 21-1361 /SRGP /R&D/HEC/2016)
3. Studies on the Histopathological and Hematological alterations in fish under chlorpyrifos and endosulfan stress (SRGP, At final Stage) (Ref.#21-1473/SRGP/R&D/HEC/2016)

