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# Assessment Of Immunotoxicity By Quantitative Alteration Correlated With Ros Generation In Haemopoietic Cell Population In *Labeo Rohita* (Hamilton, 1822) Exposed To Azadirachtin

Sen, Bidisha M. <sup>1,2\*</sup> and Homechaudhuri, Sumit<sup>1</sup>

<sup>1</sup>Aquatic Bioresource Research Laboratory, Department of Zoology, University of Calcutta, 35 Ballygunge Circular Road, Kolkata 700019, India

<sup>2</sup>Post Graduate Department of Zoology, Asutosh College, 92, S. P. Mukherjee Road, Kolkata-700026, India

Contact email: sen.bidisha07@gmail.com

## Abstract

The increasing emphasis on the assessment and ecological monitoring of freshwater ecosystems has highlighted the necessity to deploy and subsequently evaluate appropriate biological indices. In the present study, haemopoietic tissue imprints and flowcytometric analysis were employed to assess the impact of plant pesticide, azadirachtin (at No Observed Effect Limit concentration) on

the cellular composition of head kidney cells from freshwater carp, *Labeo rohita*. The small lymphoidhemoblast decreased significantly throughout the experimental tenure whereas transient stages (i.e. basophilic erythroblasts, polychromatophilic erythroblasts and acidophilic erythroblasts) increased significantly suggesting the immediate requirement of younger erythroid cells into circulation post agrocontaminant exposure. Among leucocytes, the percentage of neutrophils rose and percentage of lymphocyte decreased significantly suggesting the impaired leukopoietic efficiency. Flowcytometric analysis clearly subdivided the entire head kidney cell population into two separate groups, viz. granulocytes and lymphocytes. In a time dependent and dose independent experiment, these two populations showed significant variation ( $P$  value .000 and .003) and Pearson correlation suggested that both are negatively correlated (-.718). Flowcytometric measurement of ROS production showed linear regression throughout the experimental tenure. A significant rise in ROS production indicated that these are good “oxidative stress biomarkers” for the ecotoxicological assessment of any pollutants, even in a limited exposure. Thus, this study establishes a novel and easy approach towards characterization of fish head kidney cell population which can be exploited to compare pattern of quantitative cell subpopulation alteration due to external stress factor and an alternative system for immunotoxicity testing of xenobiotics in native freshwater fishes.

**Key words:** Azadirachtin, head kidney, erythrocytes, leucocytes, flow cytometry, Reactive oxygen species (ROS), biomarker, *Labeo rohita*.





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Knowledge Partners:





**Bidisha Maitra Sen<sup>1\*</sup> and Santl Ranjan Dey<sup>2</sup>**

<sup>1</sup>Department of Industrial Fish and Fisheries, Asutosh College, Kolkata, India

<sup>2</sup>Department of Zoology, Rammohan College, Kolkata, India

\*Correspondence Author's Email: sen.bidisha07@gmail.com

**ABSTRACT**

Ichthyofaunal diversity refers to the variety of fish species; depending on the varied context and dimension viz. species of life forms within a fish community or the alleles or genotypic variation found within any piscian population. Biodiversity analysis of a specific aquaregime is essential for stabilization of ecosystems, protection of overall environmental quality and for understanding the intrinsic worth of species diversity. The Dinajpur district, West Bengal, India is a region of high biological diversity and endemicy of terrestrial and aquatic fauna, but there is no documentation about its freshwater species distribution. In this present study, the study sites were selected along the stretch of Atrae (Indian Part) and Tangon (Indian part) and was carried out during January, 2015 to December, 2016. Fish sampling was done at different points; each point is 5 KM apart, on monthly basis at dawn, with the help of Fishermen during the course of study. The study revealed the occurrence of 89 species of fishes belonging to 57 genera, 28 families and 13 orders. A comparison of species richness (SR) was performed in between these two rivers. Attempts have been made to portray the fish diversity of the region zoogeographically, evaluate their conservation status and emphasize the value of conserving ichthyofaunal heterogeneity. Though much of the information related to habitat and feeding preferences of the fishes of this region is lacking, it is speculated that the differences in their activity pattern and body print could be related to food choices and predator avoidance.

**Keywords:** Fish, Dinajpur, diversity, species richness, body print