IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 2, September 2025
Impact Factor: 7.67

Metabolic Adjustments in Glycogen Profiling of Cirrhinus Mrigala under Pirimicarb-Induced Stress

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Abstract: *Aquatic toxicology is a multidisciplinary field that not only measures contaminant levels to assess hazards in aquatic ecosystems but also evaluates how these contaminants affect aquatic life and, ultimately, human health. It is broadly defined as the study of the adverse effects of synthetic and natural chemicals, as well as other materials, on aquatic organisms at cellular, tissue, organ, population, community, and ecosystem levels. Historical incidents have clearly demonstrated the harmful consequences of anthropogenic chemical contaminants on aquatic environments and human populations.Among these contaminants, Pirimicarb, a selective carbamate insecticide, has been widely used as an effective aphicide since the 1990s in India. Chemically, Pirimicarb ($C_{11}H_{18}N_4O_2$) is N, N,4,5-tetramethylpyrimidin-2-amine substituted with oxygen dimethyl carbamoyl at position 4. It belongs to the class of synthetic amino-pyrimidines and tertiary amino compounds derived from dimethyl carbamic acid. This compound is a colourless solid with a molecular weight of 238.29 g/mol, solubility of 2700 mg/L in water, density of 1.21 g/cm^3, and a vapour pressure of 7.28 × 10^{-6} mmHg.Due to its higher aphicidal efficacy compared to other carbamates, Pirimicarb is used extensively worldwide. However, its continuous application raises concern about non-target toxicity, particularly in aquatic systems. The present investigation was therefore undertaken to evaluate the toxicological impact of Pirimicarb on glycogen metabolism in freshwater fish* Cirrhinus mrigala *under acute exposure, providing insights into its role as a metabolic biomarker of pesticide-induced stress*

Keywords: Aquatic toxicology, pirimicarb, Cirrhinus *mrigala,* Glycogen metabolism, acute exposure, biomarker

DOI: 10.48175/IJARSCT-29005