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REVIEWER'S REPORT

Manuscript No.: IJAR-52728 Date: 10-07-2025

Title: BIOCHEMICAL ALTERATIONS AS TOTAL PROTEINS (TP), ASPARTATE, AMINOTRANSFERASES (AAT) AND ALANINE AMINO TRANSFERASES (ALAT) INDUCED BY CHLORPYRIFOS (AN ORGANOPHOSPHATE) IN THE FISH *CHANNA PUNCTATA* (BLOCH)

Recommendation:
Accept as it

Rating	Excel.	Good	Fair	Poor
Originality	√			
Techn. Quality		√		
Clarity			√	
Significance		√		

Reviewer Name: Dr. Manju M **Date:** 10-07-2025

Reviewer Comment for Publication.

1. Experimental procedures lack clarity; concentrations, replication, and LC_{50} derivation must be described
2. Chlorpyrifos exposure significantly reduced total protein levels in Channa punctata.
3. AAT and ALAT enzyme activities increased under both lethal and sub-lethal conditions.
4. Biochemical changes were prominent in vital organs like liver, gills, and kidney.
5. Protein breakdown and gluconeogenesis were likely triggered by toxic stress.
6. Prolonged exposure disrupted energy metabolism, leading to tissue damage and possible mortality.
7. Discussion is overly speculative; conclusions must be supported by data and relevant literature citations.

Detailed Reviewer's Report

1. Objective of the Study
The study aimed to evaluate the toxicological impact of Chlorpyrifos (organophosphate pesticide, technical grade and 20% EC) on biochemical parameters in *Channa punctata* by exposing the fish to lethal (4 days) and sub-lethal (10 days) concentrations based on 96-hour LC_{50} values.

2. Experimental Design
- **Test organism:** *Channa punctata* (freshwater fish)
- **Toxicants used:** Chlorpyrifos (Technical grade and 20% EC)
- **Exposure duration:**
  - Lethal concentration – 4 days
  - Sub-lethal concentration – 10 days
- **Organs studied:** Gill, Liver, Kidney, Brain, Muscle

3. Biochemical Parameters Monitored
Three key biochemical parameters were measured in the fish tissues:

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- Total Proteins (TP)
- Aspartate Aminotransferase (AAT)
- Alanine Aminotransferase (ALAT)

4. Observed Changes in Total Protein (TP)

- A significant decrease in total protein levels was recorded in all five organs.
- This indicates protein degradation (proteolysis) under toxic stress.
- Decreased protein content reflects disruption in protein metabolism and energy balance.

5. Increased Enzyme Activity (AAT and ALAT)

- A marked increase in AAT and ALAT enzyme activity was observed.
- These enzymes are indicators of tissue damage and are involved in amino acid metabolism.
- Elevated levels suggest enhanced gluconeogenesis to meet the energy demands under stress.

6. Mechanism: Proteolysis and Hormonal Imbalance

- Exposure to Chlorpyrifos likely causes proteolysis (protein breakdown), leading to decreased TP.
- Hormonal imbalances due to toxicant exposure disrupt normal physiological functions, accelerating protein degradation.

7. Free Amino Acid Accumulation

- Due to proteolysis and increased aminotransferase activity, free amino acids accumulate in tissues.
- These are used in alternative energy-generating pathways due to the energy crisis caused by pesticide exposure.

8. Energy Depletion and Metabolic Stress

- Toxic exposure results in depletion of primary energy sources (carbohydrates, proteins).
- Gluconeogenesis (synthesis of glucose from amino acids) becomes active to maintain energy supply, further consuming protein stores.

9. Tissue and Organ Damage

- Continuous metabolic stress leads to cellular and tissue damage in vital organs.
- This is supported by the rise in AAT and ALAT, which leak from damaged cells into tissues and blood.

10. Mortality and Ecological Impact

- The combined effects of biochemical disruption, energy depletion, and tissue damage ultimately lead to organ failure and death of the fish.
- This has serious implications for aquatic ecosystems, indicating Chlorpyrifos toxicity poses a threat to non-target species.

11. Applications

- Used to assess the impact of pesticide pollution on aquatic ecosystems.
- Helps identify biochemical markers (like AAT and ALAT) for early detection of pesticide-induced stress in fish.