

REVIEWER'S REPORT

Manuscript No.: **IJAR-51792**

Date: 21-05-2025

Title: THE CONTENT OF HEAVY METALS (CD, PB, AND CR) IN WATER AND SEDIMENT IN THE MESUJI RIVER, LAMPUNG, INDONESIA

Recommendation:

Accept as it is

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

Reviewer Name: Dr. Manju M

Date: 21-05-2025

Reviewer's Comment for Publication:

1. The study would benefit from a more detailed identification of potential sources of Cd, Pb, and Cr contamination along the Mesuji River.
2. Include more information on sampling methods, analytical techniques, and statistical analyses to enhance reproducibility and credibility.
3. The discussion should further explore the implications of seasonal variations and metal correlations for long-term river health and policy development.

Detailed Reviewer's Report:

1. Background and Importance of the Mesuji River

- The Mesuji River is a crucial natural resource, supporting human populations for drinking, irrigation, aquaculture, and recreational activities.
- It falls under Class II water quality standards as per Government Regulation No. 22 of 2021, indicating that it should be suitable for recreational and aquaculture uses.

2. Heavy Metal Contamination: A Growing Concern

- Heavy metals (Cd, Pb, and Cr) are toxic pollutants that can accumulate in river sediments and water, potentially affecting both ecological and human health.
- Contamination from these metals is a primary concern due to the potential for bioaccumulation in aquatic organisms and subsequent human exposure.

3. Study Objective and Scope

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- The study aimed to measure the concentrations of Cadmium (Cd), Lead (Pb), and Chromium (Cr) in both water and sediment at seven sampling stations along the Mesuji River.
- The study was conducted during two distinct seasons: the rainy season and the dry season, to assess seasonal variability.

4. Methodology

- Water samples were collected using polyethylene bottles, and sediment samples were collected using sediment corers.
- Analytical measurements for heavy metal concentrations were conducted using Atomic Absorption Spectrophotometry (AAS), following standard procedures.

5. Key Findings: Heavy Metal Levels in Water and Sediment

- The study found that heavy metal concentrations in the Mesuji River were within Class II quality standards:
 - ✚ Cadmium (Cd): 0.001 – 0.005 mg/L in water and 0.2 – 0.6 mg/kg in sediment.
 - ✚ Lead (Pb): 0.01 – 0.04 mg/L in water and 10 – 30 mg/kg in sediment.
 - ✚ Chromium (Cr): 0.02 – 0.06 mg/L in water and 30 – 90 mg/kg in sediment.
- These values indicate that the river is not heavily polluted by these metals at the time of the study.

6. Correlation Analysis

- Cadmium (Cd) showed a weak negative correlation (-0.217) between water and sediment concentrations, suggesting that Cd in the water does not significantly correlate with its accumulation in sediment.
- Lead (Pb) and Chromium (Cr), on the other hand, showed strong positive correlations (0.801 for Pb and 0.822 for Cr), indicating that the presence of these metals in water is closely linked to their accumulation in river sediments.

7. Seasonal Variations

- The study observed that seasonal changes (rainy vs. dry seasons) had minimal effect on metal concentrations in water.
- However, slight increases in sediment concentrations during the dry season suggest that lower flow rates and reduced sediment movement in the river could lead to more localized accumulation of metals.

8. Ecological Implications

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- Lead (Pb) and Chromium (Cr), with their strong positive correlation in water and sediment, may point to continuous sources of contamination, possibly linked to industrial activities, urban runoff, or agricultural practices.
- Cadmium (Cd), while present, does not seem to be accumulating significantly in sediment, but its presence in water may still pose a risk to aquatic organisms and the food chain.

9. Recommendations for Pollution Control

- Regular monitoring of heavy metals in both water and sediment is recommended to track trends over time.
- Investigate potential sources of Pb and Cr contamination, especially in upstream and industrial areas.
- Address the potential risks posed by sediment-bound metals through erosion control and riverbank stabilization.
- Educate local communities and industries on reducing heavy metal inputs into the river.
- Strengthen regulations on industrial and agricultural runoff, ensuring compliance with water quality standards.

10. Significance of the Study

- : Ensures that water quality remains safe for consumption and recreational use.
- : Identifies emerging trends in heavy metal contamination, allowing for timely intervention.
- Provides data to guide policymakers and stakeholders in implementing effective pollution control measures.