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REVIEWER'S REPORT

Manuscript No.: IJAR-53027 Date: 28-07-2025

Title: Health risks assessment of heavy metals (Al, Cd, Cr, Cu, Fe, Ni, Pb) linked to the consumption of used fish frying oils used by Â"garbaÂ" traders : case of the city of Daloa,

Recommendation:
Accept as it is

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

Reviewer Name: Dr. Manju M **Date:** 28-07-2025

Reviewer's Comment for Publication.

1. The study uses reliable and internationally accepted methods (AAS, WHO/FAO frameworks) for heavy metal detection and health risk assessment, enhancing the credibility of its findings.
2. By calculating both Hazard Index (HI) and Incremental Lifetime Cancer Risk (ILCR), the study effectively assesses both non-carcinogenic and carcinogenic risks for adults and children.
3. While metal concentrations are within safe limits, the slightly higher risk for children underscores the need for targeted protection of vulnerable groups and public awareness.
4. More detailed information on oil reuse frequency, frying conditions, and sampling practices would improve the study's reproducibility and clarity.
5. The call for continued monitoring is valuable, but should be expanded to include vendor education, local reuse guidelines, and potential longitudinal studies on long-term effects.

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Detailed Reviewer's Report

1. Prevalence of Palm Oil Reuse in Street Food Preparation:

Palm oil is the dominant cooking oil in Côte d'Ivoire and is commonly reused multiple times by garba vendors—raising concerns over the accumulation of harmful contaminants due to repeated heating.

2. Potential Health Risks from Heavy Metals:

Reused cooking oils can accumulate heavy metals (e.g., Pb, Cd, Cr) from frying equipment, food items, and environmental exposure. These metals may pose both carcinogenic and non-carcinogenic health risks when ingested regularly**.**

3. Study Objective and Focus Area:

The study aimed to evaluate the safety of reused palm oil used by fish-frying *garba* vendors in Daloa by analyzing heavy metal concentrations and assessing human health risks associated with consumption.

4. Systematic Sample Collection

15 oil samples were collected from street vendors across various areas of Daloa between May and July 2024. Care was taken to maintain the integrity of each sample through proper storage and transportation.

5. Use of Atomic Absorption Spectroscopy (AAS)

Heavy metals—**Al, Cd, Cr, Cu, Fe, Ni, Pb**—were detected and quantified using **AAS**, a highly sensitive and accurate technique for measuring trace metal concentrations in edible oils.

6. Compliance with International Safety Standards

The detected concentrations of all seven metals were below permissible limits established by CODINORM, FAO, and WHO for refined edible oils, suggesting safe levels for human consumption.

7. Acceptable Oil Quality Despite Reuse

Despite repeated use in frying, the reused palm oil samples maintained acceptable quality, with no metal concentration exceeding regulatory safety thresholds for edible oils.

8. Non-Carcinogenic Risk (Hazard Index, HI)

All calculated Hazard Index (HI) values were below 1 across all age groups, indicating no significant non-carcinogenic health risk from ingestion of reused oil.

9. Carcinogenic Risk (ILCR) Assessment

The Incremental Lifetime Cancer Risk (ILCR**)** values for both adults and children were well below the 10^{-6} safety threshold**,** suggesting a minimal carcinogenic risk associated with the consumption of reused oil.

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10. Children's Higher Vulnerability

While all risk values remained within safe limits**,** children exhibited higher HI and ILCR values than adults, underlining their increased susceptibility to metal exposure due to lower body weight and dietary habits.

11. Public Health Implications

Findings indicate that reused palm oil from *garba* vendors in Daloa is currently safe for consumers. However, the potential for cumulative exposure necessitates regular monitoring and preventive public health strategies.

12. Recommendations for Risk Mitigation

The study recommends:

- Ongoing surveillance of street-vended oils,
- Public education on safe oil reuse practices,
- Policy development on acceptable reuse limits, and
- Child-focused interventions to protect the most vulnerable population groups.

13. Main Significance of the Study

The study provides scientific evidence that reused palm oil used by garba vendors in Daloa does not currently pose significant health risk**s** from heavy metal contamination, supporting its safe consumption under existing conditions—while also emphasizing the need for continued monitoring and public awareness to prevent future health impacts, especially for vulnerable groups like children.