

Title: Multifactorial analysis of the effects of temperature, solute/solvent ratio, and ultrasound amplitude on the extraction of phenolic and antioxidant compounds from *Aloysia citriodora* Palau leaves (#115261)

1. Basic Reporting

Strengths:

1. The article is generally well-written with appropriate scientific language.
2. Background information is sufficient and includes up-to-date literature.
3. Figures and tables are relevant, clearly labeled, and well-referenced in the text.
4. Keywords and abstract are informative and match the manuscript content.
5. The study adheres to PeerJ's structural and formatting guidelines.

Suggestions for Improvement:

1. There are occasional grammar and phrasing issues, e.g., line 31 ("An ultrasonic assisted extraction was applied...") should be revised to "Ultrasonic-assisted extraction was applied...."
2. A language edit could further improve clarity and readability.
3. Some figures are mentioned without visual inserts ("Insert Figure 1", etc.). Ensure all are present and correctly placed.

2. Experimental Design

Strengths:

1. The use of a full factorial 3^3 design is appropriate for evaluating multiple interacting factors.
2. The methodology for antioxidant capacity assessment is robust and uses multiple radical scavenging assays (ABTS, DPPH, OH).
3. Statistical treatment (ANOVA, regression analysis) is comprehensive and supports the conclusions.

Suggestions:

1. While the methods are described in detail, including more information on how extract stability was controlled during and after processing would be helpful.
2. The ultrasound device settings (frequency, probe type) should be specified for reproducibility.
3. Justify why a 10-minute extraction time was chosen when other studies mentioned longer durations.

3. Validity of the Findings

Strengths:

1. The conclusions align with the results obtained and do not overreach.
2. Control compounds (Trolox, gallic acid, ascorbic acid) strengthen the findings' credibility.

3. IC50 values are well-documented, and the treatment T3R3A2 is convincingly shown as optimal.

Suggestions:

1. Discuss potential variability due to plant age, harvest season, or drying methods in the context of extract efficacy.
2. Mention limitations regarding extrapolation of in vitro antioxidant assays to in vivo applications.

4. General Comments

Overall Evaluation: This is a scientifically sound manuscript with significant value in optimizing plant-based antioxidant extraction techniques. The results are of potential interest to researchers in food science, pharmacognosy, and natural product chemistry.

Specific Suggestions:

1. Add a schematic of the experimental workflow to enhance understanding of the factorial design.
2. Consider comparing ultrasound extraction with other modern techniques briefly (e.g., microwave or pressurized liquid extraction) in the discussion.
3. Expand the conclusion to include a brief discussion of industrial or pharmaceutical implications.

5. Confidential Notes to the Editor (if needed)

The manuscript presents original research with solid methodology and interpretation. It is suitable for publication after minor revisions, particularly with language polishing and minor clarifications in the methodology.