ISSN(O): 2320-5407 | ISSN(P): 3107-4928

ISSN NO. 2320-5407

International Journal of Advanced Research

Publisher's Name: Jana Publication and Research LLP

www.journalijar.com

REVIEWER'S REPORT

Manuscript No.: IJAR-56942

Title: "Phytochemical Properties and In Vitro Antioxidant Activity of Lawsonia inermis (L) Extracts"

Recommendation:

Accept as it is .....

✓ Accept after minor revision.....

Accept after major revision .....

Do not accept (*Reasons below*) .....

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

Reviewer Name: Dr S. K. Nath

Detailed Reviewer's Report

Strengths of the Study:

- The study addresses an important traditional medicinal plant, Lawsonia inermis, with a focus on its phytochemical composition and antioxidant potential.
- Utilizes a comprehensive array of methods including spectrophotometry, HPLC analysis, and antioxidant assays (ABTS and DPPH), which enrich the robustness of the findings.
- Identification of specific phenolic compounds such as Apigenin, Chlorogenic acid, Lawsone acid, and Protocatechic acid contributes valuable qualitative data to the phytochemistry of L. inermis.
- The correlation between phytochemical content and antioxidant activity is well established, providing insight into potential health benefits.
- The research is relevant to the fields of phytochemistry, ethnopharmacology, and natural antioxidants.

Weaknesses of the Study:

- The sample size appears limited to the collection from a single location, which may affect the representativeness and generalizability of the findings.
- The study lacks details regarding ethical considerations, approval from an ethics committee, or informed consent procedures for plant collection.
- The statistical analysis approach, while mentioning ANOVA, is not detailed sufficiently; reproducibility and clarity on data variability are limited.
- The discussion does not sufficiently compare findings with previous studies or elaborate on the implications of identified compounds in biological systems.
- There is some inconsistency in the presentation; for example, the figures referenced (chromatograms, spectral data) lack detailed captions and integration into the discussion.
- Minor typographical and grammatical errors are present that affect clarity and professionalism.
- The references are somewhat outdated; including more recent studies could strengthen the contextual background.

Reviewer Comments:

- **Title and Abstract:** The title accurately reflects the content of the study. However, the abstract could improve clarity by emphasizing specific findings, particularly quantitative antioxidant capacities and major phytochemicals identified. Clearer statement of the study's novelty and specific implications would benefit readers.

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- **Introduction and Objectives:** The introduction provides a satisfactory overview of Lawsonia inermis' traditional uses and known phytochemicals. Yet, it lacks a precise statement of research hypotheses or specific aims. Clarifying whether the focus is on novel compound identification, antioxidant capacity comparison, or traditional use validation would strengthen the purpose.
- **Methodology and Statistical Analysis:** The methodology is generally sound, employing standard extraction, phytochemical quantification, and antioxidant assays. Nonetheless, details on sample replication, standardization procedures, and validation steps are insufficient. The description of statistical analyses (e.g., variance analysis) needs elaboration specifically, the number of replicates, p-values, and confidence intervals should be provided to establish significance and reproducibility.
- **Results and Discussion:** Results are presented clearly with supportive figures and tables, although the discussion could benefit from deeper analysis. For example, linking specific phytochemicals with known biological activities or comparing the antioxidant capacity to other plant sources would provide context. The potential health implications of compounds like Apigenin and Protocatechic acid should be elaborated.
- **Conclusion and Implications:** The conclusion summarizes the findings but remains somewhat superficial. It should emphasize the novelty, potential applications in medicine or industry, and suggest future research directions, such as in vivo evaluations or pharmacological studies.
- **Ethical Clearance:** The manuscript does not mention any ethical approval for plant collection or experimentation, which might be necessary depending on institutional or national regulations. Clarification on this point is recommended.
- **Language and Formatting:** The manuscript requires proofreading for grammatical correctness and clarity. The language is generally acceptable but includes minor typographical errors that hinder smooth reading. Formatting of figures and tables needs consistency, and referential citations should conform to journal standards.
- **Figures, Tables, and References:** Figures are informative but lack detailed legends. Tables are appropriate but should be formatted uniformly. References are relevant but somewhat outdated; inclusion of recent literature is advised.