

REVIEWER'S REPORT

Manuscript No.: IJAR-57614**Title: Effets des huiles essentielles de *Lippia alba* Mill et de *Ocimum canum* Sims sur *Spodoptera frugiperda* J.E. Smith en production de maïs à l'Ouest du Burkina Faso****Recommendation:****Accept after Major Revision**

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

Reviewer Name: Abdul Haseeb Mir

Detailed Reviewer's Report

The manuscript titled "Effet des huiles essentielles de *Lippia alba* Mill et de *Ocimum canum* Sims sur *Spodoptera frugiperda* J.E. Smith en production de maïs à l'Ouest du Burkina Faso" investigates the field efficacy of biopesticides derived from local aromatic plants against the fall armyworm (*Spodoptera frugiperda*), a devastating pest affecting maize cultivation in West Africa. Utilizing a randomized complete block design conducted across two distinct sites over two agricultural campaigns, the study evaluates the insecticidal impact of *Ocimum canum* and *Lippia alba* essential oils at varying concentrations (1% and 3%). The findings demonstrate that the 3% concentration of *Ocimum canum* essential oil yields larval density reductions and final crop yields comparable to the synthetic chemical standard, emamectine benzoate, presenting a viable, eco-friendly alternative for smallholder farmers.

The study addresses a critical challenge in sub-Saharan agronomy: the reliance on expensive and ecologically damaging synthetic chemical pesticides to combat invasive pests. The multi-campaign, multi-site field validation significantly enhances the ecological validity of the data, moving beyond laboratory bioassays to demonstrate real-world agricultural utility.

However, to elevate the manuscript to a standard suitable for indexing in reputable international agronomy and crop protection journals, the author must deepen the biochemical discussion, clarify statistical reporting, and refine the presentation of agronomic data.

Suggestions for Improvement

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- **Elaborate on the Chemical Profile of the Essential Oils:** While the manuscript evaluates the efficacy of *Ocimum canum* and *Lippia alba*, it lacks a detailed gas chromatography-mass spectrometry (GC-MS) characterization of the specific batches used. Because the chemical composition of essential oils varies drastically based on chemotype, soil conditions, and harvest time, the author must list the major active volatile compounds (e.g., citral, linalool, or camphor) responsible for the observed larvicidal action.
- **Provide Detailed Statistical Parameters in the Text:** In the results section, the author frequently asserts highly significant differences between treatments (e.g., $P < 0.0001$). However, the narrative text should explicitly include the associated degrees of freedom (df) and F-statistics alongside the p-values for all major observed variables (larval density, ear attack rates, and grain yield) to ensure full statistical transparency.
- **Discuss the Mechanism of Action and Persistent Efficacy:** The manuscript highlights the successful control of larval populations but offers minimal discussion regarding the physiological mechanism of action of these essential oils on *Spodoptera frugiperda* larvae (e.g., neurotoxicity via acetylcholinesterase inhibition or contact toxicity). Additionally, the author should discuss the environmental persistence (half-life) of these volatile oils under the intense sunlight and temperature conditions typical of Western Burkina Faso, as this directly affects spraying frequency.
- **Clarify the Preparation and Emulsification of Treatments:** Essential oils are hydrophobic and require a surfactant to remain stable in an aqueous spray solution. The methodology mentions "eau savonneuse" (soapy water) as both a control and a base, but the author must explicitly specify the exact type, concentration, and formulation ratio of the soap or emulsifier used to ensure exact replicability of the experimental treatments.
- **Incorporate Meteorological and Soil Contextual Data:** Given that the experiment was conducted across two distinct sites over two consecutive agricultural campaigns, the environmental differences between these settings must be explored. Including a brief table summarizing the rainfall patterns, average temperatures, and soil types of the experimental stations during the trials would help contextualize variations in pest pressure and crop yield between the seasons.
- **Integrate Economic Feasibility and Cost-Benefit Analysis:** To strengthen the practical recommendations for integrated pest management (IPM) in Burkina Faso, the author should include a brief economic assessment. Compare the estimated financial cost of cultivating,

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extracting, and formulating 3% *Ocimum canum* essential oil locally versus the commercial market cost of importing synthetic emamectine benzoate.

- **Standardize Botanical and Entomological Nomenclature:** Ensure strict adherence to international taxonomic conventions throughout the manuscript. The species authorities (e.g., "Mill.", "Sims", and "J.E. Smith") should be consistently and correctly punctuated, and the specific epithets must remain italicized in all section headings, figures, and table captions.
- **Correct Typographical and Orthographic Inconsistencies:** The text contains minor spacing and running text errors, particularly within the abstract and bibliography (e.g., squeezed words like "leslarves" on page 1 and missing spaces in DOI hyperlinks in the reference list). A meticulous linguistic polishing is required to eliminate these formatting flaws.

Final Recommendation

Recommendation: Revisions Required (Major Revision)

This manuscript presents valuable, field-tested data regarding localized, ecological crop protection strategies that are highly relevant to West African agriculture. The experimental design is robust, and the results clearly indicate the potential of *Ocimum canum* as a substitute for synthetic pesticides. However, to reach a publishable standard, the manuscript must be revised to integrate the specific chemical profiles of the essential oils, clarify the formulation mechanics, present complete statistical test values, and discuss the economic viability of local production.