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REVIEWER'S REPORT

Manuscript No.: **IJAR-57614**

Title: 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.

Recommendation:

Accept after minor revision.....

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

Reviewer's ID: FAHEEM ABDUL MUNEEB

Reviewers Report

The manuscript evaluates the effectiveness of essential oils extracted from *Ocimum canum* and *Lippia alba* against *Spodoptera frugiperda* under maize field conditions in western Burkina Faso. Using field experiments conducted across two sites and two agricultural campaigns, the study compares different concentrations of essential oil emulsions with emamectin benzoate, soapy water, and untreated controls in order to assess their effects on larval density, attack rates, and maize yield.

The study addresses an important and highly relevant agricultural problem. *Spodoptera frugiperda* continues to represent a major threat to maize production across Africa, and the search for sustainable, locally available, and environmentally safer alternatives to synthetic insecticides remains a significant research priority. In this context, the manuscript contributes to ongoing efforts in integrated pest management and botanical pest control, particularly within West African agricultural systems.

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One of the principal strengths of the manuscript lies in its practical orientation. While numerous studies have demonstrated the insecticidal activity of plant essential oils under laboratory conditions, relatively fewer studies evaluate their performance under real field conditions. The manuscript therefore makes a valuable contribution by testing these botanical products directly in maize production environments over two growing seasons and across two experimental sites. This considerably strengthens the applied relevance of the research.

The experimental design is generally appropriate and well structured. The use of a randomized complete block design with seven treatments repeated four times across two sites improves the reliability of the results. The inclusion of untreated controls, soapy water treatment, and a synthetic insecticide reference treatment allows for meaningful comparison between botanical and conventional management strategies.

The manuscript also benefits from relatively detailed methodological presentation. The procedures concerning essential oil extraction, treatment preparation, field application, larval monitoring, attack-rate evaluation, and yield assessment are adequately described and allow the experimental process to be understood clearly. The use of multiple statistical procedures, including ANOVA, Kruskal-Wallis tests, Tukey HSD comparisons, and generalized linear models, further strengthens the analytical framework of the study.

Another strong aspect of the manuscript is the consistency between the results and the broader objectives of the study. The findings clearly demonstrate that treatment type significantly influenced larval mortality, attack rates on maize ears, and grain yield. In particular, the results showing that the 3% concentration of *Ocimum canum* essential oil produced effects comparable to emamectin benzoate under certain conditions are scientifically important and represent one of the major contributions of the study. The discussion appropriately links these findings to the known toxicity of essential oil compounds and their potential role in integrated pest management systems.

The graphical presentation of the results is also generally effective. The figures illustrating larval density fluctuations, mortality levels, attack rates, and yield variation across treatments and years help support the interpretation of the data and make the results easier to follow.

The discussion section demonstrates good engagement with existing literature. The manuscript appropriately compares its findings with previous studies conducted under laboratory conditions and with earlier work on botanical insecticides against *S. frugiperda*. The discussion concerning the volatility of essential oils, their reduced persistence under field conditions, and the lower susceptibility of advanced

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larval stages is particularly relevant and shows good awareness of the practical limitations of botanical treatments.

At the same time, there are several areas where the manuscript could be strengthened further.

The most important issue concerns the interpretation of efficacy under field conditions. While the manuscript concludes that the essential oils, particularly 3% *O. canum*, show promising potential, the results also indicate that emamectin benzoate generally remained more effective in reducing larval populations and improving maize yield. At times, the discussion tends to emphasize the effectiveness of the essential oils somewhat strongly despite the relatively moderate field performance observed in several comparisons. A slightly more balanced interpretation acknowledging both the promise and the limitations of the treatments under real agricultural conditions would strengthen the scientific objectivity of the study.

Similarly, although the study identifies volatility and reduced persistence of essential oils as important limitations, the manuscript could further discuss the practical implications of repeated applications, production costs, scalability, and feasibility for smallholder farmers. Since the study is positioned within an applied agricultural context, greater discussion regarding field-level adoption would increase the practical value of the article.

The manuscript would also benefit from slightly deeper chemical characterization of the essential oils used in the study. While the paper discusses the general insecticidal properties of essential oils and references chemical families such as terpenes and phenols, the specific composition of the oils tested was not analyzed directly. Including or discussing the major active compounds associated with the tested oils would strengthen the scientific depth of the study.

Another issue concerns occasional inconsistencies in terminology and figure legends. In some figures, references appear to alternate between *O. basilicum* and *O. canum* in the abbreviations and legends, which may create confusion for readers. These sections should be revised carefully for clarity and consistency.

Additionally, the manuscript contains some language and stylistic issues, including grammatical inconsistencies, spacing irregularities, and typographical errors in certain sections. While these do not significantly affect comprehension, careful proofreading would improve the overall presentation and readability of the article.

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The title generally reflects the content and objectives of the manuscript accurately. It clearly identifies the botanical species studied, the target pest, and the agricultural context. However, since the study specifically focuses on field evaluation under maize production conditions, a slightly more focused title could strengthen the presentation further. Possible alternatives include:

Évaluation en conditions réelles des huiles essentielles de Lippia alba et Ocimum canum contre Spodoptera frugiperda sur le maïs au Burkina Faso

Potentiel des huiles essentielles de Ocimum canum et Lippia alba dans la gestion de Spodoptera frugiperda en culture de maïs

Overall, this manuscript represents a relevant and practically valuable contribution to research on botanical pest management and sustainable maize protection in Africa. The field-based experimental approach, comparative design, and integration of agronomic outcomes make the study scientifically useful and regionally important.

The concerns identified mainly relate to interpretive balance, clarification of certain methodological aspects, consistency in presentation, and minor language revision. These issues are manageable through revision and do not undermine the overall quality or relevance of the research.

Recommendation: Accepted with minor revisions.