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

International Journal of Advanced Research

ISSN NO. 2320-5407

Publisher's Name: Jana Publication and Research LLP

www.journalijar.com

REVIEWER'S REPORT

Manuscript No.: **IJAR-57894**

Title: *Étude des propriétés biocides d'extraits foliaires de Crataeva religiosa G. Forst. dans la protection post-récolte du niébé contre Callosobruchus maculatus Fabricius, 1775.*

Recommendation:
Accept after minor revision……

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

Reviewer Name: Faheem Abdul Muneeb

Detailed Reviewer's Report

Overall Evaluation

The manuscript titled *"Étude des propriétés biocides d'extraits foliaires de Crataeva religiosa G. Forst. dans la protection post-récolte du niébé contre Callosobruchus maculatus Fabricius, 1775"* investigates the insecticidal potential of leaf powder derived from *Crataeva religiosa* as an alternative to synthetic pesticides for the post-harvest protection of cowpea (*Vigna unguiculata*) against the storage pest *Callosobruchus maculatus*. The study evaluates the effects of different powder doses on adult mortality, fecundity, emergence rate, seed weight loss, and germination performance, while also examining the influence of insect population density on treatment efficacy.

The topic is highly relevant within the fields of agricultural entomology, post-harvest protection, food security, and sustainable pest management. Cowpea is a major food crop across West Africa, and losses

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caused by *C. maculatus* continue to represent a serious challenge for smallholder farmers. The search for locally available botanical alternatives to synthetic pesticides is therefore both scientifically and practically important. The manuscript addresses a genuine agricultural problem and contributes to the growing body of literature on plant-based biopesticides.

Unlike several manuscripts that merely advocate botanical products, this study is based on laboratory experimentation and presents original data. The authors establish a clear experimental framework, evaluate multiple biological and agronomic parameters, and employ statistical analyses to compare treatments. The manuscript therefore possesses a stronger empirical foundation than many studies commonly encountered in this area.

However, careful examination of the results reveals several issues that require clarification. Some findings appear internally inconsistent, particularly regarding dose-response relationships and the interpretation of emergence rates. In several instances, the conclusions appear stronger than what the presented data support. Certain methodological details also require further explanation, and aspects of the statistical analysis would benefit from greater transparency. While the study has clear merit and publication potential, a number of analytical and interpretative issues should be addressed before publication.

Strengths of the Paper

One of the principal strengths of the manuscript is its practical relevance. The study focuses on a major storage pest of cowpea and investigates a locally available plant species that may provide an affordable and environmentally sustainable alternative to chemical insecticides. Such research has direct implications for food security and post-harvest management in West Africa.

The experimental design is generally straightforward and easy to follow. The authors evaluate multiple doses of *C. religiosa* powder and assess several complementary response variables, including adult mortality, fecundity, emergence rate, seed weight loss, and germination. This multidimensional approach allows a broader assessment of treatment effectiveness than studies focusing solely on mortality.

Another positive aspect is the inclusion of density-dependent experiments. By examining how treatment performance changes under different infestation levels, the study moves beyond simple laboratory efficacy tests and addresses a factor that may influence practical application under storage conditions.

The manuscript also demonstrates engagement with relevant literature on botanical insecticides, cowpea storage pests, and integrated pest management. The discussion appropriately situates the findings within previous studies conducted on *Crataeva religiosa* and other plant-based biocidal products.

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A further strength is the consideration of seed germination and weight loss. These agronomic parameters are highly important from a practical perspective because an effective storage treatment should not only suppress insect populations but also preserve seed quality and viability.

Areas for Improvement

The most important concern relates to the interpretation of the dose-response results. The manuscript repeatedly identifies 3 g as the most effective treatment, despite the fact that higher doses do not consistently improve performance. In fact, several outcomes appear counterintuitive. For example, adult mortality at 3 g (93.3%) exceeds that observed at both 4 g and 5 g, while emergence rates actually increase at 4 g before declining again at 5 g.

These patterns are interesting but require much deeper explanation. The discussion briefly invokes hormesis and saturation effects, yet these explanations remain speculative. Given that the central conclusion of the paper depends on the superiority of the 3 g treatment, a more rigorous interpretation of these unusual dose-response relationships is necessary.

A second concern involves the designation of 3 g as a "DL90" (LD90). Traditionally, LD90 values are derived from dose-response analyses involving multiple concentrations and probit-type modeling. In the current study, the manuscript appears to identify 3 g as an LD90 simply because it produced approximately 93% mortality under the tested conditions. The terminology should therefore be reconsidered or more formally justified.

The presentation of emergence data also raises questions. The manuscript discusses the biocidal effectiveness of the treatments, yet Table 1 shows emergence rates of 61.72% and 67.65% at the 3 g and 4 g treatments respectively, compared with 59.47% in the control group. These values suggest that some treatments resulted in higher emergence than the untreated control. While statistical differences are reported, the biological interpretation of these results remains unclear and requires careful discussion.

The germination results also warrant further examination. On page 7, the text reports a germination rate of 65% at 3 g, whereas Figure 6 appears to display values closer to 20%, 2%, and 10% for the tested doses. This apparent discrepancy between the graphical presentation and the textual interpretation should be clarified. If the figure scale or labeling is incorrect, revision is necessary.

Methodologically, additional details would improve reproducibility. For example, the manuscript would benefit from more precise information regarding:

- environmental conditions during experiments (temperature and humidity ranges),

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- duration of storage observations,
- number of seeds used in germination assays,
- rationale for selecting the tested doses,
- and procedures used to randomize treatments.

Although some methodological information is provided, these details are important for replication and interpretation.

The statistical reporting could also be strengthened. Throughout the manuscript, p-values are presented, but measures of variability such as standard deviations, standard errors, or confidence intervals are largely absent. Providing these metrics would allow readers to better evaluate the robustness of the findings.

The discussion occasionally advances explanations that are not directly supported by the experimental data. For instance, references to cuticular penetration, reproductive inhibition mechanisms, competition effects, and hormesis are plausible but were not directly investigated in the study. These interpretations should be presented more cautiously as possible explanations rather than established conclusions.

Finally, there are a number of language, formatting, and presentation issues throughout the manuscript. Several tables and figures would benefit from improved formatting, and minor grammatical inconsistencies are visible in both the methods and discussion sections. Careful proofreading would enhance readability.

Final Recommendation

Accept with Minor Revisions

The manuscript presents original experimental research addressing an important problem in post-harvest pest management. The study is grounded in laboratory experimentation, evaluates multiple indicators of efficacy, and contributes useful information regarding the potential application of *Crataeva religiosa* as a botanical biopesticide for cowpea protection. The topic is relevant, the experimental work is generally sound, and the findings have practical significance for sustainable agriculture.

The primary issues relate not to the overall validity of the study but rather to the interpretation of several results, clarification of methodological details, improvement of statistical reporting, and resolution of apparent inconsistencies in the presentation of emergence and germination data. Addressing these points would substantially strengthen the manuscript and improve its scientific rigor.

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Subject to these revisions, the manuscript has merit and would represent a useful contribution to the literature on botanical pest control and post-harvest crop protection.