ISSN: 2320-5407
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-53866 Date: 15-09-2025

Title: Allelopathic Impact of Lantanacamara L.Extract onSeedandSeedling Traitsof Capsicum annum.

Recommendation:
Accept as it

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

Reviewer Name: Dr. Manju M **Date:** 15-09-2025

Reviewer's Comment for Publication.

1. Simplify the explanation of how phenolic compounds disrupt phosphorylation and ATPase activity by briefly linking these processes to energy production and root growth during germination.
2. Standardize citation punctuation and formatting for consistency to enhance the text's professionalism and readability.
3. Expand on how increased protease activity helps plants defend against allelochemicals by breaking down harmful proteins or signaling stress responses.
4. Discuss potential challenges of using Lantana camara extracts as bio-herbicides, including environmental impact, variability in effectiveness, and risks to non-target species.

Detailed Reviewer's Report

1. Background of the Work

Lantana camara is an aggressive invasive species known for disrupting native ecosystems. One of its key ecological strategies is allelopathy, the release of biochemical substances that inhibit germination and growth of neighboring plants. Understanding its allelopathic impact is crucial, especially on economically important crops like red chilli, which is widely cultivated for both commercial and subsistence farming.

2. Objectives of the Study

ISSN: 2320-5407
International Journal of Advanced Research
Publisher's Name: Jana Publication and Research LLP
www.journalijar.com

REVIEWER'S REPORT

- To investigate the allelopathic potential of aqueous leaf extracts of Lantana camara on red chilli seed germination and seedling development.
- To determine how varying extract concentrations (10% to 100%) influence germination index, radicle growth, and seedling morphology.

3. Materials and Methods

- Viable red chilli seeds were surface-sterilized and used for experiments.
- Fresh Lantana camara leaves were collected, dried, and processed into aqueous extracts of 10%, 20%, 40%, 80%, and 100% concentrations.
- Seeds were placed on moistened filter paper in petri dishes and treated with respective extract concentrations. A control group received only distilled water.
- Germination Percentage, Germination Index, Radicle Length, and Phytotoxic Morphological Traits.

4. Experimental Design

- Each treatment (including control) was replicated three times.
- Seeds treated with distilled water served as the baseline.
- Germination and growth observations were recorded daily for up to 7 days.

5. Results – Germination Index

- A clear dose-dependent decline in germination index was observed.
- Highest inhibition occurred at 100% concentration, showing significantly reduced vigor.
- 10% and 20% treatments showed minimal impact; however, 40%, 80%, and 100% showed increasingly negative effects.
- Statistical analysis confirmed the significance of these differences ($p < 0.05$).

6. Results – Phytotoxicity and Morphological Effects

- Morphological abnormalities increased with extract concentration:
  - Root tip necrosis, discoloration, curling, and absence of root hairs were notable at 80% and 100%.
  - Seed swelling and delayed germination were observed at higher concentrations.
  - 20% and 40% concentrations showed only mild phytotoxic effects.

7. Discussion – Allelopathic Mechanisms

- Likely allelochemicals involved include phenolic acids, flavonoids, and terpenoids.
- These compounds may inhibit enzyme activities, disrupt hormonal balances, or block water/nutrient uptake, leading to reduced germination and stunted growth.
- The root system, being the first to interact with allelochemicals, showed the most visible damage.

8. Ecological and Agricultural Implications

ISSN: 2320-5407
International Journal of Advanced Research
Publisher's Name: Jana Publication and Research LLP
www.journalijar.com

REVIEWER'S REPORT

- Lantana camara poses a threat to crop productivity via allelopathic suppression of germination.
- However, its inhibitory properties also suggest potential use as a natural herbicide, offering an eco-friendly alternative to synthetic chemicals.
- Sustainable agriculture can benefit from further exploration of bio-herbicidal properties of Lantana.

9. Limitations of the Study

- The study was conducted under controlled laboratory conditions, which may not fully replicate field environments.
- Only one crop species (red chilli) was tested.
- Chemical characterization of active allelochemicals was not performed.
- Long-term and multi-crop studies are needed for comprehensive assessment.

10. Conclusions and Applications

- Lantana camara leaf extracts exhibit strong allelopathic effects, especially at higher concentrations.
- Germination inhibition and morphological abnormalities are dose-dependent.
- Potential applications include:
  - Development of bio-herbicides for weed management in organic and sustainable farming.
  - Use as a pre-emergent or post-emergent treatment to suppress weeds in crops like Vigna mungo and other legumes.
- **Recommendations:**
  - Farmers and ecologists should monitor Lantana encroachment near crop fields.
  - Researchers should pursue field trials and phytochemical profiling of Lantana extracts for safe agricultural application.