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Environmental and green chemistry

Insecticidal activity of *Hyptis spicigera* Lam. essential oil from Senegal against of stored maize pest *Sitophilus zeamais* Motschulsky

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Context

The intensive use of synthetic pesticides has generated growing concerns regarding their environmental and health impacts. This has encouraged increasing interest in natural alternatives, particularly essential oils from aromatic plants (Gueye et al., 2019). In this context, *Hyptis spicigera* has attracted considerable scientific interest and has been the subject of numerous studies due to its promising bioactive properties (Ignareki et al., 2024). Building on this perspective, the present study aims to evaluate its efficacy against the maize weevil *Sitophilus zeamais*.

Material and methods

Plant of *Hyptis spicigera*

Extraction

Equipment for extracting *Hyptis spicigera* essential oil

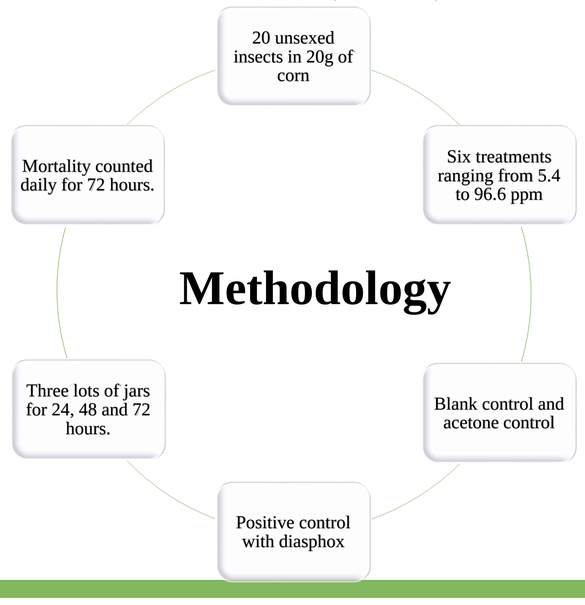
Essential oil

Adult of *Sitophilus zemais*

Fumigation system diagram

Dilutions of solutions (acetone + Eo)

Gas chromatograph coupled with a mass spectrometer



Results and discussion

Table 1 : majors compounds identified in *Hyptis spicigera* essential oil from Senegal

Name	indice de retention	% Composition	Formula
α-Pinene	937	18.8	C10H16
β-Pinene	980	13.4	C10H16
γ-Terpinene	1063	13.7	C10H16
1.8-Cineole	1035	11.3	C10H16O
Caryophyllene	1428	16.7	C15H24

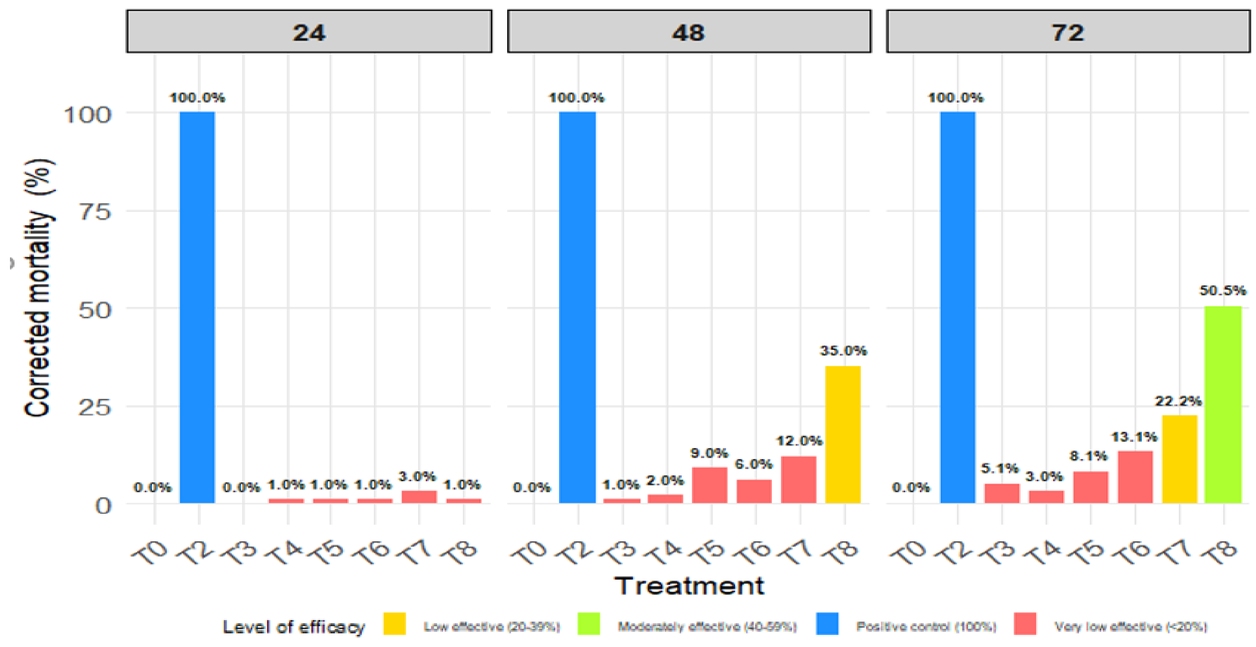


Figure 1: insecticidal activity of *Hyptis spicigera* essential oil fumigation against *Sitophilus zeamais* (n=5)

Analysis of essential oil of *H. spicigera* revelead a composition of major monoterpenes (α-pinene, β-pinene…) and sesquiterpene such as caryophyllene. This chemical profile, consistently reported in the literature, highlights its diversity and potential biological activity. Regarding insecticidal activity, the results showed that only the highest concentration of essential oil (96.6 ppm) produced a noticeable effect, reaching 50.4% mortality after 72 h. At lower concentrations, mortality remained low and similar to that observed in the blank controls, with only slight variations at 48 h and 72 h.

Conclusion

The essential oil of *H. spicigera* exhibits moderate insecticidal activity, indicating that higher concentrations and prolonged exposure times could be effective. Its rich monoterpene composition suggests potential that could be optimised through appropriate formulation approaches.

References

Gueye M.T. et al. (2019) Chemical composition and efficacy of *Eucalyptus* essential oils in maize preservation against the pest *Sitophilus zeamais. ITA ECHOS* - Biannual newsletter on agri-food research and development N°12

Ignareki D. D. et al. (2024) Adulticidal activities and synergistic effects of *Citrus aurantifolia* peels and *Hyptis spicigera* leaves essential oils against *Anopheles gambiae* (Diptera: Culicidae). International Journal of Current Science Research and Review, 7(3), 1910-1922

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