Data Article

Data of insecticide effects of natural compounds against third instar larvae of *Cochliomyia macellaria*

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Morphological biomarkers can be used to establish a diagnosis of fly larvae structural damage and toxicity to target cells by biopesticide candidates. Insecticide activity of natural compounds such as *Curcuma longa* essential oil (CLLEO) extracted from leaves, and its major constituent α-phellandrene have proven to be a novel biopesticide candidate against third instar larvae (L3) of *Cochliomyia macellaria*. In this way, groups of 20 L3 were placed on filter paper impregnated with different concentrations of CLLEO, from 0.31 to 2.86 μL/cm² and α-phellandrene, from 0.29 to 1.47 μL/cm². The extracts were solubilized in ethanol. Data shown in this article is related to the research article “Can an overlooked by-product from turmeric industry be effective for myiasis control?”

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Chaaban et al., 2019. Data on L3 toxicity was observed after 6 and 24h of contact with both extracts, as well as a marked reduction of L3 movement, color changes in the cuticle and progressive darkening in their body. Major cuticle damage and L3 mortality were reported.

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1. Data

The data of this paper involves the experimental analysis regarding the cuticular damage of the natural compounds CLLEO, and its major constituent α-phellandrene against L3 of C. macellaria [1]. L3 from the control group, showed no change in cuticle morphology after 6 and 24h of contact (Video 1a, 1b; Video 2a, 2b). Data of the insecticide effect of the extracts was observed a few hours after contact with the doses of 1.59 and 1.47 µL/cm² of CLLEO and α-phellandrene, respectively (Video 1c; Video 2c).
Moreover, progressive darkening in L3 body, marked reduction of larval movement, color changes in L3 cuticle and death were observed after treatment (Video 1d; Video 2d).

Supplementary video related to this article can be found at https://doi.org/10.1016/j.dib.2019.104181

2. Experimental design, materials, and methods

2.1. Plant material, essential oil extraction and chemical characterization

Curcuma longa (leaves) used in this work were cultivated at the Medicinal Plants Unit of the Cat- arinense Federal Institute (IFC), located at 26° 23′ 33.6691″ S and 48° 44′ 18.3336″ W. The location is at 10.6 m above the sea level in the city of Araquari, Santa Catarina, South of Brazil. The plant cultivation, essential oil extraction and chemical characterization were carried as described in the companion paper [1]. \(\alpha\)-Phellandrene (CAS: 99-83-2) was acquired commercially (Sigma-Aldrich, São Paulo, Brazil) and certified as having \(\geq 99\%\) purity.

2.2. Establishment of Cochliomyia macellaria colonies and larval toxicity

Data of the establishment of stock colonies, insects’ identification, mass reproduction, and the protocol for the biological tests were performed as described in the companion paper [1]. The toxicity of CLEO and \(\alpha\)-phellandrene over L3 of C. macellaria was performed using groups of 20 L3, which were placed on filter paper that were impregnated with a range of concentrations of CLEO (0.31—2.86 \(\mu\)L/cm\(^2\)) and \(\alpha\)-phellandrene (0.29—1.47 \(\mu\)L/cm\(^2\)). L3 were put into glass vials containing filter papers (12.56 cm\(^2\)) impregnated with 0.2 mL of EO solution, that were solubilized in ethanol using the protocol described by Chaaban et al. (2017) [2]. The toxicity was evaluated by observing L3 mortality at 6, 24 and 48 h after contact [2,3]. Total larval mortality (LM) was calculated [2–4] as follows:

\[
LM = \frac{(\text{total dead larvae} \times 100)}{\text{total tested larvae}}
\]

Damages were measured by macroscopic biomarker changes and microscopic lesions using histological sections and scanning electron microscopy in L3 treated with 1.59 \(\mu\)L/cm\(^2\) of CLEO and 1.47 \(\mu\)L/cm\(^2\) of \(\alpha\)-phellandrene, both solubilized in ethanol. The data on these alterations can be observed in the companion paper [1].

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] A. Chaaban, E.N. Gomes, V.S. Richardi, C.E.N. Martins, J.S. Brum, M.A. Navarro-Silva, C. Deschamps, M.B. Molento, Essential oil from Curcuma longa leaves: can an overlooked by-product from turmeric industry be effective for myiasis control? Ind. Crops Prod. 132 (2019) 352–364. https://doi.org/10.1016/j.indcrop.2019.02.030.

[2] A. Chaaban, A.L.F. Souza, C.E.N. Martins, F.C. Bertoldi, M.B. Molento, Chemical composition of the essential oil of Tagetes minuta and its activity against Cochliomyia macellaria (Diptera: calliphoridae), Eur. J. Med. Plants 18 (1) (2017) 1–10, https://doi.org/10.9734/EJMP/2017/32078.

[3] A. Chaaban, V.M.C. Santos, E. Gomes, C.E.N. Martins, W. Amaral, C. Deschamps, M.B. Molento, Chemical composition of Piper gaudichaudianum essential oil and its bioactivity against Lucilia cuprina (Diptera: calliphoridae), J. Essent. Oil Res. 30 (3) (2018) 159–166. https://doi.org/10.1080/10412905.2017.1423406.