

# EVALUATION OF THE NEMATICIDAL POTENTIAL OF LIMONENE ESSENTIAL OIL IN *Caenorhabditis elegans*

Matteus Guerra<sup>1</sup>, Helena Barcelos<sup>2</sup>, Julia Esteves<sup>2</sup>, Natalia Jardim<sup>3</sup>, Daiana de Ávila<sup>4</sup>

<sup>1</sup>Main author, Federal University of Pampa, Uruguaiana, RS, Brazil  
<sup>2</sup>Co-author, Federal University of Pampa, Uruguaiana, RS, Brazil  
<sup>3</sup>Co-supervisor, Federal University of Pampa, Uruguaiana, RS, Brazil  
<sup>4</sup>Supervisor, Federal University of Pampa, Uruguaiana, RS, Brazil

Contact main author, [matteusguerra.aluno@unipampa.edu.br](mailto:matteusguerra.aluno@unipampa.edu.br)

**INTRODUCTION:** Parasitic infections affect approximately 2 billion people globally, presenting clinical symptoms such as malnutrition, anemia, and diarrhea. Parasite resistance to current treatments highlights the need for new drug development, with limonene emerging as a promising candidate for nematicide treatment. However, the development of new drugs faces challenges, such as access to relevant life cycle stages of the parasites. Therefore, the use of *Caenorhabditis elegans* as an alternative model offers advantages for studying nematicide effects, given its similarity to parasitic nematodes. **OBJECTIVE:** To evaluate the nematicide potential of limonene essential oil on the nematode *Caenorhabditis elegans*. **METHODOLOGY:** Wild-type N2 strain worms of *Caenorhabditis elegans* were chronically exposed to limonene starting from the L1 stage, on NGM plates seeded with *E. coli* OP50. The tested concentrations were 0.005%, 0.05%, and 0.1% (v/v; corresponding to fractions of the total essential oil concentration), or 1% DMSO used as the vehicle control. After 48 hours, at the L4 stage, the worms were subjected to analyses to evaluate the nematicide potential of limonene: survival, brood size, motility, and larval development. **RESULTS AND CONCLUSION:** Limonene essential oil significantly reduced worm survival compared to the control group at all tested concentrations (0.005%, 0.05%, and 0.1%). Similar effects were observed in the analyses of brood size, motility, and larval development. Furthermore, in the egg production analysis, a significant decrease was observed only at the highest concentration (0.1%) compared to the control group. These results indicate a potential nematicide effect of limonene essential oil. However, further investigations are necessary to elucidate the underlying mechanisms of action and to assess its effectiveness against strains resistant to currently available nematicides.

**Keywords:** Anthelmintic. Parasites. Toxicity. *C. elegans*.