TOXICITY EVALUATION OF NANOBIOINSECTICIDES CONTAINING GERANIOL IN *Caenorhabditis elegans*

Daniel Balbé Nunes[1]; Aline Castro Silva[1]; Danielle Araujo Agarrayua[1]; Jhones Luís Oliveira[2]; Leonardo Fernandes Fraceto[2]; Claudia Martinez [4]; Daiana Silva de Ávila[1]

[1]Universidade Federal do Pampa, Campus Uruguaiana – UNIPAMPA;
[2]Universidade Estadual Paulista – Campus Sorocaba- UNESP;
[3]Universidade Estadual de Londrina - UEL.

INTRODUCTION: Chemical control strategies are the most widely used methods for managing agricultural pests. However, the indiscriminate use of pesticides can lead to harmful effects on human health and the environment. In this context, nanoformulations containing natural products have emerged as promising alternatives. **OBJECTIVE:** This study aimed to evaluate the toxicity of geraniol-loaded nanoparticles with bioinsecticidal potential using the alternative model *Caenorhabditis elegans*, and to investigate whether different carrier polymers influence their toxicity. **MATERIALS AND METHODS:** L1-stage worms were exposed for 48 hours to a range of concentrations of geraniol/Pluronic or geraniol/lignin nanoemulsions (0.08, 0.16, 0.24, and 0.32 mg/mL) to determine the median lethal concentration (LC_{50}). The LC_{50} values were 0.2 mg/mL for the geraniol/Pluronic nanoemulsion and 0.6 mg/mL for the geraniol/lignin nanoemulsion. These concentrations were used to assess Zein/Pluronic nanoparticle containing geraniol (NZPG), control zein/Pluronic nanoparticle (NZPC), zein/lignin nanoparticle containing geraniol (NZLG), and control zein/lignin nanoparticle (NZLC) in terms of survival, body size and area, and brood size. Statistical analysis was performed using one-way ANOVA followed by Tukey's post hoc test. **RESULTS AND DISCUSSION:** Our results showed that both nanoemulsions significantly reduced worm survival compared to the geraniol-loaded nanoparticles, indicating that nanoencapsulation reduced the toxicity of geraniol. For body size and area, as well as brood size, no significant differences were observed. These findings suggest that the nanoparticles are potentially safe for non-target organisms such as *C. elegans*. Further studies are ongoing to confirm the safety of the nanoparticles across other parameters in *C. elegans*, as well as to evaluate their insecticidal activity in *Drosophila melanogaster*.

Keywords: Nanotoxicology; Alternative model; bioinsecticide.

Support: Fundação de Amparo à Pesquisa do Estado do Rio Grande do Sul (FAPERGS)