FIPRONIL INSECTICIDE: INSIGHTS INTO THE DEVELOPMENT AND MORPHOLOGY OF *DROSOPHILA MELANOGASTER*

Pereira, Heloísa S. [1]; Souza, Fernanda A.[1]; Dalla Corte, Cristiane L.[1].

[1]Laboratory of Biochemistry and Experimental Toxicology, Department of Biochemistry and Molecular Biology, Federal University of Santa Maria - UFSM, 97105-900, Santa Maria, RS, Brazil

INTRODUCTION: Fipronil is a widely used insecticide in agriculture for controlling insect populations. In Brazil, its use has significantly increased, especially in crops in Rio Grande do Sul, leading to the death of several non-target organisms, such as bees. Therefore, studying Fipronil toxicity in non-target species is essential to assess environmental and human health risks. OBJECTIVE: This study aims to investigate the morphometric and toxicological effects of the insecticide Fipronil in *Drosophila melanogaster*. MATERIALS AND METHODS: Oral exposure of *D. melanogaster* from embryos to adulthood was carried out using concentrations of 0.016, 0.040, 0.081, 0.163, 0.327, and 0.490 μM. The emergence rate relative to the number of pupae, the percentage of adult flies to the number of embryos, adult survival after 7 days, and locomotor behavior were evaluated. Additionally, morphometric analyses were performed using TPSDig 232 and MorphoJ software to identify morphometric variations in the wings. RESULTS AND CONCLUSION: Fipronil exposure caused a significant reduction in the emergence rate and fly survival compared to the control group ($p < 0.0001$), indicating severe impact on development and high toxicity via ingestion. Regarding climbing behavior, a significant difference was observed only between males treated with 0.081 μM and the control group, and between females treated with 0.081 μM and 0.040 μM. However, no significant difference was found between sexes. Principal Component Analysis (PCA) revealed no morphological changes in the wings of flies treated with Fipronil. Nevertheless, Canonical Variate Analysis (CVA) showed a significant difference between males and females, as well as between groups exposed to 0.016 and 0.040 μM compared to the control group. Therefore, Fipronil proved toxic via ingestion, significantly affecting the development and behavior of *D. melanogaster*. Moreover, differences in the insecticide's effects between sexes were demonstrated, implying a potential reduction in species fitness, particularly in terms of flight and courtship behavior. These findings reinforce the importance of further studies on this insecticide to better understand its effects on non-target organisms.

Keywords: Toxicity; insecticide; development; morphometric analysis; *D. melanogaster.*

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