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DROSOPHILA MELANOGASTER AS ALTERNATIVE MODEL TO INVESTIGATE THE HEPATOTOXIC EFFECTS OF THE HERBICIDE BROMACIL

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Introduction – Metabolism-associated fatty liver diseases (MAFLDs) are a serious public health concern worldwide and, unfortunately, there are still no effective therapies available. These diseases have different etiologies, including exposure to environmental contaminants, which may have deleterious effects on the environment, damaging human health and others living beings. Among these contaminants are uracil-based pesticides, such as the herbicide bromacil. In this context, *Drosophila melanogaster* has emerged as an important biotechnological tool for the study of human diseases and toxicology, considering that 70% of the genes related to human metabolism find their orthologs in *D. melanogaster*. Moreover, human and flies shares a lot of metabolic pathways conserved. **Objective –** The aim of this study was to use *D. melanogaster* to investigate the effects of the herbicide bromacil on hepatic-like metabolism to evaluates its deleterious effects. **Materials and Methods –** To this end, eggs form flies of the Canton-S strain were subjected to different types of diets: control; hyperlipidic (5% coconut oil); and diets containing different concentrations of bromacil (5 nM, 50 nM and 5 µM) until the prepupae stage, which were then collected for biochemical and molecular analysis. Metabolites related to energy metabolism (triglycerides and glucose), mitochondrial function (activity of the enzyme lactate dehydrogenase - LDH - and production of reactive oxygen species - ROS) and gene expression by RT-qPCR were evaluated. **Results and Conclusion –** The results revealed a modulation in LDH activity, with a decrease of 54% at the 5 µM concentration compared to control. Additionally, an increase in ROS production was observed, indicating the induction of oxidative stress. Gene expression analysis demonstrated a significant impairment of the antioxidant defense system, especially in the *cnc* gene, orthologous to the human *Nrf2*, which showed 85% reduction in expression at 5 µM concentration compared to control. Furthermore, there was a marked downregulation of genes involved in detoxification and epigenetic regulation. These findings indicate that bromacil induces significant metabolic disturbances in *D. melanogaster*, reinforcing its toxic potential.

Key words: *Drosophila melanogaster*; MAFLDs; environmental contaminants; bromacil; alternative animal model

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