Abstract Information

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Title :	Neurotoxic Effects of Lambda-Cyhalothrin: Behavioural Alterations and Protein Interaction Insights

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Abstract : Lambda-cyhalothrin (LCT) is a type-II pyrethroid widely used in agriculture to protect crops from pests. Despite being considered safer for non-target organisms compared to other pesticide families, such as organophosphates, LCT poses potential risks for rural female farmworkers. The present study investigates the behavioural effects of LCT in 8-week-old female Swiss mice subjected to daily oral gavage for 21 consecutive days. Mice were divided into three groups: a control group treated with corn oil (vehicle), and two treated groups receiving LCT at doses of 0.5 mg/kg and 2 mg/kg b.w. Behavioural tests were conducted to evaluate locomotor activity (open field test), anxiety (dark-light box test), learning memory (novel object recognition test), memory retention (elevated plus maze test), and spatial working memory (Y-maze test). LCT-treated mice exhibited a decrease in locomotor activity, an anxiogenic effect characterized by reduced time in the enlightened compartment, impaired learning memory with a lower recognition index, and altered memory retention with increased latency time. Spatial working memory, however, remained unaffected. Emerging bioinformatics analyses suggest that LCT may interact with proteins involved in memory, such as retinoblastoma-binding protein (RbAp48), which is highly expressed in the dentate gyrus of the hippocampus. These findings indicate that LCT's neurotoxic effects on behaviour, might be involved in disruptions in neuronal circuits, potentially mediated through oxidative stress and altered neurotransmission. Thus, preliminary bioinformatics analyses suggest that LCT may interact with proteins related to memory, such as RbAp48. Molecular docking studies reveal potential binding sites for LCT on RbAp48, highlighting its role as a possible molecular target

contributing to LCT-induced memory impairments.

Keywords: Lambda-cyhalothrin, neurotoxicity, behaviour, Locomotion, anxiety, memory, RbAp48, Swiss mice.