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STUDYING NEUROTOXIC EFFECTS OF THREE SYNTHETIC INSECTICIDES ON THE NERVOUS SYSTEM OF THE FRUIT FLY DROSOPHILA MELANOGASTER

by

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<https://eu.bbcollab.com/guest/e69bbd665c304755ad6a7fa19a4e6a21>

Abstract

Pesticides applied on plants and animals can reach the human diet once they enter food chains. Because most of the insecticides are neurotoxic agents, they have the potential of causing damage to the nervous system in people. This type of damage could induce or promote neurodegenerative diseases such as the Parkinson's and Alzheimer's. It is well-documented that the exposure to the insecticide chlorpyrifos induces the Parkinson's disease in humans and experimental animals. Thus, this research project will study effects of three synthetic insecticides pirimicarb, tefluthrin, and chlorpyrifos on the nervous system of *Drosophila melanogaster* as a model organism. In addition, the project will evaluate the neuroprotective effects of two natural herbal infusions anise, and hibiscus, individually and in mixture against chlorpyrifos induced neurotoxicity. Adult female flies have been reared on media containing pirimicarb (0.312 ppm) and tefluthrin (0.625 ppm) and their mixture. In another experiment, flies have been reared on media containing chlorpyrifos (0.25 ppm), as well as chlorpyrifos with anise, chlorpyrifos with hibiscus, and chlorpyrifos with their mixture. Negative geotaxis assay, mortality, and gene expression using RT-qPCR were done to assess the effects of exposure. Pirimicarb and tefluthrin did not cause significant deleterious impact on the negative geotaxis and the three tested genes. In addition, the two herbal infusions did not show neuroprotective effects against CPF exposure. However, a trend that requires more testing in the future indicated that exposure to CPF resulted in upregulation in the ple gene and the hibiscus infusion showed the potential to bring it to normal levels. However, more exposure time is suggested to see the effects of herbal infusions. More studies are needed using different concentrations.

Keywords: Chlorpyrifos, Pirimicarb, Tefluthrin, Dopamine, Dopamine-related genes, *Drosophila Melanogaster*, Central Nervous System, Parkinson's Disease