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The insecticidal potency of some phytochemical against Tribolium castaneum(Coleoptera:Tenebrionidae) and Callsobruchus maculatus (Coleoptera :Chrysomelidae)

A Thesis

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ABSTRACT

Stored grains represented the main constituent of food in Egypt. The rust-red flour beetle, *Tribolium castaneum* (Herbst) coming on the top of stored grain pests caused up to 40% weight reduction pills. There is a growing need to find new safe alternatives of extensively used synthetic insecticides, which represent the main control strategy against stored grain pests, due to their hazardous effect on human health and agriculture. Biopesticides from plant origin attract the attention as cheap, safe, effective alternatives. This study aimed to determine the insecticidal activity of four every days-used essential oils extracted from *Allium sativum* (garlic), *Cinnamomum camphora* (camphor), *Syzygium aromaticum* (clove) and *Brassica junicea* (mustarda) against *T. castaneum* adults under laboratory conditions. Also, the effects of the tested oils at sub-lethal dose on biology and physiology of *T. castaneum* were tested. In addition, the effect of tested oils on wheat grains germination was determined. Gas chromatograph-Mass spectrometry was used to analyze the major constituent of the most effective essential oils. Results indicated that the four tested essential oils have insecticidal, anti-feedant, and repellent activities against *T. castaneum* adult. Clove has the highest insecticidal activity followed by garlic. Results revealed the clove and camphor have adverse effect adult physiology. Also, it was indicated that both oils have the lowest phytotoxicity. Mass spectra results obtained from GC-Mass for each essential oil revealed different bioactive components, on the top of them, decanes, cosane, sulphide groups. Finally, the cytotoxic activity of clove and garlic oil was investigated against WI-38 human cells by MTT test. Results demonstrated that both oils showed low cytotoxic effect. Given the biosafety of clove and garlic oils to non-targets, we conclude that clove and garlic oils are considered promising effective alternatives for synthetic insecticides to control stored grain pests.

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