

Alterations in Esterases and Phosphatases of Three Economically Important Stored Grain Insect Pests Exposed to Botanical Extracts, *Nicotiana tabacum* and *Eucalyptus globulus*

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Abstract : Natural extracts of two medicinal plants *Nicotiana tabacum* and *Eucalyptus globulus* were tested for their toxic and enzyme inhibition effects against three insects species of stored grains *Tribolium castaneum*, *Trogoderma granarium* and *Sitophilus granarius*. Responses of insects varied with exposure periods and dilution levels of acetone extracts of plants. Both plant extracts were lethal to insects but the crude leaf extract of *N. tabacum* evidenced strong toxic action against three tested insect species. Maximum mortality 36.30% in *S. granarius*, 25.96% in *T. castaneum*, and 21.88% in *T. granarium* were found at 20% dilution level, after 10 days exposure to botanical extract of *N. tabacum*. The impact of *N. tabacum* and *E. globulus* on the activity of esterases; acetylcholinesterase (AChE), α -carboxylesterase (α -CE), β -carboxylesterase (β -CE) and phosphatases; acid phosphatase (AcP), alkaline phosphatase (ALP) of three stored grain insect species were also studied in the survivors of toxicity assay. Whole body homogenates of insects were used for enzyme determination and consumption of high dose rate *N. tabacum* extract containing diet resulted in maximum 55.33% inhibition of AChE and 26.17% ALP inhibition in *T. castaneum*, while 44.17% of α -CE and 31.67% inhibition of β -CE activity were noted in *S. granarius*. Maximum inhibition 23.44% of AcP activity was found in *T. granarium* exposed to diet treated with the extract of *E. globulus*. The findings indicate that acetone extracts of *N. tabacum* and *E. globulus* are naturally occurring pesticide and facts of the enzyme inhibition relations specify that their effect changes with the insect species.

Keywords : natural extract, medicinal plant, toxic effects, enzyme inhibition, acetone extract

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