## 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),  $\alpha$ -carboxylesterase ( $\alpha$ -CE),  $\beta$ -carboxylesterase ( $\beta$ -CE) and phosphatses; 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 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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