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PHYSIOLOGICAL AND HISTOLOGICAL EFFECTS OF SOME NATURAL PRODUCTS ON THE GLASSY CLOVER SNAIL *MONACHA CARTUSIANA*.

A Thesis

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By

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ABSTRACT

The current study interested in controlling high population densities of the destructive glassy clover land snails *Monacha cartusiana*, which cause severe damages to some economic crops at Sharkia Governorate. The effectiveness of two plant extracts (*Zingiber officinale*, Ginger and *Mesembranthmum crystalinum*, Ice plant) and two Biocides (Biozed, fungal derived and Biogard bacterial derived) in addition to Lannate (carbamate pesticide) were tested by using poisonous baits technique in the laboratory. Toxicity tests in this thesis revealed that Lannate was the most toxic against *M. cartusiana* and the highest mortality percentages followed by Ginger, Ice plant and Biozed respectively while Biogard caused the lowest lethal effect. These results be censured by the obtained data of evaluating the lethal concentrations and toxicity indices of tested materials as a result, the tested pesticides arranged in a descending manner as follows: Lannate > ethanolic extract of *Z. officinale* > ethanolic extract of *M. crystalinum* > acetonic extract of *Z. officinale* > Biozed > acetonic extract of *M. crystalinum* > Biogard. The mortality percentages of adult clover snails increased with increasing the concentrations of tested molluscicides and times of exposure. Biochemical estimations of adult snails treated with sub lethal concentrations (LC_{25}) of tested materials for three weeks were determined. Results showed that, all treatments with examined materials resulted in obvious disturbances in the activities of Amylase, Protease, AST, ALT, ACP, ALP, α & β esterase and the antioxidant enzyme Phenoloxidase. Moreover, there were highly decreased values of total soluble proteins and total lipids due to high stress induced by these toxicants. Histological alterations of the digestive and hermaphrodite glands of treated snails after two weeks of treatments with sub lethal (LC_{25}) concentrations of tested molluscicides were microscopically investigated. Abnormalities appeared in the histological structure were in the form of severe tubular disruptions, vacoulations, tissue necrosis,

inflammatory infiltrations and nuclear pyknosis. Deformed sperms and oocytes were noted in hermaphroditic acini after treatments with tested pesticides except Biogard who causes mild histological alterations in the examined glands. Transmission electron microscopic studies indicated the presence of three distinctive types of cells, digestive, excretory and calcium cells lining digestive tubules. TEM studies showed that Ginger causes rupture of microvilli, the cytoplasm is highly vacuolated with dense osmiophilic granules, deformation in rough endoplasmic reticulum and mitochondrial pyknosis. Biozed produced mild ultrastructural alterations. Lannate produced various ultrastructural abnormalities in the digestive gland of *M. cartusiana* in the form of ruptured microvilli of different cells, mitochondrial pyknosis and digestive cells have many lysosomal vacuoles containing cellular debris. Excretory cells have many dark granules and vacuolated cytoplasm. The nucleus of calcium cells become pyknotic and the lumen of the tubule has excessive secretions.

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