Thesis Title Structural Changes in Digestive, Reproductive, Respiratory and Nervous Systems of *Indoplanorbis exustus* (Mollusca : Gastropoda) Induced by Molluscicides

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ABSTRACT

Screening for molluscicidal activity of 50 different plant species of 22 families was done by exposing the snails, *Indoplanorbis exustus* to the crude-water extract of powdered leaves of plants for 24 h. Thirty-two species (64%) of the extracted assay demonstrated molluscicidal activity. The crude-water extract of *Brassaia actinophylla* showed the best result with the LC_{50} and LC_{90} values of 22.73 and 32.11 mg/l; while in methanol extract, they were 23.40 and 35.48 mg/l, respectively. For niclosamide (Bayluscide®), the LC_{50} and LC_{90} values were 0.009 and 0.01 mg/l, respectively. The LC_{50} and LC_{90} values of the crude-water extract of *B. actinophylla* on two species of fish, *Puntius gonionotus* and *Poecilia reticulata* were 47 and 55

mg/l, and 85 and 111 mg/l, respectively. Concerning the crustacea, *Moina macrocopa* and *Macrobrachium rosenbergii*, the LC_{50} and LC_{90} values of the crude-water extract of *B. actinophylla* were 258 and 861 mg/l, and 141 and 181 mg/l, respectively.

Toxicity studies were conducted with the crude-water of powdered leaves of *B. actinophylla* and niclosamide. The mature snails, *I. exustus* were exposed to niclosamide and *B. actinophylla* at the LC_{50} concentrations. After 1h, 6h, 12h and 24 h, organs of digestive, reproductive, respiratory and nervous systems were dissected out and prepared for light microscopic observation. Histological alterations of cells in different organs of digestive tract, ovotestis, cerebral ganglia and respiratory sac of snails intoxicated with niclosamide and *B. actinophylla* were relatively similar at different periods of intoxication, but more severe in snails intoxicated with *B. actinophylla*. Conspicuous alterations occurred during 12-24 h after intoxication. In the respiratory sac, there was an increase in volume of blood sinuses and the walls had become smooth in outline. In the ovotestis, there was a degeneration of spermatozoa and oocytes. In the cerebral ganglia, there was a lysis of neuropile and deformation of neurosecretory cells with the increase in size of cells and nuclei.

Histological alteration of the epithelial cells of the alimentary tract was noticable from 1h after intoxication with molluscicides, especially in the postesophagus and prointestine. The epithelia of esophagus and intestine were severely damaged after 12 and 24 h of intoxication. The alterations of the epithelium were dilatation of cells with increase of mucous vacuoles, reduction of cilia, and secretion of cell content into

the gut lumen. Alterations of the cells in digestive gland were extrusion of cell content, increase of large vacuoles, and karyolysis.

Ultrastructural changes that occurred in the epithelium of digestive tract of *I. exustus* exposed to the LC_{50} concentrations of niclosamide and *B. actinophylla* for 12 h were the formation of blebs, increase fusion of vacuoles, increase in infoldings of basal lamina, formation of myelin-like figures, degranulation and dilatation of RER , swelling of mitochondria and cristae,and an increase in mucous production.