Vasakorn Bullangpoti 2007: The Novel Botanical Insecticide, Alpha-Mangostin from Mangosteen Pericarp Extracts, for Control of *Nilaparvata lugens* (Stal.). Doctor of Philosophy (Zoology), Major Field: Zoology, Department of Zoology. Thesis Advisor: Associate Professor Suraphon Visetson, Ph.D. 116 pages.

This research was done to evaluate the efficiency of mangosteen (*Garcina mangostana* L.) pericarp extract as an alternative control of the Brown planthopper, *Nilaparvata lugens* Stal (BPH) (Thailand strain). The pericarp of mangosteen fruit was extracted using ethanol, hexane, acetone and dichloromethane as separate solvent systems. The topical sprayer method was used to apply extracts against various stages of nymph and adult BPH to determine toxicity. The highest yield, *ca.* 29.46% w/w, was obtained for ethanol and exhibited LC50 at 4.5% w/v (r^2=0.95) against 3rd instar BPH. The active ingredient compound, alpha-mangostin (2.956% w/w) showed LC50 at 5.44% w/v (r^2=0.88). The ethanolic mangosteen pericarp extract produced less toxicity than imidacloprid, which showed LC50 at 0.0042% w/v (r^2=0.99) against the same stage of BPH. The toxicity to non-target organisms was determined with guppies (LC50 = 2.53 and 4.27 ppm for females and males, respectively; r^2 =0.97 and 0.97, respectively) and bees (LC50 = 4.38% w/v, r^2 =0.95). Furthermore, mice showed no acute toxic effects via oral injection and no dermal inflammation was recorded. On the other hand, they showed temporary eye irritation for 1 day. The *in vitro* detoxification enzyme activities of carboxylesterase, acetylcholinesterase and glutathione-s-transferase from BPH after 24 hours exposure were also observed. Carboxylesterase showed stronger activity than other enzymes. Toxicity in terms of LC50 values of both the extract and imidacloprid treatments increased in each generation. The LC50 values for each generation ca. 4.22 – 6.67 after sequential spray. Comparisons of carboxylesterase gene sequences between control, Genbank, imidacloprid treatment (F8) and mangosteen fruit extract treatment (F8) showed that sequences were homologous. After the ethanol extract was kept at 4 °C, room temperature and 55 °C for 3 months, the quantity of alpha-mangostin and the BPH control efficiency was lower at 55 °C than those for other temperatures.

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