

Nutchaya Kumrungsee 2014: Bio-efficacy and Mode-of-action of Some Essential Oil Compounds and Their Binary Mixtures Against Lepidopteran Species. Doctor of Philosophy (Zoology), Major Field: Zoology, Department of Zoology. Thesis Advisor: Assistant Professor Vasakorn Bullangpoti, Ph.D. 83 pages.

Present work determines the bio-efficacy of thymol, 1,8 cineole, pulegone and linalool and their impact on detoxification enzymes of *Plutella xylostella* (Lepidopteran : Plutellidae) The activity was also determined against *Spodoptera littoralis* larvae. The compounds were applied topically to *P. xylostella* 3rd instars. Thymol was most active compound with 24 hours LD₅₀ of 220 ± 22.87 ppm. The effect on feeding behavior was observed using leaf disc no-choice assay. 1,8 cineole exhibited the best antifeedant action with an FI₅₀ of 339.5 ppm compared to least active linalool with and FI₅₀ of 1,598.02 ppm 6 hours post-treatment. Antifeedant activity of pulegone (FI₅₀ of 556.5 ppm) was significantly closer to 1,8 cineole. In case of *S. littoralis* oral administration effects were prominent only in case of thymol treated insects. After treating larvae with binary mixtures significant synergism was observed in pulegone and thymol combinations. Detoxification enzymes like α -esterase, β -esterase, glutathione-s-transferase and acetylcholinesterase were induced in both *in vitro* and *in vivo* assay. The results obtained in present study suggest that all the 4 evaluated compounds have potential to control lepidopteran larvae if a strategized approach of application is used.

Student's signature

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