

Oral Presentation Session: Pharmaceuticals

PM-OP-03

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**A Study of Synergistic Effects of Some Sri Lankan Essential Oils against Cowpea
bruchid, *Callosobruchus maculatus***

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Spices and essential oils are known to have various effects on stored grain pests. Essential oils are believed to act as semiochemicals and have also been shown to be potent source of bio-pesticides. Lemongrass- *Cymbopogon citratus*, Cinnamon- *Cinnamomum zeylanicum* and Curry leaf- *Murraya koiniggi* are native spice plants abundant in Sri Lanka. Toxicity and repellent activity of these essential oils were reported. The present study was carried out to investigate the toxicity and repellent activity of the mixtures of the above three volatiles (1:1 v/v) against cowpea bruchid- *Callosobruchus maculatus* (F.). In the contact toxicity tests, an appropriate amount of the volatile combination was evenly applied on inner surface of a container and 5 pairs of 5-10 h old bruchids were introduced into the container. After 24 h, the bruchids were transferred to another container with 50 fresh, untreated cowpea seeds. In the fumigant toxicity tests required amount of volatile combination was applied into a filter paper attached to inner surface of the container and a metal mesh was used to cover the mouth of the container to avoid the contact of test insect. The bruchids were fumigated for 24 h in the container and transferred to another container as contact toxicity. The repellent effects of the volatiles were studied using "Y" shaped olfactometer and multiple-choice chamber. During the contact toxicity assay, 100 % mortality was observed at concentration of 0.15 g/l of lemongrass: cinnamon and lemongrass: curry leaf mixtures and 0.20 g/l of cinnamon: curry leaf combination. In the fumigant toxicity tests 10.00 g/l concentrations of mixture of essential oils were required to obtain 100 % mortality. The oviposition and F₁ adult emergence were significantly inhibited in all treatments during contact and fumigant tests. The results revealed that the contact effect of the oil combination was higher than that of the fumigant effect. The LC₅₀ values obtained in Lemongrass: Cinnamon, Lemongrass: Curry leaf and Cinnamon: Curry leaf were 0.050, 0.063 and 0.067 g/l respectively. The repellent effect of the oil combinations against the bruchid revealed that some degree of repellency at the doses ranging from 10- 160 mg. The % responded to the treated arm in the olfactometer varied from 40.0 to 10.0 where as in the choice chamber bioassay this value was varied from 10.0 to 0.0 %. The % responded to all the treatments were significantly low compared to the controls and ethanol treatments (mean 28.0 %) in the choice chamber test. Thus the above 3 oil combinations could be considered as highly toxic and repellent against cowpea bruchid, and it could be used to develop botanical pesticide to protect stored cowpea in the region.

Keywords: *Cymbopogon citratus*; *Cinnamomum zeylanicum*; *Murraya koiniggi*; *Callosobruchus maculatus*; pest control; essential oils.