Fumigant Effect of Plant Essential Oils against Lesser Grain Borer *Rhyzopertha dominica* (Fabricius) and Red Flour Beetle *Tribolium castaneum* (Herbst)

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ABSTRACT

The bioefficacy of plant essential oils, namely, eucalyptus oil, orange oil and clove oil was evaluated against lesser grain borer (*Rhyzopertha dominica* Fabricius) in sorghum and red flour beetle (*Tribolium castaneum* Herbst) in rice. Each essential oil at 0.5, 1.0 and 1.5 mL was impregnated on plywood cube of one inch and placed on the surface of grain (250 g) in a plastic jar. Eucalyptus oil and orange oil showed very good fumigant activity at all the doses tested against lesser grain borer and recorded no progeny emergence. Clove oil showed significantly ($p<0.05$) few numbers of adult emergence compared to the untreated control which recorded a total emergence of 215.67 adults after 120 days of insect release. Similarly, eucalyptus oil and orange oil treatments recorded no emergence of red flour beetles at all the doses tested at 40-day after release of the insects. Subsequently, except in the highest dose of eucalyptus oil and orange oil treatments, progeny adult emergence was observed in all other treatments. The untreated control recorded a total of 91.33 adults after 200 days of insect release. However, there was a dose-dependent effect on progeny emergence of both test insects. The results indicated that the red flour beetle was more tolerant to fumigant effects of the essential oils compared to the lesser grain borer. The doses of essential oils at which no emergence of lesser grain borer insects was noticed, could not exert similar effects on red flour beetle. The use of fumigant plant oils without direct mixing to grain may be economical and may provide a better option to protect grain from storage insects. However, sorption of the odors of the essential oils by the food grains has to be addressed.

Key words: *Plant essential oils, Tribolium castaneum, Rhyzopertha dominica*