

ECO-FRIENDLY ALTERNATIVES FOR STORAGE PEST MANAGEMENT: LEAVES OF *RUTA GRAVEOLENS* (ARUDA) AS A REPELLENT AGAINST THE RICE WEEVIL, *SITOPHILUS ORYZAE* L. (COLEOPTERA: CURCULIONIDAE)

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In view of worldwide interest and greater public awareness in finding plant products as the most promising, ecologically safer, and economical alternatives for synthetic insecticides for post-harvest protection of stored rice, present study was undertaken to explore the potential of leaves of *Ruta graveolens* (Aruda) as a repellent against *Sitophilus oryzae* infestations. Leaf powder and solvent extracts of *R. graveolens* were evaluated under laboratory conditions ($29 \pm 2^{\circ}\text{C}$ and $84 \pm 2\%$ RH) for their contact and fumigant repellent properties against seven day old *S. oryzae* adults. In contact repellency test, weevils (20 each) were exposed to 1.0 g, 3.0 g, 5.0 g, and 7.0 g of leaf powder mixed with white raw rice grains (30 g) in a modified cup bioassay apparatus. Fumigation repellency of leaf powder was tested using same dosages and number of weevils in a fumigation-repellency chamber. Number of weevils that moved from the bioassay chamber was recorded one hour after weevil introduction. To evaluate the repellent action of leaf extracts, leaves of *R. graveolens* were extracted in hexane, ethyl acetate, methanol and distilled water. Four extracts of different concentrations 10, 50, 100% (v/v) were assessed separately for repellent activity by means of an area preference bioassay. In all experiments, ten adult weevils for each were tested and the number repelled was recorded 30 minutes after weevil introduction. Both contact and fumigant repellent effects of plant powder against *S. oryzae* were significantly high at all doses and the results indicated that repellency rate increased with the increase of dose. Highest contact and fumigant repellent effects were elicited by 7.0 g of leaf powder resulting in repellency of 96% and 95% respectively, whilst lowest dose also produced more than 50% weevil repellency indicating extremely strong repellent action of the plant powder. In comparison, aqueous leaf extract exhibited the most potent repellent activity (91%) while hexane, ethyl acetate and methanol extracts also produced 72%, 79% and 84% of repellent effects on weevils respectively at the concentration of 100% (v/v). Overall findings of the study suggest that both powder and extracts of *R. graveolens* leaves could be used as eco-friendly agents for post-harvest rice protection.

Keywords: *Ruta graveolens*, *Sitophilus oryzae*, stored rice, leaf powder, repellent