



***STRUCTURE-ACTIVITY RELATIONSHIP OF LONG CHAIN
ALIPHATIC 2-METHYL KETONES CONSTITUENTS OF *Ruta graveolens*
ESSENTIAL OIL AS FUMIGANTS AGAINST *Sitophilus zeamais* AND
*Corcyra cephalonica****

Perera A.G.W.U.1*, Karunaratne M.M.S.C.1 and Chinthaka S.D.M.2

1Department of Zoology, University of Sri Jayewardenepura, Sri Lanka

2Department of Chemistry, University of Sri Jayewardenepura, Sri Lanka

wathsalauda@gmail.com

Essential oils have long been used as pharmaceuticals, in food products, in fragrances and particular emphasis has been placed on their fumigant insecticidal activities. Hence, identification of the main constituents responsible for fumigant activity combined with comparative-effectiveness research of each constituent are of interest, which could enable determination of the necessary structures for their fumigant action towards stored insect pests. As part of an effort aimed at the development of reduced-risk pesticides based on plant essential oils, fumigant effects of *Ruta graveolens* essential oil and its long chain aliphatic 2-methyl ketones (2-octanone, 2-nonanone, 2-decanone, 2-undecanone, 2-dodecanone and 2-tridecanone) were comparatively evaluated against *Sitophilus zeamais* and *Corcyra cephalonica*. Essential oil caused 100% mortalities at 66.67 ml l⁻¹ air and 14.81 ml l⁻¹ air against *S. zeamais* (LC₅₀= 0.602 ml l⁻¹ air) and *C. cephalonica* (LC₅₀= 0.561 ml l⁻¹ air) respectively after 24 h of exposure. All alkanones had LC₅₀ values smaller than 0.486 and 0.209 ml l⁻¹ air exhibiting significant fumigant lethality against *S. zeamais* and *C. cephalonica* respectively. Susceptibility of two insect species to the alkanones and parity of the alkanones was inversely associated. In that sense, odd-chained congeners exhibited significant fumigant effects against *S. zeamais* while even-chained congeners showing negligible toxic effects. Of these congeners, 2-nonanone and 2-undecanone demonstrated high fumigant activities with respective LC₅₀ values of 0.186 and 0.196 ml l⁻¹ air followed by 2-tridecanone (LC₅₀= 0.486 ml l⁻¹ air). Contrastingly, *C. cephalonica* was more susceptible to even chained- congeners than to the odd-chained congeners whereas 2-octanone was not active at all. In that context, idiosyncratic interspecific fumigant insecticidal potential of alkanones of *R. graveolens* essential oil may be suitable as fumigants or vapor-phase pesticides in integrated pest management programs. Acknowledgement: Financial assistance by University of Sri Jayewardenepura research grant (ASP/01/RE/SCI/2016/35)

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