

Phytochemical Profiling and Insecticidal Potential of *Rosa moschata* Extracts Against Key Agricultural Pests

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1 ABSTRACT

This study evaluated the insecticidal potential of ethanolic extracts from *Rosa moschata* (musk rose) leaves and flowers against four agriculturally important insects representing distinct orders: *Acyrtosiphon pisum* (pea aphid, Hemiptera), *Drosophila melanogaster* (fruit fly, Diptera), *Tribolium castaneum* (red flour beetle, Coleoptera), and *Spodoptera exigua* (beet armyworm, Lepidoptera). In 2% (w/v) screening, *A. pisum* was the most susceptible, exhibiting 100% mortality within 24 h, whereas *D. melanogaster* and *S. exigua* showed only moderate, time-dependent effects and *T. castaneum* was unresponsive. GC–MS (Gas Chromatography-Mass Spectrometry) profiling identified 20 constituents in leaf extract and 10 in flower extract, dominated by fatty-acid esters, terpenoids, and aromatic compounds. In dose–response assays against *A. pisum*, the 2% leaf extract was most potent (LC₅₀ = 35 ppm; LC₉₀ = 101 ppm), and the 2% flower extract also showed activity (LC₅₀ = 125 ppm; LC₉₀ = 197 ppm). In a focused series on leaf extract concentrations, the 2% treatment achieved even lower lethality thresholds (LC₅₀ = 17 ppm; LC₉₀ = 47 ppm at 24 h), while 1% and 0.5% were markedly less effective. These findings position *R. moschata* particularly the leaf extract as a promising botanical candidate for integrated pest management targeting aphids, and they motivate fractionation, mechanism elucidation, formulation optimization, and semi-field/field validation.