

The mortality and repellency effect of a formulation of spearmint essential oil on the cotton-melon aphid under greenhouse conditions

M. Riazi¹, J. Khajehali^{1*}, N. Poorjavad¹ and A. Bolandnazar²

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Abstract

In recent years, application of essential oils derived from aromatic plants has been considered as low-risk insecticides. These compounds have repellency, insecticidal and growth-reducing effects on immature stages of a variety of insects. Since it is not possible to use pure essential oils in agricultural fields and greenhouses, development of commercial formulations essential-oils is necessary. In this study, the insecticidal activity and repellency effect of essential oil from spearmint (*Mentha spicata*) and its formulation was tested against the melon aphid (*Aphis gossypii*), which is one of the key pests of greenhouse crops. The LC₅₀ values of fumigation bioassay of the essential oil against the first instar nymph, third instar nymph and adult of *A. gossypii* were 2.70, 3.41 and 5.24 µl/L, respectively. For contact toxicity bioassay, based on preliminary tests, a formulation of essential oil from spearmint was used in four concentrations (8000, 12500, 16000 and 25000 mg/L). Results revealed that spearmint essential-oil formulation caused 88.7% adult mortality when applied at a concentration of 25000 mg/L. The repellency index was calculated when aphids were exposed for 24 h to LC₂₀ concentration. This index was -10%. These results showed that formulation of spearmint essential oil could be used as a commercial substitute for chemical insecticides to control *A. gossypii* under greenhouse conditions.

Keywords: *Mentha spicata*, Botanical insecticide, Insecticidal effect, *Aphis gossypii*.

1. Dept. of Plant Protection, College of Agric., Isfahan Univ. of Technol., Isfahan, Iran.

2. Research Center for Medicinal Plants, Barij Essence Co., Kashan, Iran.

*: Corresponding Author, Email: khajeali@cc.iut.ac.ir