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

(Received: Dec. 21-2013; Accepted: Nov. 17-2014)

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