Insecticidal effects of the essential oil of caraway, *Carum carvi* on the tomato leaf miner, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae)

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The tomato leaf miner, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae), is one of the most important pests of tomato (*Lycopersicon esculentum*), which can be regarded as a serious threat to tomato production in Iran. One of the main tools in its management, is the use of conventional synthetic insecticides, however this overreliance on the use of synthetic insecticides quickly leads to problems of insecticide resistance. The use of plant essential oils in pest control is suitable method for reduction of the side effects of chemical insecticides on the environment. In this research, fumigant toxicity of caraway, *Carum carvi* essential oil was studied on the 2nd larval instars and eggs. The essential oil was obtained by hydrodistillation method, using a modified Clevenger-type apparatus. Experiments were carried out at 27 ± 2°C and 65 ± 5% R.H. Different concentrations of essential oil ranging from 4-8 µl L⁻¹ air and 20-100 µl L⁻¹ air were used in the main bioassay tests on the 2nd larval instars and eggs, respectively and each concentration and control included three replicates. The mortality was recorded at 24th larvae after 48 hours. The results showed that by increasing oil concentration, the mortality was increased. Based on Probit analysis, the LC₅₀ values for 2nd larvae and egg were 5.84 and 44.24 µl L⁻¹ air, respectively. Study of the effects of the essential oil on egg of the pest showed that by increasing equivalent to 100 µl L⁻¹ air caused 100% mortality on the eggs. The results showed that the caraway essential oil has high potential in controlling tomato leaf miner especially in protected areas.