Lethal and sub lethal effects of *Heracleum persicum* and *Pimpinella* -anisum essential oils on Aphis gossypii Glover (Hem: Aphididae)

Abstract

Cotton aphid (Aphis gossypii) is a serious pest of greenhouse with a wide host range that causes damage with feeding on plant sap and transmission of viral diseases. Currently, synthetic pesticides are used to combat this pest that resulted to resistant biotype. On the other hand, the plant secondary metabolites having less insecticidal properties and fewer resistance probability, so researchers have been interested to them. The fumigant toxicity and sublethal effects of seed essential oil from two plants of Apiaceae, the Angelica (Heracleum persicum) and Anise (Pimpinella anisum) were studied on the adults of cotton aphid. The results showed that the mortality rate of test insects increased significantly with rising essential oil concentration 24 hours after treatment. LC50 value for the essential oil of Anise and Angelica, obtained 0.88 and 1.32 μ l/l air, respectively. For studying sublethal effects of essential oils, the survival and birth rate of cotton aphid was recorded on cucumber leaves under laboratory conditions (25±1° C; RH. 70%; L:D, 16H:8H) in LC₁₅ and LC₃₀, and fertility life table parameters were estimated. Based on the results, the net reproductive rate (R_0) of control and treatment with Acetone, were 76.16 and 73 female/female, respectively. While in LC₁₅ of Anise and Angelica essential oil, the R₀ were 49.78 and 64.14 female/female, respectively. The intrinsic rate of increase (rm) of control and treatment with Acetone, were 0.4619 and 0.454 female/female/day, respectively. Whereas, the r_m parameter in LC15 of Anise and Angelica essential oil, was equal to 0.419 and 0.439 female/female/day, respectively. Mean generation time (T) in control and treatment with Acetone, were 9.39 and 9.46 days, respectively. But, Mean generation time (T) in LC₁₅ of Anise and Angelica essential oil, was equal to 9.49 and 9.48 days, respectively. The net reproductive rate (R_0) of LC₃₀ of Anise and Angelica essential oils, were 39.53 and 57.39 female/female, respectively. The intrinsic rate of increase (rm) of LC₃₀ of Anise and Angelica essential oils was equal to 0.381 and 0.4004 female/female/day, respectively. Mean generation time (T) in LC_{30} of Anise and Angelica essential oils, was equal to 9.36 and 10.12 days, respectively. The results showed a significant decrease in the fertility parameters of cotton aphid in sub-lethal concentrations of plant essential oils.

Keywords: Anise, Angelica, Cotton aphid, Essential oil, Fumigant toxicity, Sublethal effect



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