

Abstract :

The migratory locust, *Locusta migratoria* (Linnaeus), is the most widespread locust species. Frequent applications of insecticides have inevitably resulted in environmental pollution and development of resistance in some natural populations of the locust. To find a new and safe alternative to conventional insecticides, experiments were conducted to assess the effect of olive leaf extracts on *L. migratoria* fifth instar larvae. The methanolic extracts were prepared from the leaves sampled during four phenological growth stages of olive tree which are as follows: Cluster formation (Cf), Swelling inflorescence buds (Sib), Full flowering (Ff), and Endocarp hardening (Eh). The most relevant result was noted with the extract prepared from the leaves collected at the Sib-stage. Results showed that treatment of newly emerged larvae resulted in a significant mortality with a dose-response relationship. The olive leaf extracts toxicity was also demonstrated by histopathological changes in the alimentary canal resulting in a considerable disorganization and serious damage of the midgut, ceca, and proventriculus structure. Epithelial cells alterations, less dense and degraded striated border, disintegrated regeneration crypts, vacuolarized cells, extrusion of cytoplasmic contents, and rupture of muscular layer were evident in the midgut and ceca of treated larvae. Data of biochemical analyzes showed that olive leaf extracts induced a significant decrease of the hemolymph metabolites (proteins, carbohydrates, and lipids). In a second series of experiments, we showed that the olive leaf extracts reduced the activity of acetylcholinesterase and induced the glutathione *S*-transferases with a dose-response relationship.