# USING UNTRADITIONAL ALTERNATIVES IN IPM PROGRAM TO CONTROL FRUIT FLIES AND MITES INFESTING CITRUS TREES IN EGYPT

***A Thesis***

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compounds to protect crops from insect invasion, because of their low cost and because they are bio- degradable and thus are ecofriendly. In this study, violet dough extract, *V.odorata* and *Eucalyptus* leaves extract *E. camaldeulensis* were applied on immature stages (full-grown larvae and pupae) and adults of *Ceratitis capitata.* With different concentrations; $0.25\times10^3$, $0.5\times10^3$, $1\times10^3$,$2\times10^3$and $3\times10^3$ ppm in immature stages by two methods; spray and contact treatment. The larval and pupal response to the two leave extract concentrations varied according to the method of treatment. The Mediterranean fruit fly, *C.capitata* one-day and eight-days old pupae were more sensitive to the Violet dough different concentrations treatments by using the spray and contact treatment methods principally at the high concentrations than full- grown larvae. In *Eucalyptus* leave, threre were fluctuation of mortality percentages among different concentrations. According to $LC_{50}$ and $LC_{90}$ calculated values, the mortality percentage of *C. capitata* full-grown larvae, one-day and eight-day pupae was higher by using the contact treatment method than the spray method. The adult individuals treated with *V. odorata* were more sensitive and recorded higher mortality rates than that treated with *E. camaldeulensis*. Consequently, deformed sensillae on antennae and ommatedia were observed by scanning electron microscopy on individuals treated with *V. odorata*.

**3. Repellent effect of leaves extracts of** *Viola odorata* **Linn and** *Eucalyptus camaldeulencis* **Dehnh against** *Eutetranychus orientalis* **Females (Acari:Tetranychidae) under laboratory conditions**:

Brown spider mites can rapidly develop resistance to pesticides. Organic control may be considered as an alternative and eco-friendly approach. Two plant extracts were tested for their repellence against adult females of

*Eutetranychus orientalis* (Klein). In this study, the violet leaves extract, *Viola odorata* L. (Violacaea) and Camphor leaves extract, *Eucalyptus camaldeulensis* Dehnh (Myrtaceae) have been tested as repellent agents via assorted exposure periods ( 6, 12, 24, 48, 96, and 72hr) at five assorted doses ($0.25\times10^3$, $0.5\times10^3$, $1\times10^3$, $2\times10^3$ and $3\times10^3$ ppm/L). We observed repellency effect in all doses and for the two extracts, whereas *E. camaldeulencis* was proven to be a slight stronger repellent compared to *V. odorata* at $2\times10^3$ and $3\times10^3$ ppm/L along all exposure time. This repellence effect is due to terpenoid constituents presented in the two extracts. There were significant differences between two extracts whereas the high diversity of terpenoid groups in *E. camaldelensis* than in *V. odorata*. The present work was carried out to study the behavioral effect represented in the repellence of two plant extracts on the mite, *E. orientalis,* a pest of citrus and could be a potential alternative for the development of eco-friendly products used to control pests which is very harmful to agriculture.

**4. Efficacy of Acaricides on *Eutetranychus orientals* (Acari: Tetranychidae) and Its Compatibility with Predatory Mite *Euseius scutalis* (Acarei: Phytoseiidae) under Field Conditions:**

Efficacy evaluation of seven acaricides, i.e.Acarine (Abamectin 5% EC), Gat Fast (2% Abamectin +10%Thiamthoxam (12%SC)), OrtisSuper (Fenpyroximate 5% EC), Concord (Chlorfenapyr 24% EC), Perfect (2% Abamectin+10%Chlorfenapyr (12%EW)), Micronet S (Sulfur 80%WP) and Acarots (Fenpyroximate 5% SC) at recommended dose (RD), against the brown spider mite, *Eutetranychus orientalis* (Tetranychidae) and its predatory mite, *Euseius scutalis* (Phytoseiidae), was applied on citrus crop in Assiut Governorate under field conditions. Three assorted exposure eras: three days, one week and two weeks, were achieved in May 2018. It was

found that a total reduction rate of these 7 acaricides against *E. orientalis* was 88.26, 90.40, 87.99, 88.91, 88.78, 88.41 and 87.82% and against *E. scutalis* was 23.69, 19.61, 14.33, 12.7, 15.52, 16.51 and 15.33%, respectively. Abamactin 5% was significantly higher than other acaricides ($p < 0.05$) followed by Fenpyroximate 5%EC and Fenpyroximate 5%SC. On the other hand, the rest of acaricides appeared to be insignificant ($p > 0.05$). Acaricides can be used against *E. orientalis* without affecting *E. scutalis* where the results showed compatibility between acaricide and predatory mites in the field. For mode of action, Fenpyroximate is safer for human and animal than others because it acts as mitochondrial electron transport inhibitor with contact action. Application of serial concentrations from these compounds is recommended to reduce its toxicity in the environment.