Faculty of Science
Dept. of Entomology

INVESTIGATION OF BOTANICAL AND MICROBIAL AGENTS OF BIOLOGICAL ACTIVITY AGAINST CERTAIN DISEASE VECTORS

A Thesis

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Abstract

The present study was carried out to evaluate the toxic effect of nine plant oils (e.g., *Anethum graveolens, Apium graveolens, Carum carvi, Curcuma longa, Cyminum cyminum, Foeniculum vulgare,* Melia azedarach*, Petroselium crispum* and *Piper nigrum*) in addition to four commercial insecticides [e.g., malathion® (٥٧٪ EC), spinosad (Tracer® ١٢٪ SC), agerin® (WP – ٣٢،٠٠٠ IU/mg), and tebufenozide (Mimic®, ٣٠٪ EC)] and two bacillus species toxins against larvae and adult of *Culex pipiens* and *Musca domestics*. Some biological aspects, the joint action, the synergestic effect were studied and the developmental changes resulted from treating the tested insects with $LC_{٥٠}$ concentration level were also recorded. The phytochemical screening were carried out to detect the effective chemical groups in the tested oils then the oils were analyzed by GC/MS. Natural formulations were then prepared using the tested oils in different pesticidal preparations, i.e. EC, WP, CRF (Controlled Release Formulation), repellency tablets, sugar bait and paired mixture discs and tested for their efficacy against the targeted insects. Their residual toxicity was also evaluated.

The present findings clear that, all the tested oils showed high toxicity against larval and adult stages of *C. pipens* and *M. domestica* and cumin oil resulted in the highest repellency effect. Among the tested insecticides, spinosad was the most effective. The tested oils proved to have IGR properties when compared with mimic and caused sever shortage in stage's period. Many morphological changes and abnormalities were also detected. The joint action and synergistic studies indicated the synergistic effect of the tested oils when they mixed together or with the tested insecticides. Also the non- lethal concentration of spinosad and agerin have synergized the tested oils toxicity. Results showed that, Bti toxin was more toxic than Bs when they were tested against larvae and adults of mosquito and

housefly. Synergism was proved by mixing tested oils at LC_{50} concentration level was mixed with the non-lethal concentration (LC_{0}) of the two Bacillus toxins. Studies on prepared oils formulations indicated that these formulations have improved the toxicity and prolonged their storage time.

Key words: *Culex pipiens*- *Musca domestica*- Essential oils- Bacterial toxins- IGRs- Insecticides- Pesticide formulations - WP- EC - CRF- Toxicological and Biological activitie, Joint action, synergestic effect, Phytochemical screening, GC/MS analysis.

CONTENTS

LIST OF ABBREVIATIONS

C. Pipiens	Culex pipiens
M. domestica	Musca domestica
Bt	Bacillus thuringensis
Bs	Bacillus sphearicus
IGR	Insect Growth Regulator
LC	Lethal Concentration
LD	Lethal Dose
RC	Repellent Concentration
GC/MS	Gas Chromatography Mass Spectrum
EC	Emulsifiable Concentrate
WP	Wettable Powder
CRF	Controlled Release Formulation
CRP	Controlled Release Pellets
CRC	Controlled Release Capsules
CSP	Clinical series pipette
LC-P lines	Lethal Concentration Probit lines
S.F.	Synergistic/ Antagonistic Factor
FID	Flame Ionization Detector

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