Faculty of Science
EntomologyDepartment

Biological and Biochemical Studies on *Culex pipiens* L. (Diptera:Culicidae) Exposed to *Allium sativum*,*Nigella sativa* Oil Extractsand *Bacillus sphaericus*(Neid)

A Thesis

Submitted to the Department of Entomology,Faculty of Science, Ain Shams University
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Dedication

I am pleased to dedicate this work to my beloved parents, sister, wife, daughter and people who I missed them

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صدق الله العظيم

بسم الله الرحمن الرحيم

(سوره البقره الأيه26)

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ABSTRACT

Bacillus sphaericus has a larvicidal activity towards *Culex pipiens* larvae.Development of resistance in certain populations of *Culex* sp. is the most common disadvantage of *B. sphaericus* application. During application, pesticide, *B. sphaericus* formulations suffering from long exposure to sun light and UV which turned them impotent. So, the present study was designed to evaluate the larvicidal activity of *Bacillus sphaericus* toxin, *Allium sativum* and *Nigella sativa* oil extracts solitary and in combination against *Culex pipiens* 3rd larval instar. Data revealed that, *Bacillus sphaericus* was the most potent insecticide recording LC_{50} value as (0.25ppm.) followed by *Allium sativum* and *Nigella sativa* recording (0.45 and 2.46 ppm.), respectively. Addition of *Allium sativum* generally increased the toxic effect of *Bacillus sphaericus*, where LC_{50} decreased from (0.25 ppm to 0.12 ppm). Addition *of Nigella sativa* to *Bacillus sphaericus* decreased the toxicity of *Bacillus sphaericus* by increasing its LC_{50} from (0.25 ppm to 0.39 ppm) .The biochemical studies using (SDS-PAGE), revealed that there was an increase in number of protein bands due to treatment with (*Bacillus sphaericus* combined with *Allium sativum*and*Bacillus sphaericus* with *Nigella sativa*). Theseimpressive results from combinations proved that when joint-action is considered, the application possibilities for vector control increase significantly.

Keywords: *Bacillus sphaericus*, Plant oil extracts, *Allium sativum*, *Nigella sativa*, *Culex pipiens*, Bioassay test, protein electrophoresis.

LIST OF ABBREVIATIONS

ITEM	Abbreviation
Bacillus sphaericus	***B.sphaericus***
Bacillus thuringiensis israelensis	***B.t.i.***
Culex	***Cx.***
Anopheles	***An.***
Aedes	***Ae.***
Allium sativum	***A. sativum***
Nigella sativa	***N. sativa***
Lethal Concentration	**LC**
Lethal Time	**LT**
Binary Toxin	**Bin**
World Health Organization	**WHO**
Part Per Million	**ppm.**
Kilo Dalton	**KDa**
Sodium Dodecyl Sulfate	**SDS**
Poly Acrylamide Gel Electrophoresis	**PAGE**
Commassie Brilliant Blue	**CBB**
N,N,N',N'Tetramethylethylenediamine	**TEMED**
Ploymerase Chain Reaction	**PCR**
High Performance Liquid Chromatography	**HPLC**
Thin Layer Chromatography	**TLC**
***Culex pipiens* membrane**	**Cpm**
***Anopheles gambiae* membrane**	**Agm**

Glycosyl-Phosphatidyl-Inositol	**GPI**
Genetically Engineered Organism	**GEO**
Brush Border Membrane Fraction	**BBMF**
Acetyl Choline Esterase	**AChE**
Hours	**Hrs.**
Resistance Ratio	**RR**
Internal transcribed spacer	**ITS**
Co-toxicity Factor	**C.F**
Potentiation	**P**
Additive	**A**

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