



**Faculty of Science**  
**Entomology Department**

**EFFECT OF SOME NEW INSECTICIDES ON  
BIOLOGICAL AND BIOCHEMICAL CHANGES OF THE  
COTTON LEAFWORM, *Spodoptera littoralis* (Boisd.)  
(LEPIDOPTERA: NOCTUIDAE)**

A Thesis Submitted to Faculty of Science, Ain Shams University,  
In partial fulfillment for the award of M.Sc. degree  
(Entomology)

**BY**

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## DEDICATION

*This thesis is dedicated to the loving memory of my father, Mahmoud Farag. I miss him every day, but I am glad to know he saw this work through to its completion, offering the support to make it possible, as well as plenty of friendly encouragement. His words of inspiration and encouragement in pursuit of excellence, still linger on.*





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## LIST OF ABBREVIATIONS

<b>AChE</b>	Acetylcholinesterase
<b>AI</b>	Active ingredient
<b>ALT</b>	Alanine amino transferase
<b>AST</b>	Aspartate amino transferase
<b>CBB</b>	Coomassie Brilliant Blue
<b>Conc.</b>	Concentration
<b>EC</b>	Emulsifiable Concentrate
<b>EDTA</b>	Ethylene Di amine tetra Acetic acid
<b>G.d.</b>	Genetic distance
<b>hrs.</b>	Hour(s)
<b>IGR<sub>s</sub></b>	Insect growth regulators
<b>IPM</b>	Integrated pest management
<b>IUPAC</b>	International Union of Pure and Applied Chemistry
<b>KCl</b>	Potassium chloride
<b>kDa</b>	kilo-Dalton
<b>L.</b>	Liter.
<b>LC</b>	Lethal Concentration
<b>Min.</b>	Minute(s)
<b>M.W.</b>	Molecular Weight



<b>N</b>	Normality
<b>O.D.</b>	Optical density
<b>O.D.I</b>	Oviposition deterrent Index
<b>PAGE</b>	Poly acrylamide gel electrophoresis
<b>Ppm</b>	Part per million
<b>PTU</b>	Phenylthiourea
<b>R<sub>f</sub></b>	Relative fragmentation
<b>RH</b>	Relative humidity
<b>Rpm</b>	Revolution per minute
<b>SAS</b>	Statistical analysis system
<b>SC</b>	Suspension Concentrate
<b>SE</b>	Standard error
<b>S.I.</b>	Similarity Index
<b>TEMED</b>	N,N,N,N, tetramethylendiamine
<b>V</b>	Volume
<b><math>\alpha</math>-Est</b>	$\alpha$ -esterase
<b><math>\beta</math>-Est</b>	$\beta$ -esterase



CONTENTS	Page
<b>I. INTRODUCTION</b> .....	<b>1</b>
<b>II. LITERATURE REVIEW</b> .....	<b>5</b>
<b>1. Laboratory studies</b> .....	<b>5</b>
<b>a. Toxicological and biological studies</b> .....	<b>5</b>
1. Effect of Indoxacarb (Steward 15% EC) on <i>Spodoptera</i> sp ....	<b>5</b>
2. Effect of Spinetoram (Radiant 12% SC) on <i>Spodoptera</i> sp .....	<b>8</b>
3. Effect of Methoxyfenozide (Runner 24% SC) on <i>Spodoptera</i> sp .....	<b>11</b>
<b>b. Biochemical studies</b> .....	<b>18</b>
1. Effect of three tested insecticides on total metabolites (protein, lipid and carbohydrate) of <i>Spodoptera</i> sp spectrophotometrically .....	<b>18</b>
2. Effect of three tested insecticides on electrophoretic protein patterns of <i>Spodoptera</i> sp .....	<b>20</b>
3. Effect of three tested insecticides on activity of some enzymes of <i>Spodoptera</i> sp spectrophotometrically .....	<b>21</b>
4. Effect of three tested insecticides on electrophoretic patterns of some enzymes of <i>Spodoptera</i> sp.....	<b>31</b>
<b>2. Field and semi-field studies</b> .....	<b>32</b>
<b>a. Effect of Indoxacarb on larval instars of Lepidopterous pests</b> ....	<b>32</b>
<b>b. Effect of Spinetoram on larval instars of <i>Spodoptera</i> sp</b> .....	<b>36</b>
<b>c. Effect of Methoxyfenozide on larval instars of <i>Spodoptera</i> sp</b> ....	<b>42</b>
<b>III. MATERIALS AND METHODS</b> .....	<b>46</b>
<b>1. Laboratory studies</b> .....	<b>46</b>
<b>a. Toxicological and biological studies</b> .....	<b>46</b>
1. Laboratory maintenance of the cotton leafworm <i>Spodoptera littoralis</i> (Boisd.).....	<b>46</b>
2. Experimental design .....	<b>47</b>
3. Tested insecticides .....	<b>48</b>
4. Effect of Indoxacarb, Spinetoram and Methoxyfenozide on toxicological and biological aspects of 2nd and 4th instar larvae of <i>S. littoralis</i> (Boisd.) .....	<b>51</b>
a. Toxicological evaluation.....	<b>51</b>
b. Biological evaluation .....	<b>52</b>
<b>b. Biochemical studies</b> .....	<b>53</b>
1. Preparation of samples for biochemical analysis (Haemolymph collection) .....	<b>53</b>
2. Analysis by using spectrophotometer .....	<b>53</b>