

## BIOCHEMICAL RESPONSES OF *SPODOPTERA LITTORALIS* (BOISD.) TO THE TREATMENT WITH SPINETORAM, TEFLUBENZURON AND TEBUFENOZIDE

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### Abstract

The susceptibility of the laboratory 4<sup>th</sup> instar larvae of cotton leafworm *Spodoptera littoralis* to the treatments with the green chemical spinetoram and two IGR's (teflubenzuron and tebufenozide) was studied. Teflubenzuron exhibited high level of toxicity with low LC<sub>50</sub> value (8.9 ppm) followed by tebufenozide (65.7 ppm) and finally spinetoram (121.1 ppm). The LC<sub>50</sub> value of each compound was used to determine the biochemical responses of *Spodoptera littoralis* to the treatment with the tested compounds (Spinetoram, Teflubenzuron and Tebufenozide), the treatment with spinetoram caused significant increase in chitinase, phenol-oxidase, trehalase and acetylcholine esterase activities, while the activity of amylase was significantly reduced. The treatment with tebufenozide reflected in high  $\alpha$ -esterase activity. In contrary teflubenzuron remarkably reduced chitinase, trehalase and  $\alpha$ -esterase activities.

### INTRODUCTION

Among more than 1300 insect species recorded from cotton, the most important pest to have spread is the cotton leafworm *Spodoptera littoralis* (Boisduval), which is found almost every where cotton is grown (Matthews and Tunstall, 1994). It is one of the most notorious and destructive phytophagous insect pests in Egypt, not only to cotton, but also to other field crops and vegetables (Kandil *et al.*, 2003). Although, chemical insecticides are very effective mean of preventing the major damage caused by *S. littoralis*, the extensive and continuous use of traditional insecticides to control cotton pests created many problems, mainly the incapability of toxic agents in controlling the target pest at the recommended doses. Therefore, insecticides with novel modes of action are required. Spinetoram is a new class of insect management tools developed by Dow, produced from fermentation of *Saccharopolyspora spinosa* as other spinosyns, but fermentation is followed by chemical modification to create the unique active ingredient in spinetoram which owned the 2008 presidential green chemistry challenge award (USEPA, 2008). Also insect growth regulators (IGR's) received great attention as a hope for the future of insect control. Among these IGR's, chitin synthesis inhibitors (CSI's) acylureas interfere with the chitin deposition. Occurrence of chitin is mainly restricted to arthropods, fungi and nematodes, ingestion of chitin synthesis inhibitors by insect larvae disturbed