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COMPARATIVE TOXICITY AND TOLERANCE FOR SOME INSECTICIDES IN A LABORATORY AND FIELD STRAINS OF COTTON LEAFWORM IN RELATION TO SOME ENZYME ACTIVITIES

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ABSTRACT

Third instar larvae of *Spodoptera littoralis* (Boisd.) of susceptible, Behera, Gharbia and spinosad resistant strains, were tested in the laboratory. Treatments were done in the laboratory with profenofos, sumi-gold and spinosad insecticides. before and after spraying programs in the fields of these areas. In general data indicated that the LC_{50} values of these insecticides after spraying programs were higher than those before spraying. The results also indicated that no-cross resistance, between spinosad, profenofos and sumigold insecticides.

With regard to the activity of α, β esterases acid and alkaline phosphatases in 4th instar larvae of *S. littoralis* for each governorates and spinosad resistant strains at g/Min/larvae, it was clear that the enzyme activity increased gradually with increasing the levels of resistance.

On the other hand, a positive correlation was recorded between resistance values and esterases activity. Also a good correlation between phosphatases activity and resistance to insecticides. As for the spinosad resistant -strain, there are a good correlation between the activity of α, β esterases and alkaline phosphatase, while a negative correlation between acid-phosphatase and a resistant to spinosad.

Keywords: *Spodoptera littoralis* (Boisd.), Insecticides, Biocides, Biochemical effect, Resistance.

INTRODUCTION

The noctuid *Spodptera littoralis* (Boisd) is considered one of the most serious pest of Egyptian cotton. After intensive use of broad – spectrum insecticides, *S. littoralis* populations, have developed high levels of resistance to organophosphates, carbamates, and pyrethroids (Ishaaya *et al.* 1995). Moreover, biological insecticides such as *Bacillus thruigensis* (Berliner) have been reported to provide inadequate control of S. *littorals* (Smugglie *et al.* 1998)

Spinosad is the naturally occurring metabolite derived form fermentation of the soil bacterium *sachraropoly spinosa*. Spinosad is a new biocide and due to its low toxicity thus showing low impact on the environment, the environmental protection Agency (EPA) registred spinosad as a reduced risk material to control a variety of insects (Dow Agroscience 2000).

The occurance of resistance to an insecticide in insects is mainly due to the action of enzyme, which are either insensitive to insecticide or able to degrade it to non toxic metabolites. Armes *et al.*, (1997) found that resistance of *Spodoptera litura* (Fab.) to pyrethroids may be due to the enhanced detoxification enzymes and those esterases and possibly glutathione S-transferases were contributing to organophosphate resistance.

Gunning *et al.* (1999) Found that resistant strains increased levels of esterase activity that detoxified significant quantities of esfenvalerate.