



## Combined Effect of a ChitinaseProducing Bacteria and *Bacillus thuringiensis*Against *Muscadomestica* (Diptera: Muscidae) Larvae.

Elham M. Salama<sup>1\*</sup>, I.A. Ismail<sup>2</sup> and Abeer A. Khattab<sup>3</sup>

<sup>1</sup>Entomology Department, Faculty of Science, Benha University, P.O. Box 13518, Egypt.

<sup>2</sup>Pests & Plant Protection Dept., National Research Centre, 33<sup>rd</sup> El Buhouth St.P. code: 12622, Dokki, Giza, Egypt.

<sup>3</sup>Botany Department, Faculty of Science, Benha University, P.O. Box 13518, Egypt.

**Abstract:** In the current study we investigated the potential of *Streptomyces griseus* which is a chitinase producing bacteria for insect control as a bio-pesticide and its mixture with *Bacillus thuringiensis* as a different mode of action. This *Streptomyces griseus* was isolated from the Elsulayel area, Saudi Arabia in 2011. Serial dilution technique was adopted to isolate the organism and was screened for its chitinolytic activity. The activity of chitinase extracted was determined using standard colloidal chitin as the reference control. The enzyme activities were found to be 0.12 µg/ml/minute for degradation of crab, *Muscadomestica* L. (Diptera: Muscidae) larvae. Larvae were tested in feeding, drinking and contact toxicity methods with both *Streptomyces griseus* and *Bacillus thuringiensis*, either separately or in combination with each other. Reduction in the percentages of pupal and adult emergence was recorded for seven days after treatment by two doses of *B. thuringiensis* (5.0 and 1.0 mg/L) and with suspensions containing approximately  $5 \times 10^{10}$  ml<sup>-1</sup> of *Streptomyces griseus*. The chosen concentrations were 1, 0.5 & 0.1 µg/ml. Contact toxicity of the *Streptomyces griseus* was found very weak and no significant result in comparison with normal control except in younger instars only. The bacterium *Bacillus thuringiensis* proved to be a good candidate in controlling *Muscadomestica*. Furthermore, treated extracts affected house fly larvae and resulted in reduction of adult stages. The number of tested larvae developed to pupae and adults was less than that of the control group. The crude extract at concentration  $9.5 \times 10^4$  mg/l completely inhibited development from larvae to pupae. The current study gives the attention that the *Streptomyces griseus*, which is a chitinase producing bacteria is not promising to be used as a bio-control agent or as an additive to *Bacillus thuringiensis* in reduction of *Muscadomestica* population in control management strategy. The difference of significance was found 4% to 5% in larval mortality with the first and second larval instars. The larvae were not susceptible to be affected and maybe immunology resistant to *Streptomyces griseus*, non-pathogenic. It only acts as a biodegradation factor for chitin in nature but is very weak to act in a live biological system.

**Key words:** *Musca*, synanthropic fly species, bacterial control, *Bacillus thuringiensis*, *Streptomyces griseus*.