

ANTAGONISTIC AND INSECTICIDAL ACTIVITIES OF SOME *STREPTOMYCES* ISOLATES

ABSTRACT

Fifteen local isolates of *Streptomyces* named, S01, S02, S03, S04, S05, S06, S07, S08, S09, S10, S11, S12, S13, S14, and S15; isolated from different soils and geographical areas in Egypt were used in this investigation. These isolates were propagated and subjected to screening studies to evaluate their efficiency as antagonistic agents against some phytopathogenic fungi such as, *Rhizopus stolonifer*, *Aspergillus niger*, *Fusarium oxysporum*, *Helminthosporium graminum* and insect pest, cotton leaf worm (*Spodoptera littoralis*). The *Streptomyces* isolates were grown on starch nitrate broth medium under shaking condition at 28°C for 6 days. Culture supernatants were then tested against the five applied phytopathogenic fungi. Results revealed that most of the isolates were varied in their antagonistic activities. Isolate S08 was active against *R. stolonifer*, *A. niger* and *F. oxysporum* while isolates S01, S05, S11 and S14 were active against *A. niger* and *F. oxysporum* and isolates S04, S09 and S13 were active against *R. stolonifer* and *A. niger*. On the other hand, no antifungal activity was found against *Helminthosporium graminum*. The insecticidal activity of both culture filtrates and cell pellets were tested against cotton leaf worm. The experimental results showed that the pellets of some *Streptomyces* isolates were more active against cotton leaf worm than culture filtrates. Generally, isolates S05, S08, S10 and S15 showed 80, 100, 70 and 80% mortality against cotton leaf worm, respectively. The protein(s) of isolate S08 cells was purified through ammonium sulfate saturation 40, 60 and 80%. Results of SDS-PAGE analysis showed that a 40 KDa protein was purified and showed high activity against four instars of the cotton leaf worm. This result demonstrated the ability of use such *Streptomyces* isolates as effective biopesticide agents.

Key words: *Streptomyces*, Antagonistic and insecticidal activity, Fungi, Cotton leaf worm, Toxicity, Mortality.

INTRODUCTION

Integrated pest management (IPM) programs create the need for novel fungicides or insecticides having more selective modes of action. Attempts have been made to develop *Streptomyces* species as fungal root disease control agents, since *Streptomyces* spp. are capable of producing a remarkably wide spectrum of antibiotics as secondary metabolites (Lechevalier and Waksman, 1962; Lechevalier, 1988 and Franklin *et al.*, 1989). Microorganisms produce many useful anthelmintic and insecticidal antibiotics (Pachlatko, 1998; Ghazal *et al.*, 2001 and Yuhui *et al.*, 2002).

In 2001, Bream *et al.* investigated the biological activity of the secondary metabolites of 41 Egyptian actinomycete strains on the cotton leaf worm *Spodoptera littoralis*. They found that 58% of the tested strains caused larval mortality ranging from 10-60%; *Streptomyces* and *Streptoverticillum* were the most potent actinomycetes affecting the biological and physiological criteria of the present insect species.