RESEARCH PAPER

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Symbiotic bacteria, *Xenorhabdus* spp. of entomopathogenic nematodes: Source of antifungal compounds against four plant pathogens

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Nematodes that kill the insects are called as Entomopathogenic nematodes (EPNs). These nematodes are in association with symbiotic bacteria (*Xenorhabdus* spp. and *Photorhabdus* spp.) which are known to secrete different bioactive compounds and exhibit broad spectrum biological activities *viz.*, insecticidal, antifungal, antibacterial properties. Entomopathogenic nematodes, *Steinernema* and *Heterorhabditis* were isolated from soil using *Galleria mellonella* baited traps at fourteen locations representing different cropping agro-ecosystems in Gandhi Krishi Vignana Kendra campus, University of Agricultural Sciences, Bangalore, Karnataka, India. Bacteria isolated from nematodes were identified as *Xenorhabdus* spp. and designated as School of Ecology and Conservation one to fourty four. Two symbiotic bacterial cultures, School of Ecology and Conservation-6 and School of Ecology and Conservation-10 were used for *in vitro* evaluation against four plant pathogenic fungi. These two cultures have shown a good insecticidal activity when tested on second instar larvae of diamond black moth *Plutella xylostella* L. under *in vitro* condition, compared to other isolated bacterial cultures. Hence, these cultures were selected to know its fungistatic activity against four plant pathogenic fungi i.e., *Fusarium oxysporum* (Vanilla), *Alternaria solani* (Tomato), *Sclerotium rolfsii* (Brinjal) and *Aspergillus niger* (Groundnut). SEC 6 culture was found to be best for inhibiting the growth of *Sclerotium rolfsii* (82.41) followed by *Aspergillus niger* (51.73), *Fusarium oxysporum* (48.29) and *Alternaria solani* (45.10).

Key words : *Alternaria solani*, *Aspergillus niger*, *Fusarium oxysporum*, *Heterorhabditis* spp, *Sclerotium rolfsii*, and *Steinernema* spp.

INTRODUCTION

A number of biological agents have been developed or are in the process of being developed for controlling some important plant diseases. Secondary metabolites from microbial fermentation offer a good source of bioactive compounds for controlling plant diseases. Soil is the natural habitat for EPNs where they are associated with various insects. They can be extracted from soil by baiting with susceptible insects, a simple and efficient soil sampling baiting technique with *Galleria mellonella*. (Bedding and Akhurst, 1975). The bacteria, *Xenorhabdus* and *Photorhabdus* spp of family Enterobacteriaceae are symbionts of Entomopathogenic nematodes, *Steinernema* (Rhabditida: Steinernematidae) and *Heterorhabditis* (Rhabditida: Heterorhabditidae) known to produce novel secondary metabolites, which have shown broad spectrum of biological properties ranging from antimicrobial to insecticidal property (Chen *et al.*, 1994). In recent days it has become difficult to control many plant pathogenic fungi by conventional/ synthetic fungicides. Because of development of resistance due to heavy selection pressure by synthetic fungicides application by the farmers in disease management. Therefore, in this connection a study was conducted for *in vitro* evaluation of supernatant of symbiotic bacteria against some plant pathogenic bacteria.

MATERIALS AND METHODS

Isolation of plant pathogenic fungi :

The diseased crop plants *viz.*, vanilla infected by *Fusarium oxysporum*, tomato by *Alternaria solani*, groundnut by *Aspergillus niger* and brinjal by *Sclerotium rolfsii* were brought to laboratory from the field. The leaf, stem or root tissues of infected plants were cut into small bits of 5-6 mm size and surface sterilized with 0.1 per cent sodium hypochlorite solution prepared using distilled water for one minute and washed repeatedly

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