Influence of growth media on pathogenicity of *Metarhizium anisopliae* (Metsch) Sorokin against *Chilo partellus* (Swinhoe)

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ABSTRACT

The present study was undertaken to evaluate various liquid growth media *viz* sabouraud dextrose, sabouraud sucrose, sabouraud maltose supplemented with yeast extract, potato dextrose and coconut water derived coniospores and blastospores on sorghum stem borer *Chilo partellus* (Swinhoe)Among the media, the conidia harvested from sabouraud maltose yeast extract broth (SMYB),potato dextrose broth and coconut water were found to be pathogenic to all the larval instars of *C.partellus*. However, blastospores derived from none of the media did cause mortality

Key words: *Metarhizium anisopliae, Chilo partellus*, growth media

INTRODUCTION

Entomopathogens based on fungi are now being extensively used as biocontrol agents, because of their broad spectrum activity, less non- toxic effect and ease of multiplication of fungi on wide range of synthetic and non - synthetic media (Mishear *et al.*, 2005). Among the 750 species of entomopathogenic fungi, *Metarhium anisopliae* (Metsch) Sorokin is reported to control a wide variety of insect pests (Chroton, 2007) The knowledge on growth requirements of entomopathogenic fungi is more essential for their mass production and pathogenicity (Sreeramakumar *et al*., 2002) The nutritional requirements of entomopathogenic fungi vary with the fungal species and even the fungal strains under consideration. Generally fungi require oxygen, water, source of carbon, inorganic or organic nitrogen besides minerals that play a major role in growth and their pathogenicity including novel metabolite production (Samson,1988)

Chilo partellus (Swinhoe) ranks first in lowering the yield both qualitatively and quantitatively. Stem borer severity on sorghum has ranged from 59-100% in different area in last few decades. The loss caused by *C. partellus* during khariff season is about Rs 110.50 crores annually (Shekharappa and Kulkarni, 2002). Because of adverse side effects and insecticide resistance, biological control is now extensively used to control the pest. In the present study conidia and blastospores derived from various growth media was evaluated against sorghum stem borer *C. partellus*.

MATERIALS AND METHODS

M.anisopliae was isolated from dead mycosed larvae of *C.partellus* collected from sorghum fields in an around Vizhupuram District, Tamil Nadu. The dead insects were collected in sterile glass vials and processed using standard methods (Humber,1997) The pure culture of the fungi was maintained on PDA slant and 15 days old culture was used for further study. Sabouraud dextrose broth, sabouraud sucrose broth, sabouraud maltose yeast extract broth, potato dextrose broth and coconut water was used in this study

Respective medium were inoculated with 0.1 ml of spore suspension in 250 ml of Erlenmeyer flasks. The seeded flasks were incubated for 15 days at 26 C. The mycelia was separated from the broth by filtration and washed with sterile distilled water containing Tween 80 (0.1%) to collect the conidial suspension. The spore count was recorded using hemocytometer. For blastospore production, the respective inoculated flasks were placed on a rotatory shaker and agitated at 200rpm for 15 minutes at 26^0 C. After the incubation blastospores were recovered and counted using haemocytometer.

C. partellus was collected from sorghum field in Vizhuppuram area and the collected pests were maintained on young sorghum shoots placed in plastic container. Ten larvae from each instars was dipped in conidial and blastospore suspension (10^8 spores/ml) derived from respective media. Five replications were maintained for each treatments and instars separately. All the treated

instars were transferred to plastic container containing moist filter paper at the bottom and fed with young shoots of sorghum plants at room temperature. Mortality rate was recorded for every 24 hours

RESULT AND DISCUSSION

The distinct mortality rate was observed in *C. partellus* with respect to spore derived from all the tested media. However blastospores did not cause any mortality. Among the media, conidia from SMYB recorded maximum mortality. Bormes *et al.* (1989) reported that the yeast containing media enhanced the growth and sporulation of *M. anisopliae* and the spores may be viable which enhances the fungal virulence on larvae. Similarly conidia from PDB caused 81.0, 69.1, 61.2, 57.5 and 49.6% mortality to first, second, third, forth and fifth instars respectively. Coconut water was also found to cause mortality to all instars of *C. partellus* (75.1,69.3,59.1,47.3 and 38.4% for first, second, third, forth and fifth instars respectively). Dangar *et al.* (1991) reported that coconut water was found to be ideal medium for growth and sporulation of *M. anisopliae* and present findings reveals that the conidia from the media may viable and enhances fungal infectivity. Less than 50% mortality recorded in sabouraud dextrose and sabouraud sucrose broth. Mortality recorded in SDB was 45.3, 23.1, 12.1, 07.4 and 03.2 % .

Blastspores did not cause any mortality on all the tested larval instars. Similarly blastospores of *Nomuraea rileyi* caused any mortality on *Spodoptera litura* (Sreerama kumar *et al.*, 2002) and also in *Bombyx mori* (Rriba and Ghandard,1981). It is known that the condition favouring spore formation is more restricted than those controlling mycelial growth (Smith,1981). In this study SMYB, PDB and coconut water were found to favour best sporulation of *M.anisopliae* and increase fungal spores viability, thus in turn enhances pathogenicity. The results from this study would be useful for those intending to mass produce *M. anisopliae* for use against *C. partellus* or any other pests using these media. Since *M. anisopliae* has been distributed in most of the agroecosystems of Tamil Nadu (Sahayaraj and Borgio, 2009), it was recommended to use them in pest management programme.

Table 1. Mortality of *Chilo partellus* by conidia derivied from various media

Media	Mortality (%)				
	I Instar	II Instar	III Instar	IV Instar	V Instar
SMYB	100.0[b]	100.0[b]	91.4[b]	87.4[b]	79.3[b]
PDB	81.0[b]	69.1	61.2	57.5	49.6
SDB	45.3	23.1	12.1	7.4	3.2
SSB	45.0	22.5	11.0	6.5	2.5
Coccunut water	73.1	69.3	59.1	47.3	38.4

In column, the mean followed by the same letter is statistically significant (P<0.05) by DMRT.

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