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Bioefficacy of antagonist on mycelial growth of *Rhizoctonia bataticola* by dual culture technique

Amol Harne, Reeti Singh and Deepak Kumar Verma

Abstract

All the four fungal and two bacterial bio agent evaluated under *in-vitro* were found antagonist against *R. bataticola*, however *T. harzianum* was found most effective and recorded highest mycelial growth inhibition (78.43) percent of the test pathogen over untreated control. Second and third best antagonistic found were *T. viride*₁ and *T. viride*₂ which recorded mycelial inhibition of 69.41 and 65.49 percent respectively. The bacterial antagonist and *B. subtilis* and *P. fluorescens* was found fungistatic recorded 53.34 and 51.76 mycelial inhibition percent respectively.

Keywords: Antagonist, *Rhizoctonia bataticola* fungistatic, inhibition percent

Introduction

Clusterbean, [*Cyamopsis tetragonoloba* (L.) Taub]. Commonly known as guar is a *kharif* legume crop grown in rainfed conditions due to drought resistance. The crop is affected by number of phytopathogenic fungal and bacterial diseases. Among these diseases, dry root rot incited by *Rhizoctonia bataticola* has been reported as one of the most important disease causing potential yield losses in Cluster bean. Biological control using antagonistic microorganisms is also an alternative method to the fungicides and provides an ecologically based approach to integrated disease management in sustainable agriculture in agro ecosystems. The use bio control agents for controlling fungal diseases in plants is considered as an interesting alternative to synthetic fungicides due to their ecofriendly effect on the environment as well as they are economically feasible. Considering the importance of the pathogen / disease in the state and the losses incurred by the disease in the farmer's field, the present investigations of bio management were undertaken to minimize the development of resistance against fungicide.

Material and Methods

Five soil samples were collected from research field of Department of Plant Pathology for isolation of local *Trichoderma viride* isolate. Sample will be brought to laboratory and store at 4 °C until used. Five folled serial dilutions of each sample will be prepared in sterilized distilled water by using serial dilution method and 0.5ml diluted sample will be poured on a surface of PDA. Plates will be incubated at 27±2 °C for 96 hr. The local isolate of *T. viride* termed as *T. viride*₁ and use for further study. Four fungal antagonists' viz. *T. harzianum*, *T. viride*₁, *T. viride*₂, *A. flavus* and two bacterial antagonists *P. florescens*, and *B. subtilis*. were evaluated *in-vitro* against *R. bataticola*, applying dual culture technique (Dennis and Webster, 1971) [1]. Seven days old culture of the test bio agents and test fungus (*R. bataticola*) grown on (PDA, NA) were used for the study. Disc (5mm) diameter of PDA along with culture growth of the test fungus and bio agents were cut out with the sterilized cork borer. Then two culture discs, one each of the test fungus and bio agents were placed at exactly opposite and equidistance with each other on solidified PDA medium in Petri plates aseptically and plates were incubated at 27± 2 °C. PDA plates inoculated only with culture disc of the test fungus were maintained as untreated control. Observations on linear mycelial growth of the test fungus and bio agents were recorded till untreated control plates were fully covered with mycelial growth of the fungus. Percent inhibition of the test fungus by the bio agents over untreated control was calculated by applying following formula (Vincent, 1947) [8]. Observations were recorded at seven days after incubation using stereo binocular microscope.

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$$\text{Percent growth inhibition} = \frac{\text{colony growth in control plate} - \text{colony growth in intersecting plate} \times 100}{\text{Colony growth in control plate}}$$

Result and Discussion

Results from table indicated that all the bio agents evaluated exhibited antagonistic activity against *R. bataticola* and significantly inhibited mycelial growth of test pathogen over untreated control. Out of six antagonist tested *T. harzianum* was found most effective and recorded least mycelial growth 18.33 with highest mycelial inhibition percentage of 78.43 the test pathogen. The second and third best antagonist was found pathogen *T. viride*₁ and *T. viride*₂, which recorded mycelial growth 26.00 mm and 29.33 mm respectively and inhibition of 69.41 and 65.49 respectively. The bacterial antagonist *B.*

subtilis (Colony Dia. 39.66 and inhibition 55.93%) and *P. fluorescens* (Col. Dia. 41 and inhibition 51.76 %). The fungal antagonist *A. flavus* was found least effective which recorded 54.66 mycelial growth and 35.69 mycelial inhibition. The bio agent *T. harzianum*, *T. viride*, *A. flavus*, *B. subtilis* were reported as effective bio agents/antagonist against *R. bataticola*. (Sharma *et al.*, 1999; Mukhopadhyay *et al.*, 1992; Raguchander *et al.*, 1997; Sankar and Jeyarajan, 1996; Mathew and Gupta, 1998 and Kehri and Chandra, 1991) [7, 4, 5, 6, 3, 2].

Table 1: Mean of growth inhibition of *Rhizoctonia bataticola* by bio agents

Treatment	Colony diameter (mm)	Percent inhibition
<i>T. harzianum</i>	18.33	78.43
<i>T. viride</i> ₁	26.00	69.41
<i>T. viride</i> ₂	29.33	65.49
<i>A. flavus</i>	54.66	35.69
<i>P. florescens</i>	41.00	51.76
<i>A. subtilis</i>	39.66	53.34
Control	85.00	0.00
SEM ±	0.39	
CD at 5%	1.22	

**T. viride*₁ – Local isolate
 **T. viride*₂- TNAU isolate

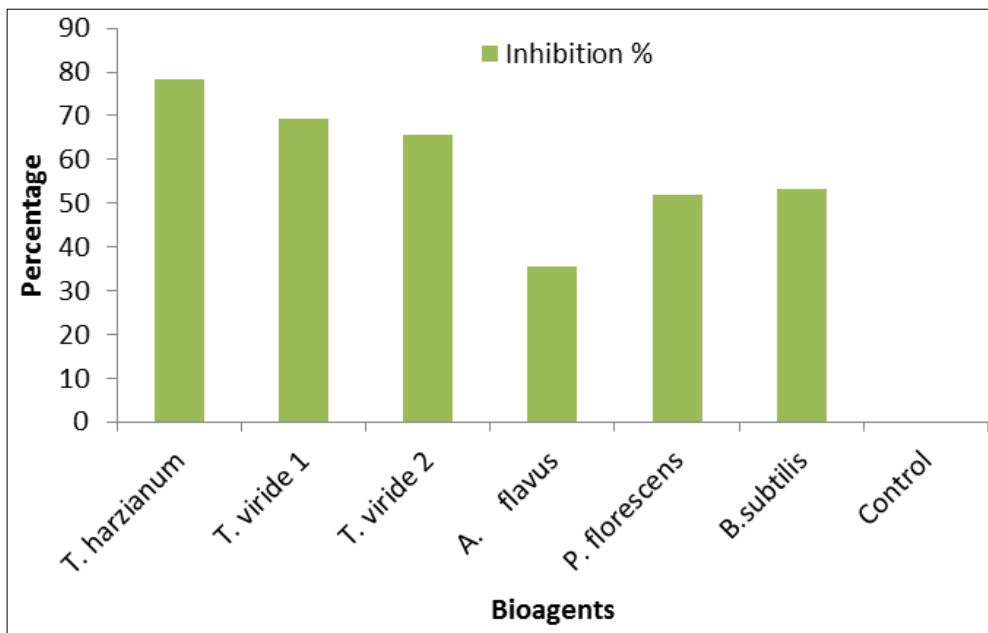


Fig 1: Percent inhibition of *R. bataticola* by antagonist



Plate 1: Antagonism against *R. bataticola* by dual culture technique

Conclusion

It is concluded that out of six antagonist, *T. harzianum* was found best which was recorded maximum inhibition mycelial growth of *Rhizoctonia bataticola*.

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