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CONTROL OF SEED BORNE FUNGI IN GREEN GRAM AND BLACK GRAM THROUGH BIOAGENTS

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ABSTRACT: Test the efficacy of fungal and bacterial antagonistic formulations were controlling the seed borne fungi in seed samples of green gram and black gram collected from Pulse Research Unit, Akola were used for laboratory test. Seed treatment with talc based formulation of *Trichoderma viride* at 4 g/kg, *Pseudomonas fluorescens* at 10 g/kg and *Bacillus subtilis* at 10g/kg bio agents were tested for their efficacy against seed-borne mycoflora to improve seed germination and also recorded significantly incidence of seed borne fungi. Among this three bio agents *T. viride* was found superior in controlling the seed borne mycoflora (86.90%, 88.00%) and also maximum seed germination was observed in *T. viride* (67.60%, 71.00%), shoot length (8.91cm, 11.5cm), root length (7.10cm,9.15cm) and seedling vigour index (1119,1466) in green gram and black gram respectively.

Key words: Green gram and black gram seeds, bio agents, In vitro

INTRODUCTION

Biological seed treatment is usually very specialized and uses specific microorganisms that attack or interfere with specific pathogens or types of pathogens. The biological seed treatment involves the use of biological organisms to control the pathogen located in the seed. Biological control is one of the viable, eco friendly propositions, which can substantially minimize the disease (Cook 1985). It is now widely recognized that biological control of plant pathogens using antagonistic fungi and bacteria is a distinct possibility for future and can be successfully utilized. (Muthamilan and Jeyrajan1996).

The objective to conduct this investigation was to find out the efficacy of bio agents on seed-borne mycoflora to improve seed germination, shoot, root length and seedling vigour index

MATERIALS

Green gram and Black gram seed sample of Kopergaon and T-9 and collected from Pulse Research Unit, Akola and fungal and bacterial antagonistic *Trichoderma viride* 4g/Kg, *Pseudomonas fluorescence*10g/Kg, *Bacillus* subtilis10g/kg collected from Department of Plant Pathology, Akola.

METHODOLOGY

Reduction of seed mycoflora by blotter method:

The seeds were treated with talc powder formulation of *Trichoderma viride* 4g/Kg, *Pseudomonas fluorescence* 10g/Kg and *Bacillus subtilis* 10g/Kg each in the form of slurry. The untreated served as control. After 24 hours of treatment, the seed were air dried and subjected to blotter test. 200 seeds of the green gram and black gram were used to record the per cent infection of seed mycoflora by standard blotter method (ISTA1985). The blotters were soaked in distilled water and placed in three layers in plastic Petri plates. 25 seed were placed at equidistance from one another in each Petri plate under aseptic condition. Total 200 seeds were plated. The plated seeds were then incubated at 27 ± 2^{0} C, under alternate cycle of 12 hrs light and 12hrs darkness for seven days by using two 40W white fluorescent tubes. After seven days of incubation, seeds were examined under stereoscopic microscope by using a magnification of 6X to 50X. Research microscope was also used to confirm the identification of fungi based on morphological characters given in standard mycological books and identification keys.

Seed Germination

Treated seeds 200 were placed between paper rolls in four replicates of 50 seeds each for germination. The rolls were kept at 23 ± 2^{0} C in seed germinator. The first count of normal seedlings was taken on the 3rd day and the second count on the 7th day. The germination per cent was calculated.

Seedling Vigour Index

Normal seedlings were evaluated for seedling vigour index. The root and shoot length of normal seedlings were measured and seedling vigour index was calculated by using formula. Seedling vigour index = [Mean root length (cm) + mean shoot length (cm)] \times percentage germination. The laboratory studies on seed mycoflora, seed germination and seedling vigour index calculated with completely randomized design.

RESULTS AND DISCUSSION

Result indicated that seed treatment of *T. viride* reduced the incidence (86.90%) followed by *B. subtilis* (65.20%) and *P. fluorescens* (47.80%) in green gram (Table 1). Similar result was observed by Shamsur Rahman (2002) who reported that when mungbean seeds were coated with the conidial suspension of *T. viride* effectively control (93.00%) seed-borne *M. phaseolina*. And also reduction of seed borne fungi of black gram with treatment of *T. viride* (88.00%) followed by *B. subtilis* (56.00%) and *P. fluorescens* (48.00%). (Table 1) Present findings are in confirmation with earlier workers Sethuraman *et al.* (2003) who reported effective control of *M. phaseolina* with seed treatment of *T. viride* and *P. fluorescens* in black gram.

Table 1:	Effect of bio agents on so	ed borne fungi of gre	en gram and black gram	by blotter paper method
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	Dose (g/kg seed)	Per cent fungi associated with seed					Total fungi (%)		Reduction of fungi		
Treatments		M. phaseolina		F. ox	oxysporum F. semitectum		itectum			over control (%)	
		Green	Black	Green	Black	Green	Black	Green	Black	Green	Black
		gram	gram	gram	gram	gram	gram	gram	gram	gram	gram
T. viride	4.00	1.00	1.00	0.50	0.50	-	-	1.50	1.50	86.9	88
P. fluorescens	10.00	2.00	3.50	2.00	1.50	1.00	1.50	6.00	6.50	47.8	48
B. subtilis	10.00	2.50	2.50	1.50	2.50	-	0.50	4.00	5.50	65.2	56
Control		5.50	6.00	4.00	4.50	1.00	2.00	11.50	12.50		

Seedling Vigour Index

Maximum seed germination was observed in *T. viride* (67.60%), shoot length 8.91cm, root length 7.10cm and seedling vigour index (1119) followed by *B. subtilis* in green gram. (Table 2) The present findings are in agreement with Mandhare *et al.* (2010) who reported that the seeds are treated with *T. viride*, *P. fluorescens* and *B. subtilis* @ 6g/kg seed increased seed germination75.50%,%, shoot length 11.5cm, root length 9.15cm and vigour index (2389) respectively in soybean seeds. In black gram also seeds are treated with of *T. viride* recorded maximum seed germination (71.00%) shoot length 11.50cm, root length 9.15 cm and seedling vigour index(1466) followed by *B. Subtilis* (Table 2).Similar kind of studies were carried out by Rajeswari and kumari (2009) in soybean seeds are treated with *T. viride*, *P. fluorescence*, and *B. subtilis* amongst *T. viride* gave highest germination (91.00%) seedling vigour index (2630).

Table 2: Effect of bio agents seed treatment on seed germination, shoot - root length and seedling vigour index of green gram and black gram

	Dose (g/kg seed)	Green gram				Black gram			
Seed treatments		Germination (%)	Shoot length (cm)	Root length (cm)	Seedling Vigour index	Germination (%)	Shoot length (cm)	Root length (cm)	Seedling vigour index
T. viride	4.00	67.6 (55.31)*	8.91	7.10	1119	71 (57.42)*	11.5	9.15	1466
P. fluorescens	10.00	64.4 (53.37)*	7.72	5.65	985	66 (54.33)*	9.75	7.65	1148
B. subtillis	10.00	66 (54.33)*	8.75	6.79	1085	67 (54.94)*	10.00	9.45	1303
Control		50 (45.57)*	6.00	4.53	538	50 (45.00)*	5.25	4.15	470
'F' test		Sig				Sig.			
SE(m)±		0.21				0.41			
CD (P=0.01)		0.89				1.48			

*Arc sin value

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