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BIOCONTROL OF MYCOFLORA OF PIGEON PEA SEEDS BY USING TRICHODERMA SPECIES

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Short Profile

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ABSTRACT:
Pulses are important sources of nutrients and can serve as high quality dietary protein sources to meet nutrient requirements (Perumal et al., 2001; Escudero et al., 2006). Pulses seeds have an average of twice as much protein as cereals and the nutritive value of the proteins are usually high (Vijayakumari et al., 1997).

Keywords: Mycoflora associated with pigeon pea seeds; bicontrol agent Trichoderma species

INTRODUCTION

India stands first in production and area under pulses in the world. The pulse crop like Pigeon pea (Cajanus cajan L.), is the important crops grown in Marathwada region of Maharashtra during both kharif and rabby seasons. Among the greatest hazards in crop yield, seed borne fungi are the main pathogens. Biological control of seed borne fungi is a potential alternative to the use of chemical pesticides, which have already been proved to be harmful to the environment So the present paper fouses on studies and bicontrol of seed borne fungi.

Materials & methods:

Isolation of seed mycoflora:

The cultivars of pigeon pea i.e. Maruti (ICPL-8863) & BSMR- 853 were selected. Seed borne fungi of these selected cutivars were isolated by using different methods such as Standard blotter paper method, Agar plate method & seed washates method as recommended by International Seed Testing Association ISTA (1966) and Neergaard (1973).

Table 1: Fungi associated with seeds of Pigeon pea (Cajanus cajan L.) Cv. Maruti (ICPL -8863)

Sr. No.	Name of Fungi	Percent (%) incidence of Mycoflora		
		Standard blotter paper	Agar plate	Seed washates
1	Aspergillus flavus	53	56	33
2	Aspergillus niger	48	50	28
3	Cladosporium herbarum	15	22	10
4	Alternaria tenuis	36	42	28
5	Alternaria alternata	33	36	18
6	Penicillium citrinum	3	3	0
7	Curvularia lunata	8	13	3
8	Rhizopus nigricans	13	17	8
9	Fusarium oxysporum f. sp. Udum	32	43	23

Table 2: Fungi associated with seeds of Pigeon pea (Cajanus cajan L.) Cv. BSMR-853

Sr. No.	Name of Fungi	Percent (%) incidence of Mycoflora		
		Standard blotter paper	Agar plate	Seed washates
1	Aspergillus flavus	33	38	28
2	Aspergillus niger	28	33	23
3	Alternaria tenuis	35	47	30
4	Alternaria alternata	28	40	16
5	Fusarium oxysporum f. sp. Udum	36	43	31
6	Cladosporium herbarum	13	18	10
7	Penicillium citrinum	0	3	0
8	Curvularia lunata	3	10	3
9	Rhizopus nigricans	10	10	0

Trichoderma as bicontrol agent:

The cultures of fungi (used as antagonists) *Trichoderma harzianum* and *Trichoderma viride* were brought from National Chemical laboratory (NCL), Pune and IARI, New Delhi. The effect of antagonists on seed borne pathogens is studied by dual culture technique. Pour 20mL of melted cooled (45-500C) PDA medium in each petriplates. Margin of the actively growing colonies of pathogenic culture (*Aspergillus flavus, Fusarium oxysporum and Alternaria tenuis*). Place 9mm mycelial growth disc cut from the one side of the PDA plate.

Now place another disc of 9mm of test organism (*Trichoderma harzianum* and *Trichoderma viride*), on the other side of same plate opposite to the first disc i.e. at an angle of 1800C. Petriplates were incubated at 28? 1^{0}C.

d) Effect of *Trichoderma* species on the growth of *Aspergillus flavus* Link.

The growth of *Aspergillus flavus* in presence of *Trichoderma harzianum* was 2.9 cm and percentage of growth inhibition was 61.33. In presence of *Trichoderma viride*, it was 3.2 cm and percentage of growth inhibition was 57.33. From the Table 3 It is clear that *Trichoderma harzianum* inhibits the maximum growth of *Aspergillus flavus* as compared to Trichoderma viride. The growth of Aspergillus flavus on control plate was 7.5 cm.

Table 3:Effect of Trichoderma species on the growth of Aspergillus flavus Link. in Dual culture.

Sr. No.	Fungal antagonists	Growth of Aspergillus flavus against Trichoderma species in cm	% of growth inhibition
1	Trichoderma harzianum	2.9	61.33
2	Trichoderma viride	3.2	57.33
3	Control	7.5	-

e) Effect of Trichoderma sp. on the growth of Fusarium oxysporum Schlecht.

The growth of Fusarium oxysporum in presence of Trichoderma harzianum was 3.5 cm and percentage of growth inhibition was 50.00. In presence of Trichoderma viride, it was 4.1 cm and percentage of growth inhibition was 41.42. From the Table 4 it is clear that Trichoderma harzianum inhibits the maximum growth of Fusarium oxysporum as compared to Trichoderma viride. The growth of Fusarium oxysporum on control plate was 7.0 cm.

Table 4: Effect of Trichoderma species on the growth of Fusarium oxysporum Schlecht. in Dual culture.

Sr. No.	Fungal antagonists	Growth of Fusarium oxysporum against Trichoderma species in cm	% of growth inhibition
1	Trichoderma harzianum	3.5	50.00
2	Trichoderma viride	4.1	41.42
3	Control	7.0	-

f) Effect of *Trichoderma* species on the growth of *Alternaria tenuis* Ness.

The growth of *Alternaria tenuis* in presence of *Trichoderma harzianum* was 1.2 cm and percentage of growth inhibition was 81.53. In presence of *Trichoderma* viride, it was 1.5 cm and percentage of growth inhibition was 76.92. From the Table 5 it is clear that *Trichoderma harzianum* inhibits the maximum growth of *Alternaria tenuis* as compared to Trichoderma viride. The growth of *Alternaria tenuis* on control plate was 6.5 cm.

Table 5:Effect of Trichoderma species on the growth of Alternaria tenuis Ness. in Dual culture.

Sr. No.	Fungal antagonists	Growth of Alternaria tenuis against Trichoderma species in cm	% of growth inhibition
1	Trichoderma harzianum	1.2	81.53
2	Trichoderma viride	1.5	76.92
3	Control	6.5	-

Results & discussion:

The antagonistic nature of Trichoderma species were tested against seed borne dominant fungi of the selected cultivars pigeon pea. The results from table 3, 4 & 5 clears that all the fungi associated with pigeon pea seeds were found to be significant in inhibition of fungal growth in the presence of Trichoderma spp. Among these antagonist Trichoderma harzianum proved to be stronger antagonistic as compared to other species of Trichoderma. It was observed this was the possible mechanism of bioagents in controlling fungi.

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