

## Biological management of seed pathogen of safflower

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### SUMMARY

An experiment was conducted to study the efficacy of antagonistic organism in the management of seed borne pathogens of safflower. In the present study two isolates of *Trichoderma* spp. were evaluated against wilt caused by *Fusarium oxysporium f.sp. carthami* and *Alternaria* leaf blight caused by *Alternaria carthami* by dual culture technique. The *Trichoderma viride* was most effective against *Fusarium oxysporium. f.sp. carthami* and *Alternaria carthami* at 9 days of incubation.

**Key Words :** Antagonist, Seed borne pathogens, Safflower, Wilt, Leaf blight

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**C***arthamus tinctorius* L. is commonly known as safflower or Kardi is an important oilseed. Crop belongs to family Asteraceae. The potential yield of this crop is affected by a number of seed borne disease, out of these *Fusarium oxysporium f. sp. carthami* and *Alternaria carthami* are a serious seed borne diseases. The *Fusarium oxysporium.f.sp. carthami* causing yield losses up to 80 per cent (Sastry and Chattopadhyaya, 1997) and this disease was first detected and reported by Kliswicz and Houston (1962).

*Alternaria* blight caused by *Alternaria carthami* was first detected cause heavy losses to crop (Choudhary, 1944). The biological control is one of the viable propositions for management of such a pathogen (Naik and Sen, 1991). Therefore, the present investigation was undertaken for management of seed borne pathogen *in vitro* by dual culture technique.

The pathogens like *Fusarium oxysporium.f.sp. carthami* and *Alternaria carthami* were isolated from infected seeds of safflower. The seed were collected from safflower research

station at Marathwada Agriculture University, Parbhani. The work was carried out in DSM College, Parbhani. Mycoflora of safflower seeds were detected by blotter paper method and Agar plate method recommended by International seed testing association ISTA (1966) and Agrawal *et al.* (1972).

The isolates of the pathogen were identified on colony characters and measurements (Barnet, 1972).

The two *Trichoderma* spp. viz., *T. harziarum* and *T. Viridae* were collected from Agarkar Institute, Pune. The testing was done by dual culture technique (Dennis and Webstrar, 1971), 20 ml of melted and cool PDA medium was poured in each Petriplates. Allow to the medium solidify then place a 5mm mycelia disc inoculated near the periphery of one the PDA plate (*Fusarium oxysporium.f.sp. carthami* and *Alternaria carthami*) and place another disc of 5mm of test organism. *T. viride* and *T. harzianum* on the other side of same Plate, first opposite to the first disc without inoculation of *Trichoderma* used as control. The seven days old culture was transferred aseptically into the Petriplate containing PDA. The plates were incubated at  $27 \pm 2^{\circ}\text{C}$  temperature. Observation regarding per cent inhibition and colony diameter was recorded after 3,6 and 9 days after incubation. The per cent inhibition of the pathogen was calculated by using following formula (Vincent, 1947).

$$PI = \frac{C - T}{C} \times 100$$

PI = Per cent inhibition

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C = Radius of pathogen in control

T = Radius of test organism.

The effect of fungal bio control agent *i.e.* *Trichoderma harzianum* and *T. Viride* was tested against *Fusarium oxysporium fusarium.sp.carthami* and *A. Carthami* by dual culture technique. The zone of inhibition was measured in relation to its growth and the result was recorded.

The growth of *Fusarium oxysporium* in presence of *T. harzianum* after 3 days incubation was 6.33 mm and per cent growth inhibition was 36.7 where as after 9 days of incubation the growth reached to 12.00 mm and per cent growth of inhibition was 60.00 per cent. In presence of *T. Viride* after 3 days of incubation the growth was 5mm and per cent growth inhibition was 50 per cent where as it is observed that 9 DAI (Days after incubation ). Is was 8.66 and per cent of growth inhibition was 71.1 per cent (Fig. 1) It is clear that *Trichoderma viride* inhibits the maximum growth of *Fusarium oxysporium* as compaired to *T-harzianum*.

The similar type of result with *Trichoderma*-spp. were reported earlier Gohil and Vala (1966) reported *T. viride* in vitro was most effective against soyabean wilt. Verma and Dohroo (2005) reported *T. viride* and *T. harzianum* inhibits maximum antagonistic activity against *Fusarium oxysporum*

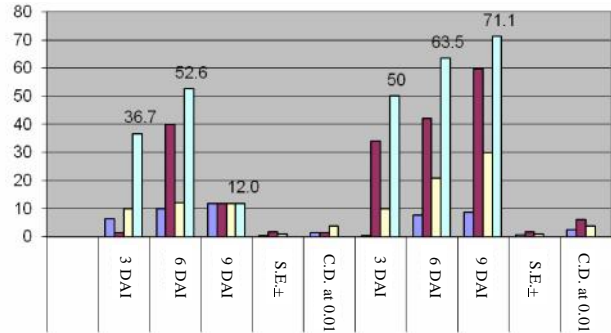


Fig. 1: Effect of *Trichoderma* spp. on the growth of *Fusarium oxysporum*

*f.sp.pisi*. Prameela *et al.* (2005) reported maximum inhibition was found in *T. viride* as compared to *T. harzianum* against *Fusarium oxysporium f.sp.carthami*. Muley *et al.* (2009) reported *T.viride* in inhibits the maximum growth of *Fusarium oxysporium* as compared to *T. harzianum* and also *T. viride* (Table 2).

The growth of *Alternaria Carthami* in presence of *T. harzianum* after 3 days of incubation was 1.66 mm and per cent growth inhibition was 7.15 per cent where as after 9 days

Table 1: Effect of *Trichoderma* spp on the growth of *Fusarium.oxysporum*

Sr. No.	Fungal antagonism	Days	Growth of <i>Fusarium oxysporium</i> (mm)	Growth of <i>Trichoderma harzianum</i> (mm)	Control	% growth inhibition
1.	<i>T. harzianum</i>	3 DAI	6.33	1.66	10.0	36.7
		6 DAI	10.0	40.0	12.1	52.6
		9 DAI	12.0	12.0	12.0	12.0
		S.E.±	0.46	1.86	1.10	
		C.D. (P=0.01)	1.54	1.44	3.81	
2.	<i>Trichoderma viride</i>	3 DAI	0.5	34	10.00	50
		6 DAI	7.66	42.0	21.00	63.5
		9 DAI	8.66	59.6	30.00	71.1
		S.E.±	0.72	1.77	1.10	
		C.D. (P=0.01)	2.48	6.13	3.81	

Table 2 : Effect of *Trichoderma* spp. on the growth of *Alternaria Carthami* by dual culture technique

Sr. No.	Fungal antagonists	Days	Growth of <i>Alternaria</i> (mm)	Growth of <i>T. harzianum</i>	Control	% Growth of inhibition
1.	<i>T.harzianum</i>	3 DAI	7.66	28.3	8.25	7.15
		6 DAI	11.3	35.3	18.35	38.41
		9 DAI	15.0	38.3	25.22	40.52
		S.E.±	1.23	1.37	5.77	
		C.D. (P=0.01)	425	4.74	1.99	
2.	<i>T. Viridae</i>	3 DAI	6.33	27.3	8.25	23.2
		6 DAI	10.0	33.3	18.35	45.5
		9 DAI	12.33	36.0	22.22	51.5
		S.E.±	1.62	1.44	0.57	
		C.D. (P=0.01)	5.60	4.97	1.99	

incubation was 15mm and per cent growth inhibition was 40.12 per cent in presences of *T. viride* after 3 days of incubation the growth of *Alternaria* was 6.33 mm and per cent growth inhibition was 23.3 mm, where as after 9 days incubation was 12.33 mm and per cent growth of inhibition was 51.1 per cent hence, it is clear that *T. Viride* inhibit growth of *A. carthami* as compared to *T. harizianum*. Similar type of result with *Trichoderma* spp. was reported earlier by Muley *et al.* (2009). *T. viride* inhibits the maximum growths of *A. alternata* as compared to *T. harzianum*.

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