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Evaluation of different plant oils and bio-agents against the *Fusarium oxysporum f. sp. ciceri (In-Vitro).*

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Abstract

Chickpea(Cicer aeritnum) is the most popular crops grow in India.The wilt of chick pea caused by fusarium oxysporium f.sp ciceri is more sever and common disease in (UP) Efficacy of six plant oil and seven bio- agents tested against the pathogen In -Vitro Neem (10%) Garlic and Ginger (10%) proved most effective in inhibiting the growth of pathogen and controlled the disease in fieldy. Bio-agent, T.harzianum, (50%). T.viride, (45%) and T. atroviride, (43.33%) were also effective but slightly less effective than mustard, blackpiper, onion and the check bio-agent. Trichoderma virens, Aspegillus niger ,and Trichoderma hamatum. Also inhibited the mycelia growth of the pathogen.

Key words- Chickpea**,** *fusarium oxysporium f.sp ciceri,* plants oil , bio-agents.

Introduction

Chickpea (*Cicer arietinum* L.*)* is also known as gram, Bengal gram or Spanish pea and it is considered to be the third most important pulse crop of the world. In India, is an important source of protein in human diet. Chickpea is most important pulse crop of India in terms of both area and production. India is the largest producer of chickpea in the world sharing 65.25 and 65.49 per cent of the total area (11.79 millian tons ha) and production (10.89 millian tons), respectively. Chickpea belongs to the subfamily "Papilionaceae of family Leguminosae" Chickpea is grown in *Rabi* season. About 172 pathogens including fungi, bacteria, viruses and nematodes are reported a chickpea. Among the fungal diseases wilt caused by *Fusarum oxysporum* is very serious as problem in (U.P.)

Materials and methods

The laboratory experiments were carried out in the Department of Plant Pathology during 2009-2010 of T.D.P.G. College, Jaunpur (U.P.). The procedure and techniques applied during the course of investigations are elucidated as below.

A- Evaluation of different plant oils against the pathogen

The following six essential oils viz, Ginger, Black piper, Neem, Onion, Mustard and Garlic were evaluated against the *Fusarium oxysporum f.sp.ciceri* pathogen under laboratory condition to screen out the best essential oils for their inhibitory effect on the growth of the pathogen. The food poison techniques" described by Schmitz (1930) in which required 10 ml quantity of each essential oil was thorough mixed with 100 ml well sterilized potato dextrose agar medium contained in 150 ml flasks then sterilized in an autoclave at 1.1 kg pressure/ square cm for 5 minutes. Now this sterilized medium was poured in Petri-dishes and allowed to solidity. Each treatment was replicated three times. One set of control was also kept in which the medium was not mixed with essential oils. Equal pieces of the fungal growth,(5mm dia meter) cut by the cork borer and inoculated in each Petri-dish at the center. These inoculated Petri-dishes were incubated at 25 ± 1^0C and for 10 days . The fungal growth was recorded the each Petri-dish.

B-Evaluation of bio-agents against the pathogen:

Six bio-agents viz., *T. viride, T. harzianum, Aspergillus niger, T. atroviride, T. hamatum* and *T. virance* were assessed for their efficacy against *Fusarium oxysporum* f. sp. *ciceri* by using dual culture technique **(Morton and Strouvle, 1955)**. The culture of test fungus and antagonists was multiplied on potato dextrose agar medium. 5 mm disc of test fungus and the antagonists cut from the edge of seven days old culture plate were placed in such a manner that test fungus was placed before 72 hours of bio-agent placement, on Potato dextrose agar medium . The test fungus and bio-agent were placed opposite to each other at a distance of 5mm from the periphery of Petri plate. Same disc of test fungus was placed alone only one side on PDA plates as control. Each treatment was replicated three times and incubated at 25 ± 1°C. The data were recorded after seven days of bio-agent placement, when the inhibition zone was formed and expressed as per cent inhibition by following formula-

$$\text{Per cent inhibition} = \frac{\text{Colony diameter (mm) in check} - \text{Colony Diameter (mm) in treatment}}{\text{Colony diameter (mm) in check}} \times 100$$

Results and discussion

A-Evaluation of different plant oils against the pathogen *in-vitro*

The maximum inhibition (50.00%)in pathogen was found by Neem oil followed by Garlic (40.38%) Ginger (34.61%) and Mustard (32.69%). While, onion and black piper was found least effective to inhibit mycelial growth (Table-1). These oil content inhibited morphlogy of the fungal growth can be further used in commercial scale in farmer's field as seed treatment and seedling soaking Similar results have also been reported by Singh, (2000) and Vishwapal, *et al.,* (2013).

Table.1 – Effect of different plant oils against the pathogen *In-Vitro.*

S. No.	Treatments	Dose (%)	Average dia. of fungal (mm)	Inhibition over control %
1	Neem	10	26.00	50.00
2	Garlic	10	31.00	40.38
3	Ginger	10	34.00	34.61
4	Mustard	10	35.00	32.69
5	Black piper	10	40.00	23.07
6	Onion	10	44.00	15.38
7	Control	-	52.00	--
	CD at 5%		**4.58**	
	SEm		**1.49**	

B-Evaluation of bio-agents against the *Fusarium oxysporum* f. sp. *ciceri(In-Vitro)*

The bio control in chickpea wilt management is an attractive eco-friendly possibility. The maximum per cent inhibition(50%) of *Fusarium oxysporum* f.sp. *ciceri* was in *T. harzianum* followed by *T.viride* (45.00%) and *T. atroviride* 43.33, respectively. The inhibition ranged 21.11% to 50.00% that shows all the bio-agents suppressed the colony growth of the pathogen (Table-2). The above finding have close agreement with finding of Gourdar, *et al.,* (2000) who also of the reported that the antagonistic fungi *T. harzianum* and *T. viride* inhibited the growth pathogen also these 10 days as upported by Singh, *et al*., (1997) and Gurha, *et al.,* (2000).

Table.2 – Effect of bio-agents against the pathogen *In-Vitro*

S.No.	Treatments	Radial growth (mm)	% inhibition
1	*Trichoderma harzianum*	30.00	50.00
2	*Trichoderma viride*	33.00	45.00
3	*Trichoderma atroviride*	34.00	43.33
4	*Trichoderma virens*	34.33	42.78
5	*Aspegillus niger*	38.00	36.66
6	*Trichoderma hamatum*	47.33	21.11
7	Control	60.00	--
	CD at 5%	**4.12**	
	SE	**1.34**	

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