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## Evaluation of fungicides and bio-agents against *Alternaria alternata* causing Alternaria blight of chickpea (*Cicer arietinum* L.)

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**Abstract**

The effect of different antagonist viz. *Trichoderma viride* and *Pseudomonas fluorescens* were evaluated against different Alternaria blight of chickpea by dual culture technique. Among Bio-agents *Trichoderma viride* (49.08%) followed by *Pseudomonas fluorescens* (41.84%) over control were found effective in controlling the Alternaria blight. Among the fungicides, Chlorothalonil was highly effective in inhibiting the growth of *Alternaria alternata* as it produced 55.27% growth inhibition at 5% concentrations, respectively. Mancozeb and Azoxystrobin were found effective as growth inhibitions about 51.54%, 42.23% respectively. Followed by Thiabendazole at 5 @ (37.33%). In food poison technique method.

**Keywords:** Fungicides, bio-agents against, *Alternaria alternata*, *Cicer arietinum* L

**Introduction**

*Alternaria alternata* is an important seed borne disease of chickpea. *Alternaria* blight of chickpea was first noticed in 1970-72 from Uttar Pradesh by (Vishwakarma and Basuchaudhary (1984)). Thereafter, it was also reported by (Haware and Nene (1976)) from Andhara Pradesh The disease appears at seedling, flowering and podding time. It first appears on older leaves. The circular, water soaked small spots appears on leaves which later turned brown to dark brown. The affected leaf-lets turned black and dropped off. On the pods, the lesions are circular, slightly sunken and irregularly scattered and were dark brown to black in colour. The infected pods remain small, get shriveled and turn black. In severe case entire foliage shows blightened appearance. Effective bio-control and fungicides methods for the management of plant diseases. Among various fungal, bacterial bio-control agents are known for their mycoparasitic, antagonistic and antifungal mechanism for the control of fungal disease. Biological control of plant pathogens has been considered as a potential control strategy in recent years and search for these biological agents is increasing. *Trichoderma* spp. are the most commonly used fungal biological control agents and have long been known as effective antagonists against plant pathogenic fungi. Several fungicides have been demonstrated to possess excellent properties for inhibition of plant pathogenic fungi led to the present study to explore the feasibility of using fungicides for the management of Alternaria blight disease of chickpea *in vitro* and under field conditions.

**Materials and Methods**

Fungicides were incorporated into melted PDA medium at different concentrations i.e. 5 % and sterilized at 15 lb pressure/sq. inch for 15 min. The amended PDA medium was poured into sterilized Petri plates @ 20 ml/plates and after solidification, 6 mm disc of 5 days old culture of *Alternaria alternata* was transferred in the centre and incubated at 26±10C. PDA not amended with fungicides served as control, replicated thrice. After 168 hrs of incubation, radial growth of test fungus was measured and % inhibition was calculated.

Bio-agents i.e. *Trichoderma viride* were prepared on PDA medium. Bacterial Bio-agents *P. fluorescens* were prepared by inoculating a loopful culture in sterilized conical flask containing hundred ml nutrient broths. Broth culture was incubated at room temperature for three days. Autoclaved PDA poured in sterilized Petriplates and allowed to solidify. Six mm disc of seven days old test fungus and bio agent were cut with the help of cork borer lifted and transferred in petriplates. Control plates were kept where; culture disc of test fungus was grown in same condition on potato dextrose agar without bio-agents. The plates were incubated at room temperature for seven days. After an expiry of incubation period the mycelial inhibition was calculated.

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## Result and discussion

### Efficacy of fungicides against *Alternaria alternata* by poison food Technique

Among the fungicides tested, Chlorothalonil was highly effective in inhibiting the growth of *Alternaria alternata* as its produced (55.27%) growth inhibition of *Alternaria alternata* at 5% concentrations. T<sub>4</sub> – Mancozeb, T<sub>6</sub> – Azoxystrobin and T<sub>3</sub> – Thiabendazole were effective to some extent as they produced growth inhibition (51.54%), (42.23%) and (37.33%) respectively depending upon the concentration of the fungicides. Thiabendazole was least effective at 5% concentration. All the treatments differed significantly from check as well as from each other's and were statistically on par to each others as far as disease intensity was concerned.

### Efficacy of Bio Agent against *Alternaria alternata* by Dual Culture Technique

Table -1 indicates that the maximum growth inhibition of *Alternaria alternata* of chickpea were observed in *Trichoderma viride* (49.80%) followed by *Pseudomonas fluorescens* (41.84) over control. Significant suppression of radial mycelial growth of *Alternaria alternata* by *Trichoderma viride*, in dual culture method reported by Mandhare *et al.* (2008) [4]. *T. viride* maximum inhibition % against *Alternaria* blight of chickpea (*Alternaria alternata*) found in lab condition.

From the results it can be concluded that for the efficacy of fungal, bacterial and fungicides against *Alternaria alternata* of chickpea showed that the reducing the mycelial growth of pathogen *in vitro* experiment. Application of bio-agents and fungicides although *in vivo* experiment some bio-agents showed some promise in controlling the pathogen of *Alternaria* blight of chickpea. In this experiment, it has been established that for the management of *Alternaria* blight of chickpea,

**Table 1:** Efficacy of bio-agents and fungicides against radial growth and percent inhibition of *Alternaria alternata*.

Treatments	Disease intensity (%)
T0 control	-
T1 <i>Pseudomonas fluorescens</i> @5%	41.84
T2 <i>T. viride</i> @5%	49.08
T3 Thiabendazole	37.33
T4 Mancozeb	51.54
T5 Chlorothalonil	55.27
T6 Azoxystrobin	42.23
C.D (0.05)	4.51

\* Average of 3 replication.

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