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In-vitro evaluation of mycotoxicity of commercial fungicides and botanicals against *Colletotrichum capsici* F. sp. *cyamopsicola* causing anthracnose disease of cluster bean

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Abstract
Cluste bean [*Cyamopsis tetragonoloba* (L.) Taub.] commonly known as 'Guar' is an important *kharif* arid legume crop of India in recent years. Anthracnose caused by *Colletotrichum capsici* f. sp. *cyamopsicola* is one of the major disease of clusterbean and is prevalent in almost all the clusterbean growing locations of country. The present study was carried out to test the efficacy of fungicides and botanicals which inhibiting the *C. capsici*, under *in vitro* condition. It was revealed from the evaluation that among seven fungicides tested Carbendazim (97.33%) was found highly effective over other treatments followed by Propiconazole (94.33%) and Tebuconazole (92.77%). Whereas resulted from the evaluation of botanicals, maximum inhibition was found in *Azadirhachta indica* (82.22%) followed by *Calotropis procera* (80%) and *Allium cepa* (79.50%).

Keywords: *In-vitro*, commercial fungicides, botanicals and anthracnose

Introduction
Clusterbean is a legume crop belongs to family Fabaceae, usually used for vegetable purpose, but it is also have industrial benefits because its gum (found in endosperm of seed) is used as a raw material in medicinal, paper, cosmetic industry etc. India is the largest grower and producer of cluster bean in the world. It contributes 82% share in the world's total production. The India, Pakistan and the United States, are great exporter of clusterbean in world. The byproduct from gum extraction process is of a high value protein feed for cattle as it contains about 40 percent protein. The crop affected by number of Phyto pathogenic fungal, bacterial and viral diseases (Anon., 1999) [1]. Among them anthracnose is one of the most serious disease characterized by black spot on leaves, petioles and stem. Under favourable conditions the disease causes huge losses. Effective management of disease by single method may not be possible. Hence, it is necessary to develop management strategies by combining fungicides and botanicals. Due to mycotoxic properties of plants extract and chemicals is useful for the control of the fungus.

Materials and Methods
The present investigation was carried out during 2017-18 at Department of Plant Pathology, College of Agriculture, RVSKVV, Gwalior**.** Each experiment was replicated three times by using CRD design.

In vitro assay of fungicides
The comparative toxicity of fungicides on growth of the fungus under *in vitro* condition was evaluated by poisoned food technique (Nene and Thapliyal, 1982) [6]. The seven fungicides were used for assay at 500 ppm concentration. Stock solutions of the fungicides were prepared in sterile distilled water and added aseptically to Sterilized PDA medium to get required concentrations and then poured in to petridishes. The plates prepared without any fungicides served as control. These plates were inoculated with 7mm disc of seven days old culture of test fungus and incubated at 28 +- 2^0C. The observation recorded after 5 and 7 days of inoculation. The percent inhibition over control was calculated.

***In vitro* assay of botanicals**

Seven botanicals were tested for their antifungal property against C. *capsici* by poisoned food technique (Nene and Thapliyal, 1982) [6] under *in vitro* condition. Fresh leaves of test plants were taken for preparing crude extracts. The leaves thoroughly washed with water and fine slurry prepared by taking 100 g leaves in 100 ml of water. The slurry was filtered through muslin cloth and through Whatman No. 1 paper and the extract used as stock solution. The all botanicals were tested at 40 percent concentration. The medium was thoroughly shaken for uniform mixing of extract. Twenty ml of medium was poured into sterile petridishes. These plates were inoculated with 7mm disc of seven days old culture of test fungus and incubated at 28 +- 20C. The radial growth recorded after 5 and 7 days of inoculation. The percent inhibition over control was calculated by using formula (Vincent, 1947) [8].

$$I = \frac{C - T}{C} X100$$

Where,
l= percent inhibition
C= Linear growth in control (mm)
T= linear growth in treatment (mm)

Table 1: *In vitro* efficacy of fungicides against *C. capsici* f. sp. *Cyamopsicola*

Chemicals (500ppm)	Mycelial growth (mm) and per cent inhibition at			
	5DAI		7DAI	
	Mycelial Growth (mm)	Mycelial inhibition per cent	Mycelial Growth (mm)	Mycelial inhibition per cent
Carbendazim	1.3	98.15	2.4	97.33
Mancozeb	6.5	90.77	11.74	86.95
Azoxystrobin	7.1	89.92	12.88	85.68
Hexaconazole	3.92	94.43	8.74	90.28
Chorothalonil	7.5	89.35	12.42	86.2
Propiconazole	2.6	96.31	5.1	94.33
Tebuconazole	3.8	94.60	6.5	92.77
Control	70.42	0.00	90	0.00
SEM	0.30		0.61	
C.D.(0.05%)	0.93		2.29	

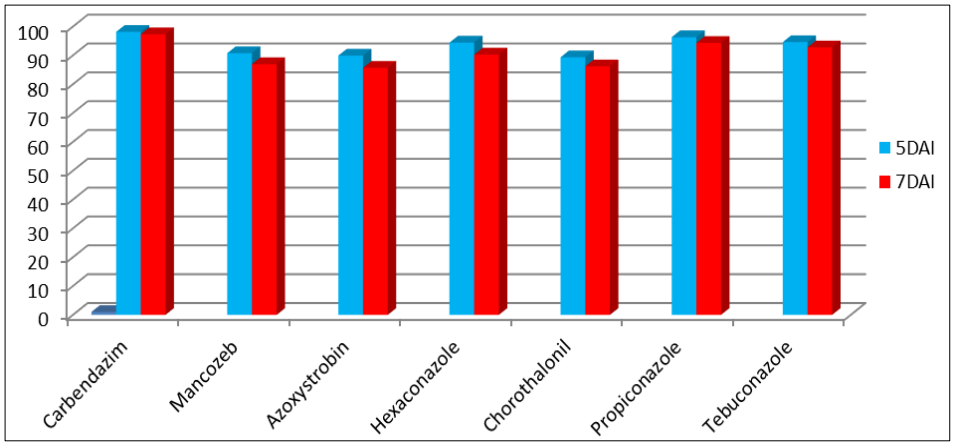

Fig 1: Efficacy of fungicides on mycelial inhibition growth of *C. capsici* f. sp. *cyamopsicola*

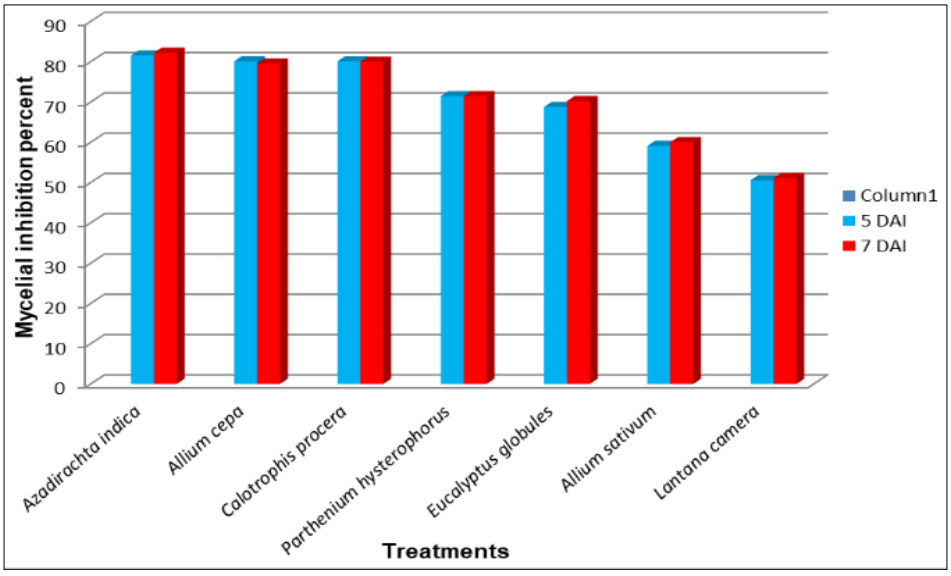

Fig 2: Efficacy of botanicals on mycelial growth of *C. capsici* f. sp. *cyamopsicola*

Table 2: *In vitro* efficacy of botanicals against *C. capsici* f. sp. *cyamopsicola*

Botanicals (40%)	Mycelial growth (mm) and per cent inhibition at			
	5DAI		7DAI	
	Mycelial Growth (mm)	Mycelial inhibition per cent	Mycelial Growth (mm)	Mycelial inhibition per cent
Azadirachta indica	13	81.53	16	82.22
Allium cepa	14	80.11	18.4	79.50
Calotropis procera	14.02	80.09	17.2	80.00
Parthenium hysterophorus	20.1	71.45	25.7	71.44
Eucalyptus globulus	22	68.75	26.8	70.22
Allium sativum	28.8	59.1	36	60.00
Lantana camera	34.8	50.58	44	51.11
Control	70.42	0.00	90	0.00
SEM	0.89	81.53	0.66	
C.D.(0.05%)	1.64		2.48	

Results and Discussion

In vitro evaluation of fungicides against C. *capsici* f. sp. cyamopsicola

The effect of fungicides on the growth of fungus is presented in Table 1. Among a fungicides tested Carbendazim (97.33%) was found significantly superior to other treatments followed by Propiconazole (94.33%) and Tebuconazole (92.77%). The results are in close agreement with Gurjar (2008) [3] and Devda (2009) [2].

In vitro evaluation of botanicals against C. *capsici* f. sp. cyamopsicola

Influence of botanicals on mycelial growth of C. *capsici* presented in Table 2 clearly indicate that all the botanicals significantly inhibited the growth of C. *capsici* under In-vitro condition. Among the tested botanicals, maximum inhibition was found in Azadirhachta Indica (82.22%) and Calotropis procera (80%) followed by Allium cepa (79.50%), Parthenium hysterophorus (71.44%), and Eucalyptus globulous (70.22%) significantly superior in reducing the fungal growth. Similar result was obtained by Mesta (1996) [5] which revealed that Neem leaf extract inhibit the growth of C. capsici. The inhibiting action of botanicals on the mycelial growth might be due to the presence of inhibiting substances in the extract. Various workers reported the presence of antifungal compounds in the plant extracts (Sinha *et al*., 2004, Laxman, 2006) [7, 4].

References

1. Anonymous, Annual Report of All India Co-ordinated Research Project on Arid Legumes R.A.U., Bikaner, 1999, 140.
2. Devda KS. Studies on anthracnose of guar [*Cyamopsis tetragonoloba* (L.) Taub.] caused by *Colletotrichum capsici* f. sp. *cyamopsicola.* M.Sc. (Ag.) Thesis, JNKVV, College of Agriculture, Gwalior (M.P.), 2009, 33.
3. Gurjar R. Studies on the factors associated with the development of anthracnose of cluster bean (*Colletotrichum capsici* f. sp. *cyamopsicola*) and its management. M.Sc. (Ag.) Thesis, JNKVV, College of Agriculture, Gwalior (M.P.), 2008, 24-26.
4. Laxman R. Studies on leaf spot of greengram caused by *Colletotrichum truncatum* (Schw.) Andrus and Moore. M. Sc. (Agri.) Thesis, Univ. Agric. Sci., Dharwad, Karnataka, India, 2006.
5. Mesta RK. Studies on fruit rot of chilli (*Capsicum annum* L.) caused by *Colletotrichum capsici* (Sydow) Butler and Bisby. M. Sc. (Agri.) Thesis, Univ. Agric. Sci., Dharwad, Karnataka, India, 1996.
6. Nene YL and Thapliyal PN. Fungicides in Plant Disease Control. 2nd Edition. Oxford & IBH Publishing Co. New Delhi, 1982, 413-415.
7. Sinha AK, Verma KP, Agarwal KC, Toorray NK, Thakur MP. Factors influencing growth, sporulations and spore germination of *C. capsici.* Advan. Pl. Sci. 2004; 17(1):71-73.
8. Vincent JM. Distortion of fungi hyphae in the presence of certain inhibitors. Nature. 1947; 159:850.