RESEARCH ARTICLE

A STUDY OF EFFECT ON DIFFERENT MEDIA PATHOLOGICAL STUDIES ON ANTHRACNOSE OF CHILLI (*CAPSICUM ANNUM* L.)

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Abstract: Anthracnose caused by *Colletotrichum capsici* is a common and sever disease of Chilli (*Capsicum annum* L.) keeping in view seriousness and importance of the disease, a chemical control trial was conducted at Student Research Farm,Pilikothi ,Jaunpur. A highly susceptible variety (local variety) was sown in 3 x 2m plots in Randomized Blok Design with three replications. Six fungicides, viz., Bavistin (0.10%), Vitavax (0.10%), Topsin-M (0.15%), Blitox-50(0.20%), IndofilM-45(0.20%) and Sulphur (0.20%) were sprayed. All the treatment was significantly superior over control. Bavistin was best for the control of the disease followed by Vitavax and Topsin-M which were significantly at per with other. The remaining fungicides were also significantly superior in decreasing disease incidence and increasing the yield in comparison to control.

Keywords: *Capsicum annum*, Chilli, Pathological studies

INTRODUCTION

Chilli is one of the most valuable crops in India. Chilli is also known as hot pepper, is a major vegetable and spice crop. Its forms a part of the Indian diet and fruits are used either dry are green. Chillies are the green or dried ripe fruits of pungent forms of *Capsicum annum* L. and sometimes *Capsicum frutescens*. It forms an indispensable adjunct in every house in tropical world. It is specially liked for its pungency, spicy teste, beside the appearing colour its adds to the food. In India, *Piper nigrum* was commonly use in its place before the introduction of this valuable condiment. Spanish paprika's lack in pungency, while Hungarian paprika's have long pointed fruits and are more pungent. African chillies too are very pungent but the paprikas of Japan are the less pungent forms. Chilli is actually reported to be native to South America and its cultivation was known the natives of Peru since 1000 year old. On account of lack of references on *Capsicum* in ancient languages, it is generally viewed that no Capsicum is indigenous to the world (De candolle, 1886.) The chilli is member of Solanaceae. Both the ripe and green chilli are important constituent, used to inpart pungency, flavour and color to foods. Chillies are rich in vitamins especially in vitamin A, C and the seed contains larches of starch . The pungency in chillies is due to an alkaloid, capsaicin, which has good export possibility.

METHOD AND MATERIAL

A regular and constant observation of chilli crop grown at student's farm of Tilak Dhari post graduate College, Jaunpur and its farmer's fields in the vicinity of Jaunpur, were made during *Kharif* season of 2001. The leaves from the affected plants of different age showing the characteristics *Colletotrichum* leaf spots were brought to the laboratory in polyethylene bag for critical examination and presence of the pathogen responsible for symptoms production. The careful examination was made by testing the diseased initial and observing of the fungal structures under the microscope some better specimens were selected, dried, pressed well in plant press and put into herbarium sheets and some wet preservation were also made in Formalin acetic alcohol (F.A.A.) solution for further references. The affected parts of the plant sowing the initial stage of the disease were used for isolation. The infected portions were first thoroughly washed in tap water. The disease part containing some healthy green portions were cut into small pieces by sterilized scalpel and washed in 3 to 4 changes of sterilized water. Their surface was sterilized by dipping them into 0.1% Mercuric chloride solution made in water, for 20-30 seconds and were thoroughly washed, thereafter in sterilized water to remove the traces of Mercuric chloride. The excess moisture removed by putting their pieces in between the folds of sterilized blotting papers.The pieces sterilized as above were transferred into petridishes containing 2% Potato Dextrose Agar medium. 4 – 5 pieces were placed at on equal distance with the help of sterilized forceps in poured petridishes. This was done aseptically in inoculated chamber to avoid the contamination. The petridishes used for isolations, were already sterilized in hot air oven at 160 ^{o}C for 3 hours and poured with 2% Potato Dextrose Agar medium which was also sterilized in an autoclave at 1.1 Kg. pressures per cm^2 for 20 minutes. The inoculated petridishes were than incubated at room temperature (25^{o}C – 28^{o}C) for the growth of fungus. After about 24 to 36 hours of incubation the mycelia growth appeared around the pieces placed in the petridishes.

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Experimental Finding

The Present investigations were carried out on the management of anthracnose of chilli [Capsicum *annum* (L.) Syd.] Caused by *Colletotrichum capsici*(syd.) Butler and Bisby. In the recent past, the disease has been observed to occur in sever from under natural conditions. Therefore, the detailed studies on symptomatology, isolation and purification of the pathogen and its pathogenecity, host range morphological characters and identification of the causative fungus, cultural and physiological studies of the pathogen, spore germination , evaluation of fungicides for the control of disease.

Symptom The disease appears during the rainy season when the atmospheric temperature and humidity are very high. The disease manifests itself mainly on the leaf but under sever conditions the lesion also appears on leaflets, leafsheath, fruits, fruitstalk and stem. In the beginning the disease initiates with minute spot on the both surface of the leaf but more on the upper surface which elliptical to long spot to size and turn light brown to dark brown in color. The spot mostly circular and sunken with black margin or brown margins are either scattered over the leaflets or concentrated near the midrib region. In general the lesion remains separate but in advanced stage of disease development, they coalesce together to from large (Up to 5-6 mm), necrotic circular to rectangular spots on the leaves with shot hole appearance. Sever spotting many cause even defoliation. The symptoms on the twinges are large number of black dots (acervuli) found scattered all over the surface. The symptoms on the fruits are small black circular spots on the skin of the fruit and spread in the direction of long axis of the fruit, infection progress such spot get diffused and black greenish or dirty grey in color or straw coloured area from normal red on these coloured area numerous acervuli may formed in concentric rings.

Isolation and purification of the pathogen

The isolations were made from the infected leaf lesions. The infected portions just touching the healthy region were cut with scalpel into small pieces. These pieces were first surface sterilized with 0.10% aqueous solution of mercuric chloride then washed in 3-4 times of distilled water. The excess moisture was remove by keeping then in between the folds of sterilized blotting paper and ultimately transferred petridishes with 2.0% P.D.A. numerous colonies of the fungus appeared within two days. The mycelia bits were transferred into P.D.A. slants. There were further purified by single spore technique and maintained on P.D.A.at room temperature (25^{o}C – 28^{o}C).

Pathogenecity Artificial inoculation was made to test the pathogenic behavior of fungus on chilli plants grown in the pots. The leaves were washing with sterilized water and then inoculated by spore or mycelial suspension both surface. Slight injuries also made with sterilized needle before inoculation. The inoculated plants were kept in the humid chamber. Numerous small black to brown circular spots appeared in leaves within 7 days of inoculation. The spots increased in size and coalesced together to cover the larger area on the leaves. The plant sprayed only with sterilized water served as control. Results obtained are summarized in

Table 1. Percentage of infection on chilli leaflets by different method of inoculations.

S. No.	Mode of infection	Treatment	No. of leaflets		Infection percentage
			Inoculated	Infected	
A.	**Inoculated**				
I.	Upper surface	Injured	20.0	15.0	75
		Uninjured	20.0	13.0	65
II.	Lower surface	Injured	20.0	16.0	80
		Uninjured	20.0	14.0	70
B.	**Uninoculated**				
I.	Upper surface	Injured	20.0	--	00
		Uninjured	20.0	--	00
II.	Lower surface	Injured	20.0	--	00
		Uninjured	20.0	--	00

Effect of different media on the fungal growth of the pathogen:

Fungal growth on the solid media

Fungi can be grown on different solid media comprising of known and unknown constituents, but *In - Vitro* they require some specific medium for their best vegetative as well as reproductive growth. With this views 13 different media synthetic and non synthetic solid media were used for the growth of fungus and data were recorded 10 days after incubation at (28 ± 1 ^{o}C).

Table 2. Diameter of the colony of *Colletotrichum capsici* on different solid media at (28 ± 1 °C) after 10 days incubation.

S.No.	Media	Ave. dia.of fungal colony growth (mm)	Colony	Colour	Development of acervuli
1.	Potato Dextrose Agar Medium	92.00	Fluffy	Pinkish white	Xxxx
2.	Richard's	88.25	Fluffy	Cottony white	Xx
3.	Oat mael	87.50	Fluffy	Pinkish white	Xxxx
4.	Kirchoff's	85.75	Compact	Creamy white	Xxx
5.	Corn meal	84.50	Fluffy	Orangish white	Xxx
6.	Sabouraud's	82.00	Compact	Pinkish	Xx
7.	Asthana & Hawker's	75.75	Sparse	Cottony white	Xxx
8.	Czapek's (Dox)	69.00	Fluffy	Pink	Xxxx
9.	Seed decoction	60.00	Sparse	Transparent	Xx
10.	Brown's starch	58.00	Compact	White	X
11.	Standard Nutrient	56.00	Sparse	Transparent	Xx
12.	Coon's medium	53.25	Compact	Yellowish pink	Xx
13.	Malt extract	51.25	Sparse	White	X
C.D. at 5%		**10.58**			

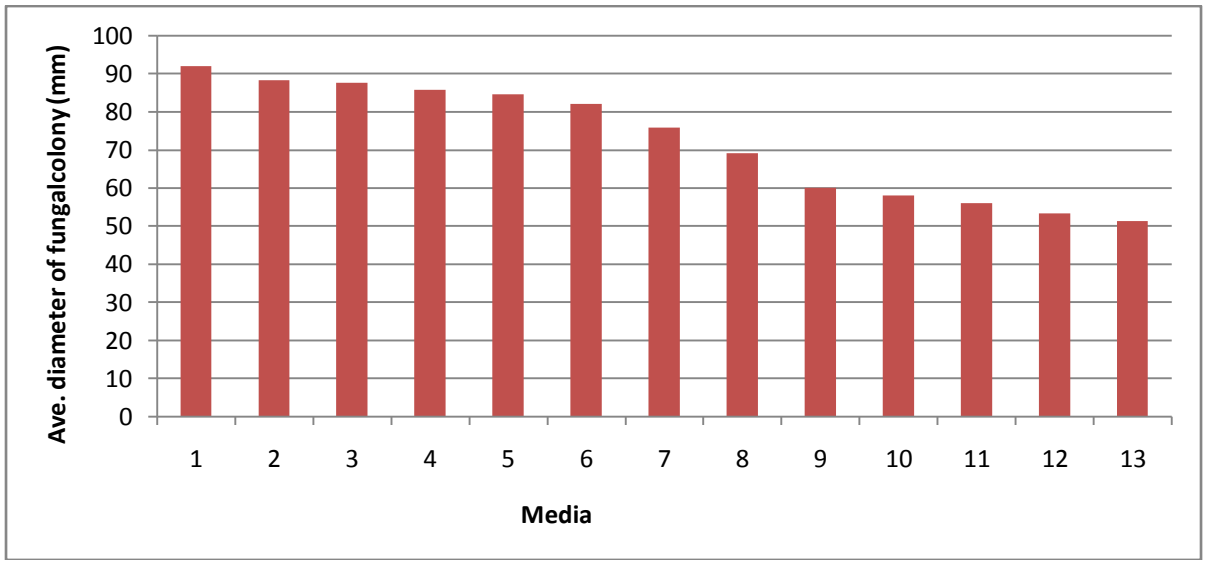

Fig. 1. Effect of different Solid media on the growth of the pathogen.

Its corresponding histogram that Potato Dextrose Agar medium supported significantly the maximum growth of the fungus followed by Richard's medium. The media like Potato Dextrose Agar medium and Richard's medium supported the average growth of fungus. There was no significant different between Potato Dextrose Agar medium and Richard's medium, Oat agar medium, Kirchoff's agar, Corn meal and Sabouraud's agar medium showed the good growth of the fungus. Asthana & Hawker's and Czapek's (Dox) agar showed the fair growth if the fungus. Seed decoction, Brown's starch agar, Standard nutrient agar and Coon's agar medium showed the poor growth of the fungus and the least growth was obtained in Malt extract medium. It is also obvious from Table-2 that the excellent sporulation was obtained on Potato Dextrose Agar, Oat meal and Czapek's (Dox) media. Which supported comparatively maximum growth o the fungus except Czapek's (Dox) media. Kirchoff's agar, Corn meal and Asthana & Hawker's media showed good sporulation. Sporulation was fair on Richard's media showed media, Saburaud's agar, Seed decoction, Standard nutrient and Coon's medium. The sporulation was least or poor on Brown's starch agar and malt extract medium. It is clear from the table that fungal growth was better on natural media than the synthetic ones. The colony character was Fluffy on P.D.A., Richard's, Oat meal, Corn meal and Czapek's (Dox) medium. Compact was on Kirchoff's, Sabouraud's, Brown's starch and Coon's medium. Sparse on Asthana & Hawker's, Seed decoction and Malt extract.

Liquid Media Study: -To find out the best the best medium for the growth of the fungus, it was grown on thirteen different liquid media and the results obtained and given in Table – 3.

Table 3. Average mycelia dry weight of *Colletotrichum capsici* in different liquid media at 28 ± 1 ^{o}C after 10 days incubation.

S.No.	Media	Av. Fungal dry weight (mg)	Sporulation
1.	Potato Dextrose Agar Medium	930	Xxxx
2.	Richard's solution	900	Xx
3.	Oat mael	890	Xxxx
4.	Kirchoff's	881	Xxx
5.	Corn meal	853.5	Xxx
6.	Sabouraud's	795.5	Xx
7.	Asthana & Hawker's	750	Xxx
8.	Czapek's (Dox)	690	Xxxx
9.	Seed decoction	660	Xx
10.	Brown's starch	620	X
11.	Standard Nutrient	580	Xx
12.	Coon's medium	530	Xx
13.	Malt extract	458	X
C.D. at 5%	**58.15**		

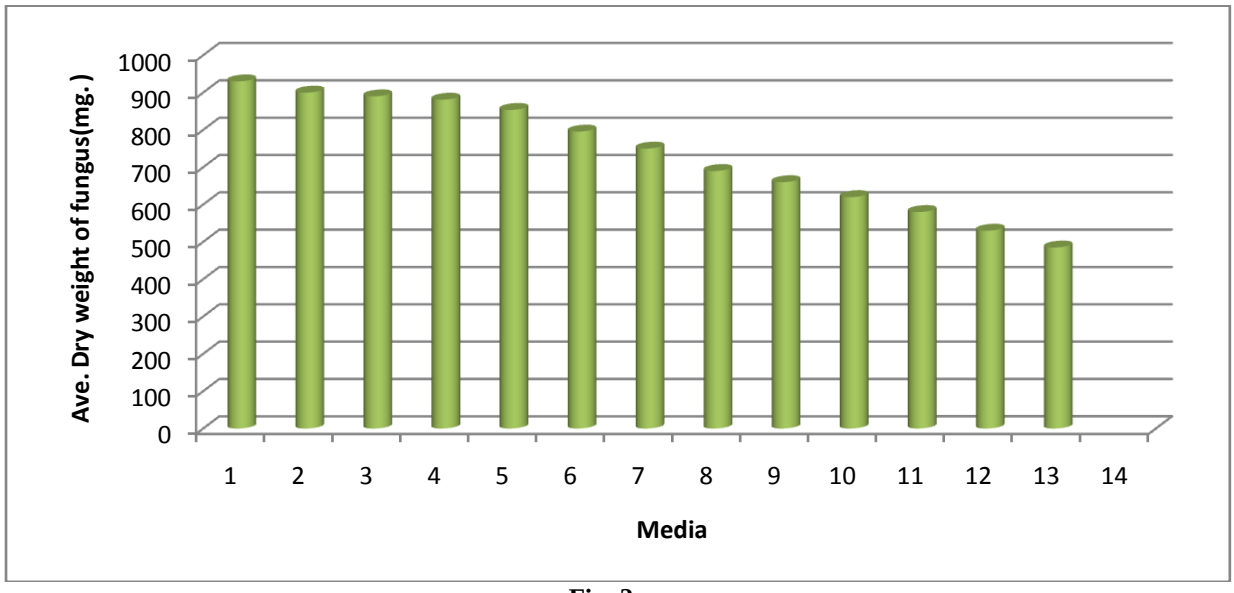

Fig. 2.

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