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RESEARCH PAPER

Cultural and morphological characters of *Colletotrichum truncatum* on different solid media

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Abstract: Chilli anthracnose caused by *Colletotrichum truncatum* is the major fungal foliar pathogen causing havoc in production, export and marketing. A study was conducted on cultural and morphological characterization of the pathogen under *in vitro* condition. Among the media, the radial growth ranged from 38.00 to 90.00 mm, maximum radial growth was recorded in Czapek's dox agar (90.00 mm) and lowest growth was seen in Czapek's malt agar (38.00 mm). Colour of the colony varied from white, dull white, grey and dull white to grey. The colony texture varied from smooth to coarse and the margin varied from regular to irregular. The sporulation varied from moderate to good. Good sporulation was recorded in corn meal agar, Czapek's dox agar, potato carrot agar and potato dextrose agar.

Key words: Anthracnose, Chilli, Media, Radialgrowth, Sporulation

Introduction

Chilli *(Capsicum annuum* L.) is renowned all over the world for its spicy taste. It is an important annual spice as well as vegetable crop which belongs to *Solanaceae* family. The origin of chilli is considered as Southern American tropics and is currently being cultivated throughout the world including the tropical, subtropical and temperate regions. *Capsicum* genus consists of approximately twenty-two wild species and five domesticated species *viz.*, *C. annuum, C. frutescens, C. baccatum, C. pubescens* and *C. chinense*. Having chromosome number $2n = 24$, *Capsicum* species may be herb or sub-shrub of height upto 2.5m with extensively branched hairy growth stem with purplish spots near the nodes. The tap root is strong with numerous lateral roots. The sustainability of chilli is affected by various biotic and abiotic stresses, currently biotic factors such as fungi, virus, bacteria and nematodes are posing a major threat (Choudhary *et al.*, 2013). Among all these, major fungal foliar pathogen causing havoc in production, export and marketing is fruit rot or anthracnose of chilli caused by (*Colletotrichum capsici*) (Syd.) Butler and Bisby which is presently renamed as *Colletotrichum truncatum* has emerged in impairing production in both tropical and subtropical regions. In this study, efforts were made to study the culture and morphological characters of *Colletotrichum truncatum* on different growth media.

Material and methods

Collection, isolation and identification

Isolation of pathogen

Laboratory experiments were carried out in the Department of Plant Pathology, University of Agricultural Sciences, Dharwad. The pathogen was isolated from the freshly infected fruits showing black dots of acervuli through standard tissue isolation technique with surface sterilization using 1 per cent sodium hypochlorite (Tuite, 1969). The pure culture of the pathogen was obtained. Pure cultures were maintained on PDA slants at 4°C in refrigerator and sub cultured on petri plates containing potato dextrose agar medium for further experiments. *Colletotichum truncatum* spores were falcate in shape with the presence of one central oil globule as described by Damn *et al.* (2009).

All the media *viz*., Carrot extract agar, Corn meal agar, Czapek's dox agar, Czapek's malt agar, OGYE agar, Potato carrot agar, Potato dextrose agar, Richard's synthetic agar, Sabouraud's agar, V8 juice agar and Yeast dextrose agar were sterilized at 1.1 kg/cm^2 pressure and 121ºC for 15 min. To carry out the study, 15 ml of each of the medium was poured into Petri plates of 9 cm diameter. These plates were inoculated with 5 mm disc of *C. truncatum* (Dharwad isolate which was molecularly identified and deposited at NCBI with accession number of ON478150.1) from periphery of actively growing six to seven days old culture and incubated at 28 ± 1°C upto 13 days. Each treatment was replicated thrice. Observations *viz.*, colour, texture, margin, radial growth (mm) and topography were taken when the pathogen covered Petri plate completely in any one of the medium. Colony colour and other characteristics were recorded with reference to Sharma *et al.* (2005).

Results and discussion

The isolated *C. truncatum* colony was light to grey in colour whereas, on lower surface it produced numerous black dots of acervuli (Fig. 1). The cultural and morphological characters were studied on different solid media and the observations recorded are mentioned below;

Colony characters

The colony characters *viz.*, radial growth of mycelium, colour, morphology, texture and margin, topography of *Colletotrichum truncatum* were studied.

Radial growth

Maximum radial growth was recorded in Czapek's dox agar (90.00 mm) followed by Potato carrot extract agar (87.00 mm)

and Sabouraud's agar (86.00 mm) which were found to be statistically on par with each other whereas, in potato dextrose agar the radial growth was (81.00 mm). Minimum radial growth of mycelium was observed in Czapek's malt agar (38.00 mm) and OGYE agar (48.00 mm) where both differed significantly with other whereas, OGYE agar was on par with Richard's synthetic agar (45.00 mm). Corn meal agar (62.00 mm) was on par with V8 juice agar (62.00 mm) (Table 1, Fig. 2).

Colony colour

Colour of the colony varied from white, dull white, grey and dull white to grey. White colour colony was observed in Czapek's malt agar, OGYE agar, Richard's synthetic agar, Sabouraud's agar, V8 juice agar and yeast dextrose agar whereas, dull white colour was observed in corn meal agar. Grey colony was seen in carrot extract agar, in the remaining three media *viz.*, Czapek's dox agar, potato carrot agar and potato dextrose agar colony colour were dull white to grey.

Texture and margin

The colony texture varied from smooth to coarse where, the coarse texture was observed in carrot extract agar, corn meal agar, Czapek's dox agar, potato carrot agar and potato dextrose agar. The smooth texture was noticed in Czapek's malt agar, OGYE agar, Richard's synthetic agar, Sabouraud's agar, V8 juice agar, yeast dextrose agar and in all the media the colony margin was regular except corn meal agar which showed irregular margin (Table 1).

Fig. 1. Culture morphology of *Colletotrichum truncatum* on potato dextrose agar

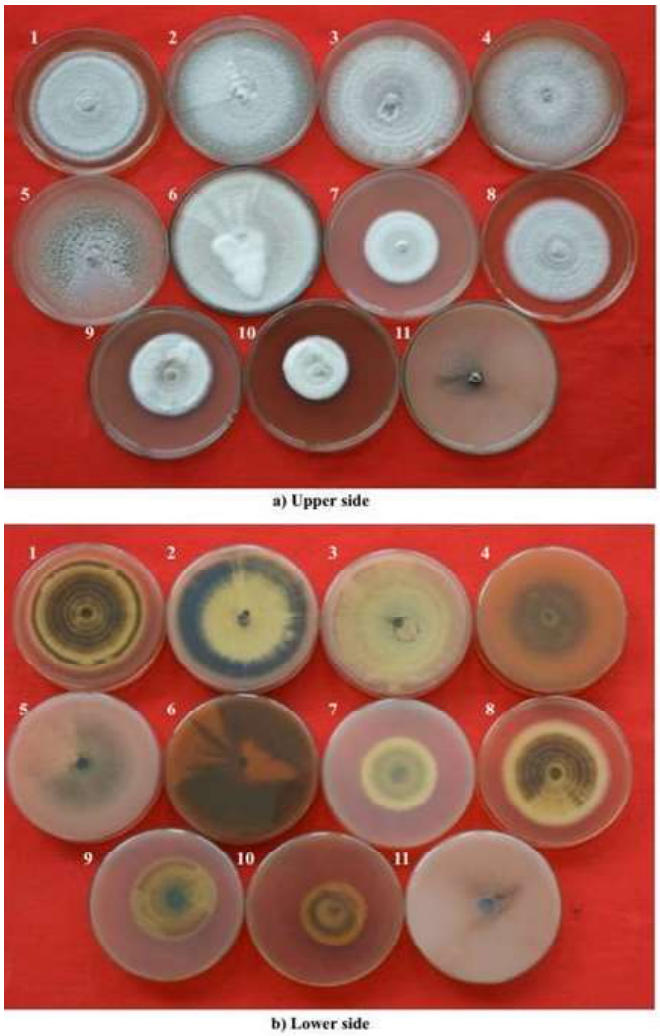

Fig 2. Growth of *Colletotrichum truncatum* on different solid media after 13 days of incubation

Table 1. Cultural and morphological characters of *Colletotrichum truncatum* on different solid media

Media	Colony characters					Sporulation
	Radial growth (mm)	Colour	Texture	Margin	Topography	
Carrot extract agar	72.00	Grey	Coarse	Regular	Raised	++
Corn meal agar	62.00	Dull white	Coarse	Irregular	Immersed	+++
Czapek's dox agar	90.00	Dull white to grey	Coarse	Regular	Raised	+++
Czapek's malt agar	38.00	White	Smooth	Regular	Flat	++
OGYE agar	48.00	White	Smooth	Regular	Flat	++
Potato carrot agar	87.00	Dull white to grey	Coarse	Regular	Flat	+++
Potato dextrose agar	81.00	Dull white to grey	Coarse	Regular	Flat	+++
Richard's synthetic agar	45.00	White	Smooth	Regular	Flat	++
Sabouraud's agar	86.00	White	Smooth	Regular	Raised	++
V8 juice agar	62.00	White	Smooth	Regular	Flat	++
Yeast dextrose agar	82.00	White	Smooth	Regular	Flat	++
S. Em. ±	1.71					
C.D @ 1 %	5.07					
C.V. (%)	4.41					

Where,
+++ Good sporulation (25-50 spores/10X microscopic field)
++ Moderate sporulation (10-25 spores/10X microscopic field)

Topography

Colony topography varied from raised, flat to immersed. *C. truncatum* colony showed raised growth in carrot extract agar, Czapek's dox agar and Sabouraud's agar whereas, immersed colony was observed in corn meal agar. In remaining seven media the growth was flat *viz.*, Czapek's malt agar, OGYE agar, potato carrot agar, potato dextrose agar, Richard's synthetic agar, V8 juice agar and yeast dextrose agar.

Sporulation

The sporulation varied from moderate to good. Good sporulation was recorded in corn meal agar, Czapek's dox agar, potato carrot agar and potato dextrose agar. The moderate sporulation was seen in remaining seven media *viz.*, carrot extract agar, Czapek's malt agar, OGYE agar, Richard's synthetic agar, Sabouraud's agar, V8 juice agar and yeast dextrose agar (Table 1, Fig. 2).

The results were in partial accordance with Tripathi (2016) who tested the effect of thirteen media on *C. capsici* growth. Maximum colony growth was observed in potato dextrose agar (90.00 mm). Colony colour were pinkish white to orangish white. Acervuli development was highest in potato dextrose agar whereas, sparse acervuli formation was seen in malt extract and brown starch medium. Similar work was carried out by Prajapati *et al.* (2020) who studied the characters on oat meal agar, potato dextrose agar, Czapek's dox agar, Richard's synthetic agar, malt extract agar and chilli fruit decoction agar. The colony colour varied from greyish white, dull white to grey in potato dextrose agar, texture varied from thin scanty, compact, fluffy and slightly fluffy. The highest diameter was observed in oat meal agar (90 mm) followed by chilli fruit decoction agar (88.67 mm) whereas, lowest growth was observed in malt extract agar medium (53.33mm).

Akhtar and Singh (2007) also studied the colony growth, colour, morphology, texture, of five isolates (KG, S2, BIL, SIT and DIN) of *C. capsici* on five different media *viz.*, potato dextrose agar, Czapek's dox agar, Richard's synthetic agar, neopeptone glucose agar and leonin agar. After five days of incubation most of the isolates showed maximum growth in potato dextrose agar in the range of 6.03-6.66 cm. Majority of isolates on all growth media formed regular colony shape with smooth margin, and colony colour varied from greyish white to black. Colony texture was thick to thick fluffy and zonation in colony was absent on all the media. The similar results were obtained in our study where, colour of the colony was dull white to grey and on all the media there was regular margin. The maximum growth was seen in Czapek's dox agar where, in their study the colony diameter ranged from 4.13 to 6.50 cm in the same media which was followed by potato dextrose agar. The growth rate varies from isolate which may be due to geographical variation.

Conclusion

The present experiment was conducted to figure out the suitability of culture medium, potato dextrose agar and potato carrot agar showed maximum radial growth next to Czapek's dox agar and also showed good sporulation. Thus, both these common media can be used for further studies.

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