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Studies on the Effect of different Media on the Mycelial Growth of *Colletotrichum lindemuthianum*

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ABSTRACT: French bean anthracnose is one of the major disease caused by *Colletotrichum lindemuthianum* and the pathogen is responsible for causing significant yield losses. *C. lindemuthianum* is a slow growing pathogen and is usually grown on Potato Dextrose Agar medium, thus *in vitro* studies were conducted to study the mycelial growth and colony characters of the fungus on six different media *viz*., Potato Dextrose Agar, Czapek's Dox Agar, Oat Meal Agar, Richard's Synthetic Agar, Fungal Agar and Potato Carrot Agar. The result revealed that the mycelial growth in all the media ranged between 62.33 mm to 90.00 mm. Among all the tested media, Potato Dextrose Agar recorded the maximum mycelial growth of 90.00 mm. However, Potato Carrot Agar recorded the minimum mycelial growth of 62.33 mm. The colony characters *viz*., growth pattern, colony margin and colony colour was also recorded. The fungus produced cottony to fluffy growth, regular to irregular margin and the colony colour varied from white to whitish gray. Potato Dextrose Agar proved to be the best suitable media for the growth of *C. lindemuthianum*.

Keywords: French bean, anthracnose, *Colletotrichum lindemuthianum*, media.

INTRODUCTION

French bean (*Phaseolus vulgaris* L.) is one of the important pulse crop, belonging to Fabaceae family (Galvan *et al*., 2003). It has been originated in Mexico (Maibam *et al*., 2015) and has gained popularity due to its nutritional value as it is a rich source of proteins, vitamins, fibers and minerals (Gepts *et al*., 2008). The crop is distributed all over the world and can be grown under different climatic zones ranging from sub-tropical, tropical to temperate region (Popelka *et al*., 2004). In India, the crop is cultivated over an area of 256 thousand hectares with an overall production of 2520 thousand MT (Anonymous, 2021). The production of bean crop suffers due to various fungal, bacterial and viral diseases like anthracnose, rust, angular leaf spot, bacterial blight, Bean Common Mosaic Virus, Bean Yellow Mosaic Virus etc (Habtu *et al*., 1996). Among these biotic factors, anthracnose disease incited by *C. lindemuthianum* is an important disease leading towards significant yield losses (Junaid *et al*., 2014). In severe conditions, it can lead to cent per cent yield loss, when contaminated seeds were grown (Sharma and Sharma 1994). The fungus drives its food from the substrates upon which it is grown in laboratory. Usually the fungus is grown on Potato Dextrose Agar medium, which is the most common substrate for all the fungal pathogens. As *C. lindemuthianum* is a slow growing pathogen and is mostly grown on Potato Dextrose Agar medium, thus, a comparison study was undertaken to determine the best medium among the tested media for rapid mycelial growth of the fungus.

MATERIALS AND METHODS

Collection of sample and identification of the pathogen. Leaves and pods of french bean plants showing typical symptoms of anthracnose were collected from Mantali village of Udhampur district during the survey conducted in 2021. The infected samples were brought to the laboratory of Division of Plant Pathology, SKUAST-Jammu for microscopic examination. Temporary slides were made from infected samples and were examined under the microscope to confirm the presence of the pathogen.

Isolation of the pathogen. After the confirmation of the presence of the pathogen in the infected samples, isolation of the pathogen was done using tissue isolation method. Infected tissues along with some healthy tissue were cut into small pieces. The tissues

were surface sterilized with 1 per cent sodium hypochlorite solution for 45-60 seconds followed by washing thrice with distilled water under proper aseptic conditions. Excessive moisture present in the sterilized tissue was removed using sterilized blotting paper and were transferred aseptically in the Petri plates containing Potato Dextrose Agar. These Petri plates were incubated at 25±2°C in the BOD incubator for 7 to 10 days. The pure culture thus obtained was maintained on Potato Dextrose Agar slants.

Preparation of media. To identify the best suitable media for the growth of pathogen, the fungal pathogen was inoculated on six different types of media *viz*., Potato Dextrox Agar, Czapek's Dox Agar, Oat Meal Agar, Richard's Synthetic Agar, Fungal Agar and Potato Carrot Agar. All the media were sterilized in autoclave at 121°C under 15 psi for 20 minutes. After sterilization, twenty ml (luke warm) each of media listed above were poured aseptically in 90 mm diameter Petri plates. After solidification of the media, 5 mm disc of the pathogen was cut from the 15 days old pure culture with the help of cork borer and was placed onto the center of each Petri plate and each media was replicated three times. The Petri plates were incubated at 25±2°C in BOD incubator and after 15 days of incubation the growth and colony characters of the pathogen on all the six media were observed and compared.

Observations to be recorded. Cultural features of *C. lindemuthianum* like mycelial growth, growth pattern, colony margin and colony colour on the different media were recorded in order to find out the suitable media for the fast and best growth of *C. lindemuthianum*.

RESULTS AND DISCUSSION

The present study revealed that the growth and colony characters of *C. lindemuthianum* varied on different media (Table 1). The mycelial growth of the pathogen ranged between 62.33 mm to 90.00 mm. Among the different media tested, Potato Dextrose Agar showed significantly maximum mycelial growth (90.00 mm) as compared to rest of the media. Next best media in order of merit was Czapek's Dox Agar (85.00 mm), followed by Oat Meal Agar (81.00 mm), Richard's Synthetic Agar (77.33 mm), Fungal Agar (64.67), respectively, (Fig. 1 and 2). However, the minimum mycelial growth of 62.33 mm was recorded in Potato Carrot Agar. The growth pattern on Potato Dextrose Agar and Richard's Synthetic Agar was observed as cottony with regular and irregular margin, respectively. In Potato Dextrose Agar, the colony colour was initially white, which later on turned gray having concentric rings at the center, while in Richard's Synthetic Agar, the colony colour was white. Fluffy type growth pattern with regular margin was observed in media *viz*., Czapek's Dox Agar, Oat Meal Agar and Fungal Agar, having white to creamy white colony colour. Whitish gray appressed cottony growth with irregular margin of the pathogen was observed in Potato Carrot Agar. This result supported the findings of Rajesha (2014) who recorded maximum fungal mycelial growth of 81.00 mm on Potato Dextrose Agar followed by Richard's Agar. Sardhara *et al.* (2016); Rathava (2017) who reported that Potato Dextrose Agar recorded the maximum mycelial growth.

Table 1: Cultural characters of *Colletotrichum lindemuthianum* on different media.

Sr. No.	Media	Mycelial growth (mm)	Colony characters		
			Growth pattern	Margin	Colony colour
1.	Potato Dextrose Agar	90.00	Cottony	Regular	Whitish gray with concentric rings
2.	Czapek's dox agar	85.00	Fluffy	Regular	White
3.	Oat Meal Agar	81.00	Fluffy	Regular	White
4.	Richard's Synthetic Agar	77.33	Cottony	Irregular	White
5.	Fungal Agar	64.67	Fluffy	Regular	Creamy white
6.	Potato Carrot Agar	62.33	Appressed cottony	Irregular	Whitish gray

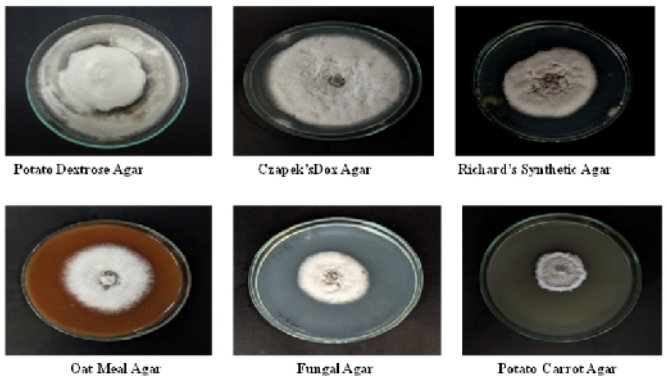

Fig. 1. Mycelial growth of *Colletotrichum lindemuthianum* on different media.

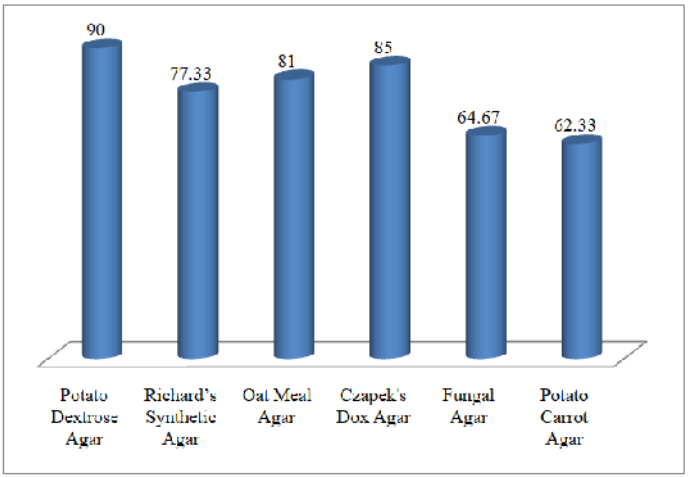

Fig. 2. Effect of different media on the mycelial growth (mm) of *Colletotrichum lindemuthianum.*

CONCLUSION

The study revealed that among all the tested media, Potato Dextrose Agar showed the best suitability for the growth of *C. lindemuthianum* and recorded the maximum mycelial growth after 15 days of incubation.

FUTURE SCOPE

All fungi require specific nutrients for the growth and reproduction under *in vitro* conditions. Mycelial growth, sporulation as well as pathogenic virulence can be altered by the nutritional conditions. Thus, selection and preparation of suitable cultural media is the pre-requisite need that will help to attain the knowledge of the cultural characters *viz*., growth pattern, growth rate and colony colour of the fungi more accurately.

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