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Effect of Incubation Period on Growth of *Colletotrichum gloeosporioides* Causing Mango Anthracnose

Sayiprathap, B. R.[1*], S. D. Ekabote[2], T. G. Manu[3], Mahantesh S. Balagar[3], Girish, B. R.[3]

[1]Ph. D., Scholar, ANGRAU, Guntur

[2]Professor and Head (Crop Protection) Horticulture College, Hiriyur

[3]Agricultural College, UHAS, Shivamogga

*Corresponding Author E-mail: saicrmsv@gmail.com

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ABSTRACT

Mango (Mangifera indica L.) anthracnose caused by Colletotrichum gloeosporioides (Penz.) Penz and Sacc. is one of the most serious diseases in all mango growing regions of the world. Pathogen, C. gloeosporioides being cosmopolitan, occurs on exceedingly diverse host plants. The pathogen being facultative saprophytic, can grow actively in vitro conditions under proper incubation upto certain days (12-15). The present study conducted to know optimum incubation period for maximum mycelial weight in potato dextrose broth (PDB). The dry mycelial growth (63.90 mg) increases gradually from 2nd day of inoculation and reached a maximum mycelial dry weight (598.80 mg) on the 12th day of inoculation, whereas, mycelial weight (534.56 mg) gradually decreases towards the 14th day of inoculation.

Key words: *Mango, Colletotrichum gloeosporioides, Incubation period, Dry mycelial weight.*

INTRODUCTION

Mango (Mangifera indica L.) is one of the most important and popular fruit crop in tropical and sub tropical regions of the world[9] belonging to the family Anacardiaceae, which is grown in more than 110 countries. Although mango is considered to be a hardy plant, it is susceptible to several diseases, insect pests and physiological disorders. Fungi are the major group of pathogens responsible for nursery, field and fruit rot diseases. Among the various fungal diseases, anthracnose caused by Colletotrichum gloeosporioides (Penz.) Penz and Sacc. is one of the most serious diseases in all mango growing regions of the world. The disease was first identified in India by McRae in 1924. The pathogen causes black spot, leaf blight, blossom blight, fruit rot and in severe cases die-back[7,1].

The pathogen, Colletotrichum gloeosporioides being cosmopolitan, occurs on exceedingly diverse host plants. Mango seedlings show blight due to C. gloeosporioides, which affect seedling health and to field spread reduces yield to a greater extent. The pathogen can be grown in vitro conditions on a specific medium under proper incubation condition.

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Under normal in vitro condition, pathogen grows actively up to certain days in a Petri plate or on broth medium, further incubation result decrease in the dry mycelial weight of the fungus, which may have been due to autolysis of mycelium, accumulation of the toxins or exhaustion of nutrients in the medium. By keeping this view, a study was conducted to know how different incubation periods effects on growth of Colletotrichum gloeosporioides under in vitro condition.

MATERIAL AND METHODS

Media preparation-potato dextrose broth (PDB)

Ingradients	Gms / Litre
Potato, infusion forms	200.00 g
Dextrose	20.00 g
Final pH (at 25˚C)	5.1±0.2

Protocol:himedialabs.com/TD/M403.pdf

Collection and isolation of the pathogen

Mango infected with anthracnose disease sample collected inside the zip covers from the field is used for isolation of the fungus *in vitro* by following standard tissue isolation technique as described below.

The infected portions along with some healthy part were cut and surface sterilized using one per cent sodium hypochlorite solution for 60 seconds. These bits were thoroughly washed in sterile distilled water to remove the traces of sodium hypochlorite if any, and then aseptically transferred to sterile potato dextrose agar (PDA) slants and incubated at room temperature (27±1°C) and observed periodically for fungal growth and sporulation.

The pathogen was identified as *Colletotrichum gloeosporioides* based on its mycelial and conidial characteristics as per standard mycological keys[2] and maintained on PDA Petri plates at 27±1°C for further studies.

Growth phase of *C. gloeosporioides* on potato dextrose broth (PDB)

Hundred ml of potato dextrose broth (PDB) was added into each of 250 ml conical flask and sterilized at 1.1 kg/cm^2 pressure for 20 minutes at 121°C. After sterilization these flasks were allowed to cool and then inoculated with 5 mm discs from 12 days old culture and incubated at room temperature. Each treatment was replicated three times.

Three flasks were harvested at 48 hours after incubation and subsequent harvesting was done at an interval of two days up to 16 days. The culture was filtered through Whatman No. 42 filter paper (dried to a constant temperature at 60°C in an electric oven prior to filtration) of 90 mm diameter. The mycelial mat on the filter paper was thoroughly washed with sterile distilled water to remove traces of salts likely to be associated with it. The filter paper along with the mycelial mat is then dried to a constant weight at 60°C and weighed immediately on an analytical balance. The difference between the final and initial weight of filter disc was taken as the weight of the mycelial mat. The data were analyzed statistically.

Dry mycelial weight (mg) = (Filter paper + Mycelial mat) – Filter paper

RESULTS

The experiment was conducted as mentioned in the Material and Methods to ascertain the optimum period for maximum growth of the fungus by dry mycelial weight method, starting from 2nd day to 16th day. The results obtained are presented in Table 1 and Figure 1. It was evident from the data that there was a gradual increase in dry mycelial weight over different incubation periods. Starting from 2nd day with mean dry mycelial weight of 63.95 mg and reached a peak on 12th day with mean dry mycelial weight of 598.80 mg and this remained significantly superior over remaining treatments. Meanwhile, on 16th day it showed 454.32 mg dry mycelial weight and decline in dry mycelial weight started from 14th day onwards with 534.56 mg.

Table 1: Growth phase of *Colletotrichum gloeosporioides* in potato dextrose broth (PDB)

Days after inoculation	Dry mycelial weight (mg) *
2	63.95
4	175.42
6	281.23
8	379.90
10	521.77
12	598.80
14	534.56
16	524.32
S. Em. ±	**3.00**
C.D. at 1%	**9.08**

*****Mean of three replications

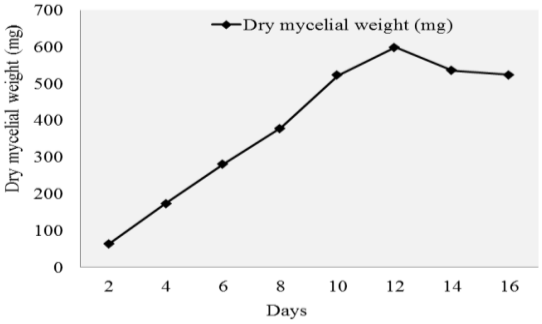

Fig. 1: Growth phase of *Colletotrichum gloeosporioides* in potato dextrose broth (PDB)

DISCUSSION

The maximum dry mycelial weight of *Colletotrichum gloeosporioides* was attained on the 12 th day (598.80 mg) of incubation in potato dextrose broth and was considered as an optimum period for growth of the fungus (Table.1). The study indicated that further increase in incubation period results in a decrease in the dry mycelial weight of the fungus The present study is in conformity with Ekabote et al. (1997) and Jayalakshmi (2010) , whereas, differ with Prashanth (2007) and Sudhakar (2000) who reported that, the maximum growth of fungus was attained on 13th to 14th of day of incubation.

CONCLUSION

Colletotrichum gloeosporioide causing mango anthracnose require an optimum incubation period of 12 days to attain maximum dry mycelial growth (598.80 mg). So, this period is considered to be the optimum period for maximum growth of fungus. Further, from the 12th day onwards the growth of the fungus gradually decreases.

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