

Physiological studies on *Alternaria alternata* pathogenic to *Solanum khasianum*

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Ten media were tested to study their influence on the growth and sporulation of *Alternaria alternata* isolated from *Solanum khasianum*. Both solid and liquid media of potato dextrose showed best growth and sporulation followed by oat meal which was significantly ($P = 0.05$) at per. Best results on sporulation was observed in both solid and liquid media of potato dextrose, oat meal and malt extract but comparatively less mycelial growth was observed in Malt extract. Comparatively poor growth with less sporulation was observed in Conn's medium among the media tested.

Key words : *Alteraria alternata*, media, growth, spoulation

INTRODUCTION

Fruit of *Solanum khasianum* is the richest known source of solasodine for the steroid hormone industry. During the comprehensive breeding programme by the Department of Genetics and Plant Breeding, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, between 1978-1981, the plants were found to be damaged by leaf spot, abaxial curling of leaves and necrotic spots on the lamina. Later the growth was affected and the stunted plants died with defoliation of mature leaves. The production of solasodine was greatly reduced by reduction in the number and size of fruit (Hait *et al.*, 1983). The pathogen was identified as *Alternaria alternata* (Fr) Keisslr by Dr. S. M. Francis, a mycologist at the International Mycological Institute (IMI), Kew, U. K; and the culture has been deposited in the herbarium (IMI 249403).

Studies were carried out *in vitro* to study the effect of different liquid and solid media on the mycelial growth and sporulation of *Alternaria alternata* and the results are presented in this paper.

MATERIAL AND METHODS

Alternaria alternata was isolated from *Solanum khasianum* leaf. Ten different media were used,

namely, potato dextrose agar, oat meal agar, corn meal agar, Richard's agar, Sabouraud's agar, host extract agar, Czapek Dox agar, Kirchoff's agar, malt extract agar and Conn's agar. An aliquot of 75 ml each of ten different medium was sterilized and then poured in three sterilized 8 mm diameter petridishes to study the linear growth of the pathogen. Petridishes were inoculated with 5 mm diameter mycelial disc of the pathogen. Inoculated petridishes were incubated at $28 \pm 1^\circ\text{C}$ for 10 days. The growth was measured in two directions of a petridish at right angles and average was taken. Then again average of the three replicates was taken and calculated.

Determination of mycelial growth was done by growing in 150 ml Erlenmeyer flasks containing 50 ml of each liquid medium with three replicates. Flasks containing medium were sterilized in autoclave at 121°C for 20 min. The flasks were inoculated and incubated at $28 \pm 1^\circ\text{C}$ for 10 days. Mycelial mat was filtered through Whatman's filter paper No. 42, and washed with distilled water. Filtered mycelial mat was oven-dried at 60°C for 48 hrs, cooled and then weighted. The average of the three replicates was taken and calculated.

Sporulation was recorded in liquid and solid media. For liquid medium 1 ml of suspension was taken

from a randomly selected flask for each medium. It was then diluted five times with distilled water and sporulation observed under microscope. For solid medium one 5 mm mycelial disc along with spores was cut out between the halfway from centre to periphery and suspended in 5 ml distilled water. Sporulation in both the case was observed under the microscope.

RESULTS AND DISCUSSION

It appears from the result (Table 1) that the best growth of the fungus was found on potato dextrose agar medium, followed by oat meal agar, corn meal agar, and Richard's medium. These four media were significantly superior that the rest of the media tested. Corn meal agar and Richard's agar media did not show significant difference in colony diameter. Very poor growth was observed in Conn's medium among the ten media tested so far.

Table 1 : Effect of different solid media on the growth and sporulation of *Alternaria alternata*.

Medium	Colony diameter (mm)**	Sporulation*
Potato dextrose agar	80.25	++++
Oat meal agar	78.50	++++
Corn meal agar	76.10	+++
Richard's agar	75.00	++++
Sabouraud's agar	67.25	+++
Host extract agar	64.25	+++
Czapek (Dox) agar	60.00	+++
Kirchoff's agar	55.00	+++
Malt extract agar	54.25	++++
Conn's agar	53.50	++
C.D (P = 0.05)	2.41	

* ++++ = best ; +++ = better ; ++ = good

** Results computed on the average of three replicates.

Table 2 : Effect of different liquid media on the mycelial growth and sporulation of *Alternaria alternata*.

Medium	Mycelial dry weight (mg)**	Sporulation*
Potato dextrose	702.3	++++
Oat meal	690.00	++++
Corn meal	682.40	+++
Richard's	631.65	++++
Sabouraud's	562.00	+++
Host extract	530.25	+++
Czapek (Dox)	473.00	+++
Kirchoff's	381.00	+++
Malt extract	379.25	++++
Conn's	340.00	++
C.D (P = 0.05)	13.23	

* ++++ = best ; +++ = better ; ++ = good

** Results computed on the average of three replicates.

Best sporulation was observed in potato dextrose agar, oat meal agar, Richard's agar and malt extract agar media. Good result was observed in Conn's agar which was the poor among the ten media tested. Other media showed better sporulation.

The above findings shows similarity with the results of Ashour and El-Kadi (1959) who reported that best growth with maximum sporulation of *A. tenuis* from tomato and *A. alternata* from pea plants (Susuri and Hagedron, 1986) took place in potato dextrose agar medium. Xu *et al.* (1984) also reported that *A. tenuis* from poplar grows best on potato dextrose agar medium. Maheswari *et al.* (1999) also showed excellent growth and sporulation of *A. alternata* from *Lablab purpureus* in potato dextrose medium and also with additional agar. Mathur and Sarbhoy (1977) showed maximum growth of *Alternaria alternata* from sugar beet in Richard's medium followed by Czapek (Dox) medium.

Results of Table 2 showed best growth of *A. alternata* took place in potato dextrose medium, followed by oat meal, corn meal and Richard's media. Oat meal medium did not show any significant difference with potato dextrose medium likewise with oat meal and corn meal media. Like solid medium Conn's liquid medium showed poor growth in respect of other media tested.

Best sporulation was recorded in potato dextrose, oat meal, Richard's and malt extract ; better was in corn meal, Sabouraud's, host extract, Czapek (Dox), Kirchoff's media and Conn's medium showed comparatively poor growth.

Similar results were observed by others on different *Alternaria* spp. Growth and sporulation of *A. helianthi* from sunflower (Reddy and Gupta, 1981) and *A. alternata* from *Lablab purpureus* (Maheswari *et al.*, 1999) was the best in potato dextrose medium among the different media tested. Patil *et al.* (1988) showed maximum growth of *A. tenuissima* from ground nut in Richard's medium among the tested ones.

It appears from the overall discussion that both potato dextrose broth and potato dextrose agar

media show good growth of mycelium and sporulation of *A.alternata* pathogenic to *Solanum khasianum* comparing with the other nine media tested.

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