

## Effect of several nutrient media on the growth and sporulation of *Alternaria alternata*

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The influence of eleven nutrient media was tested on the growth and sporulation of *Alternaria alternata*. Among the nutrient media, maximum growth of the fungus was obtained in both solid and liquid form on potato dextrose, followed by oat meal which were statistically at par. Both the solid and liquid media of potato dextrose, oat meal, Richard's and malt extract media supported excellent sporulation of the pathogen. Minimum growth and poor sporulation were found on Asthana and Hawker's medium among the test media.

**Key words :** *Alternaria alternata*, dolichos bean, mycelial growth, sporulation, solid and liquid media

### INTRODUCTION

Dolichos bean (*Lablab purpureus* (L.) Sweet) commonly known as 'Indian bean' is one of the important vegetable crops grown in India and many other parts of the world. Besides being a rich source of carbohydrates, proteins, minerals and vitamins for human beings, it also enriches the soil due to fixation of atmospheric nitrogen by the root nodule bacteria. Mostly it is used as green pods, but sometimes in dry form, it is also consumed as pulse. Dolichos bean is subjected to many diseases but *Alternaria*-leaf spot was observed in moderate to severe form in different parts of Uttar Pradesh causing substantial loss to vegetable growers. Goyal (1966) made first report of this serious disease incited by *Alternaria alternata* (Fr.) Keissler in dolichos bean from Rajasthan. Studies were carried out *in vitro* to ascertain the effect of various solid and liquid media on the mycelial growth and sporulation of *A. alternata* and the results are reported in this paper.

### MATERIALS AND METHODS

*Alternaria alternata* was isolated from infected leaf of dolichos bean. 20 ml of eleven different sterilized medium supplemented with agar agar @ 20 g per l was poured in sterilized petridishes for determining the linear growth of this fungus. Each petridish was inoculated with a 5 mm mycelial disc of the pathogen. These were incubated at  $28 \pm 1^\circ\text{C}$  for 10 days and

thereafter, the growth was recorded in mm in two directions at right angles and the average was calculated.

To determine the amount of mycelial mat produced 50 ml of each liquid medium was taken into 150 ml Erlenmeyer flasks. These flasks were sterilized in an autoclave at  $121^\circ\text{C}$  for 20 minutes. The flasks were inoculated with the fungus and incubated at  $28 \pm 1^\circ\text{C}$  for ten days. The mycelial mat was filtered through Whatman's filter paper No. 42 washed with distilled water, oven dried at  $60^\circ\text{C}$  for 48 h, cooled and weighed. Then, the average dry mycelial weight was taken.

Sporulation was also recorded among solid and liquid media. One flask from each medium was randomly taken for this purpose. From these flasks, 1 ml of fungal suspension was taken. After its dilution of five times with distilled water, 1 ml of diluted suspension was divided into five equal drops. Then, sporulation was observed under microscope.

### RESULTS AND DISCUSSION

It is clear from the results (Table 1) that the best growth of the fungus was found in solid form on potato dextrose agar, followed by oat meal agar media which did not differ significantly with each other. These media were statistically superior to the remaining media evaluated. Good growth of the pathogen was noticed on Richard's agar, corn meal agar and Sabouraud's

agar media in which Richard's agar and corn meal agar media were statistically at par. Minimum growth was resulted on Asthana and Hawker's medium.

Excellent sporulation of the fungus was recorded on potato dextrose agar, oat meal agar, Richard's agar and malt extract agar media but poor sporulation was observed on Asthana and Hawker's medium.

These observations are in conformity with the finding of Ashour and El-kadi ((59) who reported that potato dextrose agar medium supported the maximum growth and excellent sporulation of *A. alternata*. According to Mathur and Sarbhoy (1977), maximum growth of *A. alternata* was found on Richard's medium, followed by Czapek (Dox). Xu *et. al.* (1984) and Susuri and Hagedorn (1986) also reported that growth of *A. alternata* was best on potato dextrose agar medium.

**Table 1 :** Effect of various solid media on the growth and sporulation of *Alternaria alternata* at 28 ± 1°C

Name of the medium	Average diameter of the colony (mm)	Sporulation <sup>a</sup>
Potato dextrose agar	82.00	++++
Oat meal agar	80.75	++++
Richard's agar	75.00	++++
Corn meal agar	73.50	+++
Sabouraud's medium	69.25	+++
Host extract agar	66.25	+++
Czapek (Dox) agar	63.25	+++
Malt extract agar	62.50	++++
Kirchoff's medium	59.00	+++
Conn's agar	55.25	+++
Asthana and Hawker's medium	45.00	+
CD at 5% level	2.69	

<sup>a</sup>++++ = Excellent ; +++ = Good ; + = Poor

The results presented in Table 2 indicated that potato dextrose medium supported the maximum growth of the pathogen in liquid form and was significantly superior to the rest of the media tested. Oat meal and Richard's media were the next best media. Minimum growth was observed on Asthana and Hawker's medium.

**Table 2 :** Effect of different liquid media on the growth and sporulation of *A. alternata* at 28 ± 1°C

Name of the medium	Average mycelial dry weight (mg)	Sporulation <sup>a</sup>
Potato dextrose	742.33	++++
Oat meal	733.66	++++
Richard's medium	689.33	++++
Corn meal	635.00	+++
Sabouraud's medium	581.66	+++
Host extract	540.00	+++
Czapek (Dox)	495.33	+++
Malt extract	442.00	++++
Kirchoff's medium	395.66	+++
Conn's medium	350.00	+++
Asthana and Hawker's medium	311.66	+
CD at 5% level	13.93	

<sup>a</sup>++++ = Excellent ; +++ = Good ; + = Poor

Excellent sporulation was recorded on potato dextrose, oat meal, Richard's and malt extract media, whereas poor sporulation was observed on Asthana and Hawker's medium.

More or less, similar results were also found on *Alternaria* spp. by several workers. Likewise Garud *et al.* (1979) reported that Conn's and potato dextrose liquid media proved as the best for conidial germination of *A. brassicicola*. Reddy and Gupta (1981) evaluated six liquid media in which potato dextrose was the best for growth and sporulation of *A. helianthi*. Patil *et al.* (1988) observed that maximum growth of *A. tenuissima* was found on Richard's medium among the liquid ones tested.

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