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Effect of media and pH on mycelial growth and sporulation of *A. sesami*

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Abstract
Laboratory studies were conducted to study the effect of different culture media, and pH on mycelial growth and sporulation of *A. sesami*. Maximum mean radial growth was recorded on Potato dextrose agar medium and minimum was recorded on Rose Bengal agar medium. Abundant sporulation was on PDA and poor sporulation on Czepek-Dox Agar medium. Ideal pH range for growth of mycelial growth from 6.0 to 6.5. Good sporulation was observed at pH 7.0 to 7.5 & poor sporulation was found on pH 4.5.

Keywords: Mycelial growth, sporulation and spore germination, *Alternaria sesami*

Introduction
Sesame is an important oil seed crop of this country and thought to have originated in Africa (Brar and Ahuja 1979; Ram *et al.* 1990) [3, 5]. It is widely grown in tropical and subtropical regions. Its production is often concentrated in marginal and sub marginal lands (Ashri 1998) [4]. Most of the sesame seeds are used for oil extraction and the rest are used for edible purposes (El Khier *et al.* 2008) [1]. Sesame is grown primarily for its oil-rich seeds. Before seeds were appreciated for their ability to add nutty flavour or garnish foods, they were primarily used for oil and wine (Ghandi 2009) [2]. Sesame suffers from many diseases during the growth period. Alternaria blight is one of the serious disease which causes the considerable qualitative and quantitative yield losses in the crop. In case of severe infection of Alternaria blight, severe yield losses occur.

Material and Methods
Effect of media on mycelial growth and sporulation of *Alternaria sesami*:
The efficacy of various synthetic and non-synthetic media on growth of *A. sesami* was studied. Seven media *viz.* Oat meal agar, Corn meal agar, Potato dextrose agar, Carrot agar, Rose bengal agar, Asthana and Hawker´s and Czapek-Dox agar were used. The different types of media were prepared as per the composition and placed in 250 ml conical flasks. The different types of media were then poured in the sterilized plates @ 20 ml per petri plate uniformly and allowed to solidify. Mycelial disc of five mm diameter was cut from 7 days old culture of pathogen and was inoculated in the centre of each plate. The inoculated plates were incubated at 28+2°C till the pathogen completely occupied the plate. Three replications were maintained for each media. An observation on radial growth (colony diameter) was recorded in cross way at 48 hours intervals till the completion of growth of pathogen (90 mm) in any plate. Colony characters and sporulation were also recorded at the end.

Effect pH on mycelial growth, sporulation and spore germination of *A. sesami*
The pH for good growth and sporulation of the fungus was determined. Czapek-Dox synthetic media was used to study the effect of pH on the growth of *A. sesami*. Different pH levels from 4.5 to 7.5 with the difference of 0.5 were adjusted with Citrate phosphate buffer and the some cases by N/10 HCL or N/10 NaOH. Three replications were maintained, the inoculated plates were kept at 28+2°C for 8 days and observations on colony diameter were recorded at 2 days interval and sporulation was recorded in the end of the experiment.

Results and Discussion
These studies have indicated that PDA and Oat meal agar gave good growth and better sporulation than synthetic ones (Table 1).

This could be attributed to the complex nature of the natural media which contained various sugars, amino acids, growth factors etc.in comparison to synthetic media which had only one source of carbon and nitrogen each. Berry (1960) [6] and Siddaramaiah (1981) [7] also reported that the fungus grows nicely on PDA medium. He further observed that isolates of *Alternaria sesami* were found to differ markedly in cultural characteristics and virulence. The isolates differ in appearance (colony character) and growth rate too, good growth of *Alternaria ricini, A. cymopisdis* and six different species of *Alternaria* on PDA and Oat meal agar (Pawar and Patel 1957, Rangaswami and Rao 1957 and Rangaswami and Sambandan 1960 respectively) [8-10]. Also reported that PDA medium was good for the growth of *Alternaria alternata.*

Hydrogen ion concentration governs the metabolic activities of growing organisms both in nature and artificial cultures. In this case the pH of the soil and of the host plays an important part because then reaction of the substrate is largely responsible for influencing growth and sporulation of the pathogen. Investigations carried out by the author have revealed wide adaptability of the fungus because it was found to be capable of growing on a wide range of pH (4.5 – 7.5). However maximum growth observed at 6.5. Although good growth was observed on a pH range between 6.0 to 6.5. Abundant sporulation was observed on a narrow range of pH between 6.0 to 6.5.This indicated that the fungus resumes good mycelial growth and sporulation at acidic pH range of 6.0to 6.5 (Table 2). Saeed *et al.* (1995) [12] reported that pH 6 to 6.5 is suitable for the growth and sporulation of *A. alternata*. Similar findings were also reported by Jash *et al.* (2003) [13] that pH 6 to 6.5 is the suitable for the growth and sporulation of *A. zinniae pape* causing leaf and flower blight of marigold. Singh *et al.* (2009) [14] found that maximum radial growth of *Alternaria alternata* was observed at the pH 7.0. Hassain and Khutan (1997) [15] reported that maximum growth of *A. porri* was observed at the pH 6.0 to 7.0. However, Samuel and Govindaswamy (1972) [16] reported that pH 5 was best for mycelial growth and pH 7 for sporulation of *A. sesami*.

Table 1: Effect of media on mycelial growth and sporulation of *A. sesame*

S. No	Media	Mean radial growth (mm)* at 2 days interval				Sporulation at 8 days	Colony character
		2	4	6	8		
1	Oat meal agar	10.5	20.2	55.2	66.3	+++	Good growth of dirty white to iron grey mycelium, felt type growth smooth and with smooth margins and zonations diffuse type.
2	Corn meal agar	6.2	17.5	35.8	54.3	+++	Good growth of dirty white to iron grey mycelium, felt type slightly woolly growth with smooth margins.
3	PDA	10.5	23.0	35.0	68.3	++++	Olive green to iron grey mycelium, fair growth, felt type, margins smooth distinct zonations.
4	Carrot agar	5.2	18.3	26.7	54.5	+++	Good growth iron grey mycelium, felt type growth with smooth margins and zonations present.
5	Rose bengal agar	9.0	19.8	30.5	49.3	+++	Poor growth of aerial mycelium slightly submerges grey to light black in colour with smooth margins and zonations present.
6	Asthana and Hawker´s	9.2	23.2	45.0	53.3	+++	Poor growth of aerial mycelium slightly submerges light black in colour with smooth margins and ill defined zonations.
7	Czepek-Dox agar	10.0	16.8	36.8	55.7	+	Good growth of aerial mycelium falt type, slightly woolly and direct white in centre, otherwise, olive green on the margins, margins smooth slight tendency to form sector.
S. Em±		1.08	0.92	1.28	2.19		
C. D. (P = 0.05%)		3.34	2.82	3.95	6.76		

*Mean of three replications

- Nil, + Poor, ++ Moderate, +++ Good and ++++Abundant

Table 2: Effect of pH on mycelial growth and sporulation of *A. sesame*

S. No.	pH	Mean radial growth (mm)* at 2 days interval				Sporulation at 8 days
		2	4	6	8	
1	4.5	21.8	31.3	54.8	62.0	+
2	5.0	24.8	34.3	69.2	70.0	++
3	5.5	23.7	42.0	71.5	73.2	++ (Zonations present)
4	6.0	23.0	44.5	78.3	79.5	++++
5	6.5	24.8	45.5	83.3	84.2	++++
6	7.0	19.3	37.0	56.7	78.8	+++ (Zonations present)
7	7.5	16.3	20.0	31.5	73.3	+++
S. Em±		0.83	0.85	0.37	0.35	
C.D. (P = 0.05%)		2.55	2.61	1.14	1.07	

*Mean of three replications

- Nil, + Poor, ++ Moderate, +++ Good and ++++Abundant

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