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Studies on growth and sporulation of *Cercospoa canescens*

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Carrot leaf decoction oat meal extract agar (COA) medium was the best for both radial growth as well as sporulation of *Cercospora canescens* but potato dextrose agar (PDA) was best only for vegetative growth. For bio-gas production Richard's medium showed best result among the liquid media tested. It favoured acidic pH and the best growth was obtained at pH 6.0. Continous light was suitable for growth and sporulation as compared to intermittnt light and dark condition.

Key words : *Cercospora canescens*, culture media, growth, sporulation

INTRODUCTION

Cercospora canescens causing leaf spot of mungbean is an important disease in India. The disease is common in almost all the growing region throughout the year but severe during rainy season from June to September resulting economic loss of yield. Attempts have been made by several workers to know the nature of growth and sporulation of some members of the *Cercospora*. viz., *C. kikuchiana, C. beticola, C. nicotiana* and *C. canescens* (Gardner, 1972 ; Negel, 1934 ; Alasoadura and Fajola, 1970 ; Mew *et al.,* 1975 ; Khander *et al.,* 1985) In the present study the effect of different cultural media, ptt and light on growth and sporulation of *Cercospora canescens* was investigated.

MATERIALS AND METHODS

Single spore isolates of *Cercospora canescens* were prepared from freshly collected infected (with prominent leaf spot) leaf of mungbean (*Vigna radiata* L.) var. B-105. All the cultures were maintained on potato dextrose agar medium for future uses. Six different media, viz., potato dextrose agar (PDA), carrot leaf decoction oat meal extract agar (COA), mungbean leaf extract (MOA), mungbean leaf extract dextrose agar (MDA), Czepek's dox agar (CDA) and Richard's agar (RA), were used. Pathogen were grown in Petriplates at 27±2°C temperature and data were recorded in mm at different days after incubation for growth. Six lequid media, viz., host extract oat meal broth (MOA), potato dextrose broth (PDB), Richard's solution (RS), Czepek's dox broth (CDB), carrot leaf decoction oat meal broth (COB), and Fry's media were used. Each 250 ml Erlenmeyer flask containing 50 ml of medium was inoculated with a disc (5 mm of freshly prepared fungal culture and kept for 15 days at 27±2°C. Biomass of each flask was harvested on preweighted filter paper disc and dried in oven at 70°C to constant weight. Dry weight were recorded in mg per flask.

COA medium was used to determine the growth of the pathogen at different pH. Levels of the pH were adjusted to 4.0, 5.0, 6.0, 7.0, 8.0 and 9.0 using 0.1N NaOH and/or dilute HCl. The effect of light on growth and sporulation of the fungus was also studied on COA medium with three treatments-continous fluorescent light (20W) (40 cm away from the plates), complete darkness and 12 h light alternate with 12 h darkness. For complete darkness alluminium foils were used. To assess sporulation of the fungus 1.0 cm diameter culture discs were taken out from spore producing zone and suspended in distilled were (5 ml) with small amount of tween

80. After vigorous sweerling and shaking an uniform suspension were made and spore numbers were counted with the help of haemocytometer.

RESULTS AND DISCUSSION

Radial growth of the fungal colony in different media were found to very greatly. The pathogen favoured natural or semi-synthetic media while synthetic media were unsuitable when grown in agar based media. Pathogen could be grown satisfactorily either in PDA, COA or MOA media. It was observed that radial growth of mycelium was maximum on PDA followed by COA while sporulation was best on COA medium followed by MOA (Table 1). Fungal biomass production in synthetic media varied significantly. There were no significant growth difference in the natural or semi-synthetic media. In general pathogen preferred synthetic (820 mg/flask), followed by alternate light and dark conditions. Significant growth reduction was observed under continuous darkness. Very few sporulation was recorded at complete dark but highest sporulation was in contiunous light.

Table 1 : Growth and sporulation of *Cercospora canescens* Ell and Mar in different solid media.

Media used	Mean radial growth (mm)					Mean	Spore density
	3DAI	6DAI	9DAI	12DAI	15DAI		
Potato dextrose agar (PDA)	11.0	20.8	31.8	36.8	41.8	28.44	+
Carrot leaf extract oat meal agar (COA)	9.8	19.2	31.0	36.2	40.4	25.84	++++
Host extract oat meal agar (MOS)	4.8	13.2	27.4	32.2	37.0	22.92	+++
Host extract dextrose agar (MDA)	5.8	11.2	19.4	23.8	30.0	18.04	++
Czapek's dox agar (CDA)	–	2.2	3.8	5.6	6.6	3.64	–
Richard's (solution) agar (RA)	–	–	2.0	2.4	3.2	1.52	–
SEm ± =					0.53		
CD 5% of P =					1.56		

Data are the average of five replications.
DAI = Days after inoculation.
Spore density scored as : -, no sporulation ; +, very few (<10 spores/ml); ++, fair (10-50 spores/ml); +++, high (50-100 spores/ml); ++++, abundent (>100 spores/ml).

In semi-solid media pathogen grew successfully on COA and MOA. Similar observations were reported by Khander *et al.* (1985) and Ekpo and Esuruoso (1978). Sporulation of the fungus was better at low carbons levels but higher levels of carbon was required for mycelial growth. Similar results were also showed by Miller (1969) and Verma and Agnihotri (1972) in some other species of *Cercospora.* In liquid culture maximum growth was obtained in RS as compared to some other media tested (Khander *et al.*, 1985). Sporulation was maximum in COA (Mew *et al.*, 1975). Slightly acidic to neutral pH was favourable for the pathogen. (pH 6.0 was the best) while Khander *et al.* (1985) reported optimum pH as 5.9. Biomass production was recorded to be maximum under contiunous light. Ekpo and Esuruoso (1978) showed that illumination stimulated growth and sporulation of the pathogen. Report of Mew *et al.* (1975) indicated highest growth and sporulation at alternate light and dark condition. However, conidia production on detached leaves was higher in normal light (Rath and Grewal, 1973). The pathogen produced a pink pigmenation on PDA medium during active growth particularly at lower temperature showed a clear ring-like appearance surrounding the fungal colony which was also reporter by Mew *et al.* (1975).

Table 2 : Growth of *Cercospora canescens* Ell and Mar in liquid media.

Media used	Dry weight (mg/50 ml medium) at 15 DAI					Mean
	Set 1	Set 2	Set 3	Set 4	Set 5	
Host extrat broth (MOB)	415	434	308	405	442	401
Potato dextrose broth (PDA)	394	412	415	374	425	404
Richard's solution (R. Soln.)	834	855	831	800	778	820
Czapek's dox broth (CDB)	712	764	738	740	756	742
Carrot leaf oat meal broth (COB)	415	400	460	512	442	446
Fry's medium (FM)	746	724	696	708	732	721
Sem ± =						16.03
CD 5% of P =						47.2

Data are the average of five replications; DAI after inoculation.

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