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Growth Studies of *Alternaria macrospora* Zimm. an Incitant of Leaf Spot Disease of Cotton*

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The fungus *Alternaria macrospora* Zimm. grew well in host leaf dextrose extract and Czapek's solution. The fungus attained maximum growth after 14 days of incubation. Sucrose was found to be the best carbon source while sodium nitrate and urea supported good growth of the fungus among various inorganic and organic nitrogen sources. A pH range of 5 to 7 and a temperature of 27° C were found to be optimum for the growth of the fungus.

The incidence of leaf spot disease caused by *Alternaria macrospora* Zimm. is commonly observed in Tamil Nadu affecting cotton production considerably (Balasubramanian, 1965). To understand the potentialities of the fungus *A. macrospora* growth studies were carried out and the results are presented in this paper.

MATERIALS AND METHODS

Aliquots of 100 ml of seven different liquid media viz., host leaf extract, Asthana - Hawker's solution, Brown's synthetic solution, potato dextrose broth, Czapek's solution, Richard's solution and host leaf dextrose extract were transferred to each Erlenmeyer flask and inoculated with 5 mm discs of fungal growth maintained on oats agar. All experiments were conducted at room temperature (26° C - 28° C) unless otherwise specified. Dry mycelial weights were recorded after 14 days of incubation under each experiment. Three replications were maintained for each treatment.

The fungus was grown in Czapek's medium and also the amended medium in which sucrose was replaced by various carbon sources. Sodium nitrate in Czapek's medium was substituted with various inorganic and organic nitrogen sources. The medium without carbon and nitrogen sources were kept as control. The pH of the Czapek's medium was adjusted to 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11 using Trombay pH meter. The fungus was grown in Czapek's medium and incubated at different temperatures viz., 0, 5, 10, 15, 20, 27, 30 and 40° C.

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RESULTS AND DISCUSSION

The study on the growth of *A. macrospora* on different media indicated that host leaf dextrose extract and Czapek's solution were the best medium for growth (Table I).

TABLE I. Comparison of growth of *A. macrospora* in different liquid media

Treatment	Mean mycelial dry weight in mg
Host leaf extract	201.0
Asthana - Hawker's solution	114.5
Brown Synthetic solution	400.3
Potato dextrose broth	276.3
Czapek's solution	419.3
Richard's solution	208.3
Host leaf dextrose extract	446.5
C.D. (P=0.01)	120.3

Rane and Patel (1956) reported best growth of *A. macrospora* in Richard's medium although it grew fairly well on other media. Roy (1969) found good growth of *Alternaria dauci* (Kuhn) Groves and Skolko in potato dextrose medium.

TABLE II. Growth of fungus after different periods of incubation on Czapek's medium

Incubation period in days	Mean mycelial dry weight in mg
2	33.8
4	46.3
6	166.5
8	431.3
10	416.3
12	459.5
14	507.5
16	504.0
18	484.0
20	487.8
25	407.0
30	350.3
C.D. (P=0.01)	43.7

The results presented in Table II indicate that maximum growth of *A. macrospora* occurred after 14 days of incubation in Czapek's medium.

The fungus under study preferred sucrose, arabinose and glucose to other carbon sources (Table III).

TABLE III. Effect of carbon sources on the mycelial growth of the fungus.

C Source	Mean mycelial dry weight in mg
Sucrose	449.0
Fructose	293.3
Glucose	379.0
Galactose	284.0
Maltose	310.0
Lactose	361.0
Xylose	316.8
Sorbose	47.0
Arabinose	428.0
Starch	372.0
Dextrin	390.3
Glycogen	62.0
Control	27.0
C.D. (P=0.01)	74.6

Similar preference has been observed by Rao and Appa Rao (1965) who reported glucose and sucrose as the best carbon sources for the growth of *A. solani* (Ell. and Mart) Jones and Grout.

Among the various nitrogen sources tested, sodium nitrate, urea, sodium nitrite and ammonium nitrate supported maximum mycelial growth. Potassium nitrate, ammonium oxalate, peptone, ammonium chloride and casein

TABLE IV. Effect of nitrogen sources on mycelial growth of the fungus

N Source	Mean mycelial dry weight in mg
Ammonium nitrate	350.0
Ammonium sulphate	257.0
Ammonium chloride	291.0
Ammonium phosphate	260.5
Ammonium oxalate	314.8
Potassium nitrate	316.5
Sodium nitrite	403.5
Sodium nitrate	410.0
Peptone	292.8
Beef extract	201.0
Casein	281.0
Asparagine	237.0
Urea	404.0
Control	32.0
C.D. (P=0.01)	74.9

supported fair growth (Table IV). Rane and Patel (1956) found ammonium nitrate, potassium nitrate, sodium nitrate and peptone as the best nitrogen source for the growth of *A. macrospora*. Sathiabalan Samuel (1969) found that nitrogen sources like peptone, gelatin and casein supported good growth of *A. sesami*.

Mycelial growth was significantly higher at pH 4, 7, 5 and 6. The mycelial growth was very poor at pH 2 and 3 (Table V). Rane and Patel (1956) found that the fungus *A. macrospora* grew well between pH 4.8 and 5.2. Roy (1969) found pH 6.0 to be the best for the growth of *A. dauci*. The present fungus also exhibited similar pH requirements.

TABLE V. Effect of pH on mycelial growth of the fungus

Treatment (pH)	Mean mycelial dry weight in mg
2	19.8
3	23.3
4	550.3
5	505.8
6	499.3
7	523.8
8	388.8
9	450.5
10	415.8
11	439.3
C.D. (P=0.01)	66.9

Maximum growth of the fungus was observed at 27°C. The fungus grew fairy well at 20°C. Poor growth of the fungus was observable at 0°C, 5 C and 40°C (Table VI).

TABLE VI. Effect of different temperatures on the mycelial growth of the fungus

Temperature °C	Mean mycelial dry weight in mg
0	26.0
5	29.5
10	147.5
15	268.8
20	414.5
27	494.5
30	207.5
40	22.5
C.D. (P=0.01)	29.0

Rane and Patel (1956) observed that the fungus *A. macrospora* grew well at a temperature of 27°C. Changsri and Webber (1960) reported 24 - 28°C, 20 - 24°C and 24 - 28 C as temperature optima respectively for *A. brassicola* (Schwein)

Wiltshire, *A. brassicae* (Berk) Sacc., and *A. raphani* Grover and Sholko. Verma (1970) reported that optimum temperature for the growth of *A. solani* was 25°C.

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