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EFFECT OF DIFFERENT MEDIA, p^H AND TEMPERATURE ON THE RADIAL GROWTH AND SPORULATION OF *Alternaria alternata f. sp. lycopersici*

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ABSTRACT: *Alternaria alternata* f.sp *lycopersici* was grown on nine different solid media to observe the radial growth of the test fungus. P.D.A. medium favored the maximum growth and lowest growth was recorded on standard nutrient agar medium. While poor sporulation was recorded on the host extract agar medium. The temperature requirement of the pathogen was investigated on P.D.A. medium in the range of 10 to 35 C . The fungus exhibited maximum growth at a wide range of pH from 5.0 to 8.5 and the best fungal growth was recorded at pH 7.0 and poor growth was observed at pH 5.0.

Keywords : *Alternaria alternata f.sp. lycopersici, pH, temperature, growth medium.*

The tomato (*Lycopersicon esulentum* Mill.) is the very important vegetable crop in India. The *Alternaria* leaf spot is the most important tomato disease in India causing severe damage to the crop. The disease appears in the month of Dec. to March. The symptoms like dark brown, sunken lesion often with irregular with yellow margin may occurred on many germplasm. The present study was undertaken to observe the effect of different media , pH and temperature on the growth and sporulation of the test fungus, *Alternaria alternata* f.sp. *lycopersici.*

MATERIALS AND METHODS

For measuring radial growth of the pathogen 20ml of sterilized agar medium was poured in 9.0cm diameter of sterilized petridishes. After the medium solidified a 5m m dish of the fungal growth was cut with the help of sterilized cork borer and placed at the centre of each Petridish. These petridishes were incubated at 25°C to 28°C up to required incubation period. Each treatment was replicated three times. The fungal growth was observed daily and final diameter of the fungal growth was measured manually at the 10 day .

The study was conducted on the best suited-semi synthetic medium (PDA). The conical flask (150ml) containing 50ml medium were taken and these flasks, were sterilized at 1.1 kg pressure $1/cm^2$ for 20 minutes in an autoclave. These sterilized flasks with the medium were inoculated with ten days old culture of the pathogen in equal quantities (5 mm pieces) made with help of a sterilized cork borer. These flask were then incubated at a different temperature viz.,10,20,25,30 and 35°C for 10 days. Each treatment had three replications. After 10day of incubation, the medium containing mycelium mats was filtered through weighted What man's filter paper No. 42 and these filter papers with the mycelia mat were dried in the hot air oven at 60°C for 24 hours. The weight was taken separately at different temperature. The net dry weight of the filter paper from the total weight of the each case was deducted.

Potato dextrose agar medium was also used for the study of effect of hydrogen ion concentrations for the growth and sporulation of the fungus. The pH of medium was adjusted to desired level with the help of Phillip's pH meter by using N/10 hydrochloric acid and sodium hydroxide for lower and higher pH value, respectively. The p^H value more adjusted on 5,5.5,6,6.5,7,7.5,8 and 8.5. 50 ml of the pH adjusted medium was poured in 150 ml conical flask and sterilized at 1.1 kg pressure $/cm^2$ for 20 minutes in an autoclave. Each treatment was replicated for four times. The flask containing the medium of different pH value

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inoculated with 10 day old culture of the pathogen in equal quantities (5mm pieces) made with help of sterilized cork borer and were then incubated for 5 days at 25°C to 28°C for further growth and sporulation of the fungus. After incubation, the medium containing the mycelium mats of the pathogen was filtered and oven dried at 60°C for 48 hours and weighted and average dry weight was obtained in the usual manner.

RESULTS AND DISCUSSION

Effect of different media on the growth of the pathogen.

Data represented in Table 1 revealed that the best growth of the fungus was obtained on potato dextrose agar medium followed by Malt extract agar medium which were statistically superior to other media tested and significantly differed from each other. The next best medium was Kirchaff 's agar medium followed by corn meal agar medium and these were statistically similar to each other. The rest of the media found in the order of performance were Oat meal agar, Sabouraud's medium and Standard nutrient medium. These were statistically at par to each other. The Richard's agar medium and Host extract agar medium supported poor growth of the fungus confirming to results of Adbel *et al.* (1) and Gopinath (3).

Table 1: Radial growth and sporulation of *Alternaria alternata* f. sp. *lycopersici* on different solid media after 8 days of incubation at 25°C-28°C.

Media	Average diameter of fungal colonies (mm)	Sporulation
Potato dextrose agar (PDA)	90.0	Excellent
Malt extract agar	73.0	Excellent
Kirchaff's medium	65.0	Good
Corn meal agar	63.0	Good
Oat meal agar	60.0	Good
Sabouraud's medium	60.0	Good
Standard nutrient Medium	59.0	Good
Richard's medium	43.0	Fair
Host extract agar	26.0	Poor
C.D. (P=0.05)	3.73	

It is also evident (Table 1) that excellent sporulation of the fungus was recorded on potato dextrose agar and Malt extract agar medium. Sporulation was good on Kirchaff's medium, Corn meal agar, Oat meal agar, Sabouraud's medium and Standard nutrient medium. Sporulation was fair on Rechard's medium, while poor spoulation was observed on Host extract agar medium, which is similar to Sidlauskine *et al.* (5)

Table 2 : Fungal dry weight and sporulation of *Alternaria alternata* f. sp. *lycopersici* at different temperature after 10 days of incubation.

Temperature (°C)	Average dry weight of fungus (mg)	Sporulation
10	145.00	Poor
20	460.00	Good
25	670.00	Good
30	750.00	Excellent
35	430.00	Fair
C .D. (P=0.05)	8.67	

Effect of different temperature on the growth and sporulation of fungus

The results presented in Table 2 indicate that the fungus was able to grow at a wide temperature range of 10-35°C. The optimum temperature for the growth of the fungus was 30°C followed by 25°C. It is also clear that all the temperature differed significantly from each other in respect to their effect on the mycelia weight of fungus. The excellent sporulation was often at 30°C, good at 25°C and 20°C fair at 35°C while the sporulation the was poor at 10 0C confirming to the finding of Singh (6), Sahi (4) and Sidlaukine *et al.* (5)

Effect of different hydrogen ion concentration on the growth and sporulation of the fungus.

The data presented in the Table 3 revealed that the maximum fungal growth occurred at pH 7.0 followed by pH 7.5 and 8.0. The optimum pH range for fungal growth was from 7.0 to 7.5 There was also significant reduction in fungal dry weight at pH lower than 7.0 and higher than 7.5 Comparatively higher fungal growth was recorded at pH level of 7.0 as compared to other pH levels. The lowest fungal growth was noticed at pH 5.0 the There was significant difference in the growth of fungus at different Hydrogen ion concentration except in pH 5.5 and 8.5. The best growth of fungus was recorded at pH 7.0 followed by 7.5 and 6.5 which is similar to results of Turhan (7) and Auba *et al*. (2) Excellent sporulation occurred at pH 7.0. There was good sporulation at pH 6.0 , 6.5 and 7.5 and it was fair at p^H 5.5 and 8.0 while poor at p^H 5.0and 8.5.

Table 3: Effect of pH levels on the radial growth dry weight and sporulation of *Alternaria alternata* f.sp *lycopersici* on PDA medium after 5 days of incubation at 25-28°C.

pH level	Radial growth of the colony (mm)	Av. Fungal dry weight	Sporulation
5.0	16.30	420.00	Poor
5.5	19.6	504.00	Fair
6.0	21.8	576.00	Good
6.0	24.00	699.00	Good
7.0	28.0	732.00	Excellent
7.5	25.5	700.17	Good
8.0	24.8	545.58	Fair
8.5	24.3	491.0	Poor
C.D. (P=0.05)	4.15	14.26	

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