



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

# IJDR

International Journal of Development Research  
Vol. 09, Issue, 03, pp.26381-26383, March, 2019



ORIGINAL RESEARCH ARTICLE

OPEN ACCESS

## EVALUATION OF DIFFERENT PH, TEMPERATURE AND CULTURE MEDIA ON THE MYCELIA GROWTH OF *TRICHODERMA ASPERELLUM*

<sup>1</sup>Shenu Sankhwar and <sup>2</sup>Archana Srivastava

<sup>1</sup>Research Scholar, Department of Botany, D. G. P.G. College, Kanpur, India

<sup>2</sup>Associate Professor, Department of Botany, D. G. P.G. College, Kanpur, India

### ARTICLE INFO

#### Article History:

Received 14<sup>th</sup> December, 2018  
Received in revised form  
20<sup>th</sup> January, 2019  
Accepted 16<sup>th</sup> February, 2019  
Published online 31<sup>st</sup> March, 2019

#### Key Words:

Media, pH, Temperature,  
*Trichoderma asperellum*.

### ABSTRACT

The effect of different solid media, temperature and pH was observed on *Trichoderma* species. The *Trichoderma asperellum* show an excellent growth at 25 -35 °C. The radial growth of *Trichoderma asperellum* was evaluated different culture media, potato dextrose agar, sorghum meal agar, cazpeak dextrose agar, corn meal agar and starch agar. The *Trichoderma asperellum* show maximum radial growth in potato dextrose agar and minimum radial growth in starch agar. The most favourable pH 6 -7 ranges was found in which total dry weight of mycelium also varies between 1.21-1.18g. Maximum pH was found at 6 and 7 and minimum dry mycelia weight in pH4 and pH9.

Copyright © 2019, Shenu Sankhwar and Archana Srivastava. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Shenu Sankhwar and Archana Srivastava. 2019. "Evaluation of different ph, temperature and culture media on the mycelia growth of trichoderma asperellum", *International Journal of Development Research*, 09, (03), 26381-26383.

### INTRODUCTION

*Trichoderma* as saprophytic filamentous fungi that is worldwide. That is common in soil ecosystem. It has been known for many years and produced antibiotics, mycoparasitism, comparative saprophytic ability, the metabolites secretions, induction of resistance against rigidity and promotion of growth in plant. They have more biodiversity and have been broadly and versatility in nature. They have high biodiversity and have been significantly studied virtually more microorganism to examine and explored its antagonistic action against the phytopathogens. *Trichoderma* are responsible for its biological control potential, among them maximum rizhosphere competency and prolific production of extracellular protein and also they can degrade chitin and cellulose (Harman *et al.*, 1996) and are also serving as the basis for effective bio control application. Furthermore they are also known to produce antibiotics and antifungal activity (Ghisalberti and Rowland). Amaresh *et al.* (2016) studied the survivability of *Trichoderma* isolates at various temperatures (05°C, 30°C, 35°C, 40°C and 45°C) and pH(3, 5, 7 and 9) and reported that Tri-9 isolate had maximum growth rate up to the temperature 40°C and survived at pH 5 and 9.

\*Corresponding author: Shenu Sankhwar,  
Research Scholar, Department of Botany, D. G. P.G. College,  
Kanpur, India

For *Trichoderma* species found more favourable temperature between 25-30 °C where average growth recorded between (53-90mm diameter) (Singh and Kumar, 2009).

### MATERIALS AND METHODS

This part of experiment was conducted in the Laboratory, Department of Botany, D.G.P.G College, Kanpur, to evaluate the showing of different pH, Temp and media for growth of *Trichoderma asperellum*.

**Evaluation of the growth performance of *Trichoderma* species at different Solid media:** The present study carried out to evaluation of the growth performance of *Trichoderma asperellum* at five different Solid media including Potato dextrose agar, sorghum meal agar, cazpeak dox agar, Corn meal agar and starch agar. The prepared five different media were sterilized in an autoclave 1.5 kg/cm<sup>2</sup> for 30 min. All sterilized media were poured in sterilized Petri plates. The 5mm disc from 7 to 10 days old culture of *Trichoderma asperellum* was cut with the help of sterilized cork borer and placed in the center of each petri plates. The plates incubated at 25°C±2°C. After incubation the radial growth is observed in left and right direction and average of the readings was measured every 24 hours.

**Evaluation of the Growth Performance of Trichoderma Species at Different Temperature:** The evaluation of temperature on the mycelial growth of *Trichoderma asperellum* were studied in vitro on potato dextrose agar medium in 90 mm Petri plates for temperature. The 7 days old culture of *Trichoderma asperellum* were inoculated by 5mm disc at the centre of the Petri plates with the help of sterile cork borer and three replications were taken for each plate. The culture was incubated at 5, 15, 25, 35, 45 °C in BOD incubator and the mycelial growth is observed in left and right direction and average of the readings was recorded every 24 hours up to 7 days.

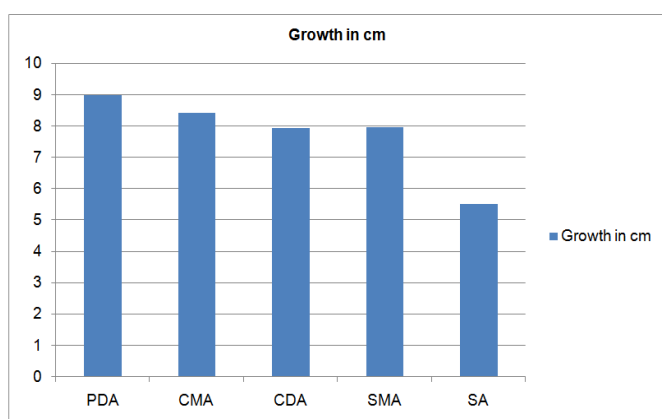
**Evaluation of the Growth Performance of Trichoderma Species at Different pH:** Potato dextrose broth was set various standard. The pH of potato dextrose broth was set as 4, 5, 6, 7, 8 and 9 by using pH meter and adjusted by adding proper acid (N/10 HCL) or base (NaOH). The 5mm disc from 7 to 10 days old culture of *Trichoderma asperellum* was cut with the help of sterilized cork borer and placed in the each flask. The inoculated flasks were kept in BOD a incubated at 25°C±2°C. After 12 to 15 days of incubation mycelial mat was gathered from the flask and collecting culture filtrate through sterilized whatman filter paper. The gathered mycelium was kept in hot air oven at 35°C for 48 hours and mycelial weight was recorded in gram.

## RESULTS AND DISCUSSION

Evaluation of the growth performance of *Trichoderma asperellum* at five different Solid media including potato dextrose agar, sorghum meal agar, cazpeak dox agar, corn meal agar and starch agar. The present study all tested media potato dextrose agar showed best mycelial growth in all isolates as 9.0cm. Starch agar showed minimum growth in all isolates. This investigation clearly showed that in study of *Trichoderma asperellum* potato dextrose agar media is best media for growth.

**Table 1. Average Colony Diameter (cm) and Fungal Growth (Category) in Different Culture Media**

Culture Media	Average Colony Diameter (cm)	Fungal Growth (Category)
Potato Dextrose Agar	9.0	Excellent
Corn Meal Agar	8.44	Good
Cazpeak Dox Agar	7.96	Good
Sorghum Meal Agar	7.98	Good
Starch Agar	5.53	Poor
S. E. Difference	0.592	

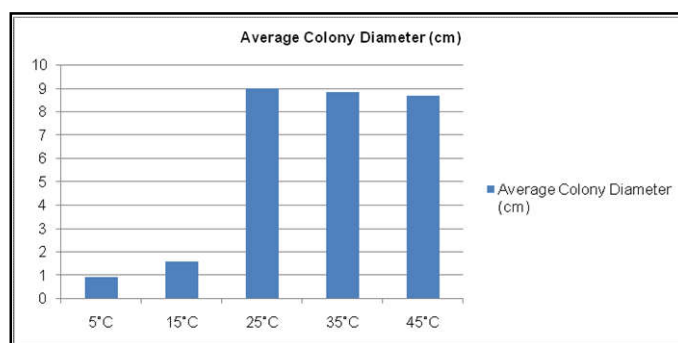


**Graphical representation of Average radial growth rate of Trichoderma asperellum on different culture media**

The growth of the *Trichoderma asperellum* was tested on five different solid media in which Potato dextrose agar in solid media supported excellent radial growth. These results were conformed to the findings of Srivastava *et al.*, 2014. Present Study was undertaken to find out the optimum as well as the best temperature for the growth of *Trichoderma asperellum* by growing the bioagent at different temperatures on potato dextrose agar medium. After 7 days of incubation the average mycelial growth was recorded. From the data presented in Table 2, it can be concluded that the growth of the fungi was better at temperature range of 25°C, 35°C and 45°C. Maximum average dry weight was observed at 25-35°C.

**Table 2. Showing Temperature Effect on Fungal Growth in Diameter and Category**

Temperature	Average Colony Diameter (cm)	Fungal Growth (Category)
5°C	.92	Poor
15°C	1.59	Poor
25°C	9.0	excellent
35°C	8.85	excellent
45°C	8.4	good
S. E. Difference	1.86	



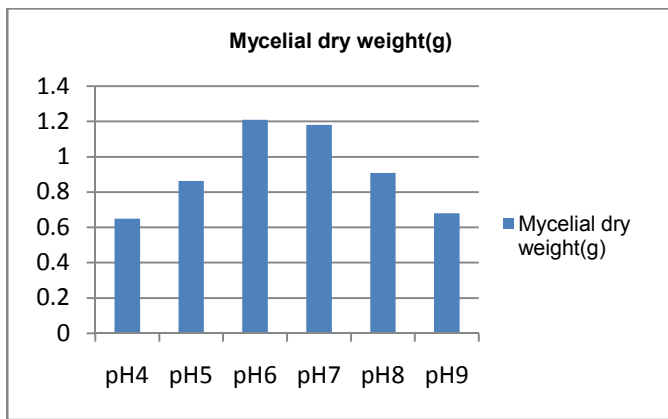
**Graphical representation of Average radial growth rate of Trichoderma asperellum on different Temperatures**

In assessing the optimum as well as suitable temperature for the growth of *Trichoderma asperellum*. *Trichoderma* produced sufficient biomass at different temperatures viz. 5, 15, 25, 35 and 45°C but they were found to be best grown at a temperature range of 25°C to 35°C. Srivastava *et al.*, (2014) reported that the most favourable temperature for growth and sporulation of *Trichoderma asperellum* was between 25- 30° C. For assessing the optimum pH for the growth of *Trichoderma asperellum*, a set of different pH values like as 4, 5, 6, 7, 8, 9 were maintained on potato dextrose broth. pH were adjusted by adding appropriate amount of citrate phosphate buffer. After 7 days of incubation the average mycelial growth was recorded and presented in Table 3.

**Table 3. Showing Mycelial dry weight of Trichoderma asperellum at different pH**

pH Range	Mycelial dry weight(g)
pH4	0.65
pH5	0.86
pH6	1.21
pH7	1.18
pH8	0.91
pH9	0.68
S. E. Difference	0.97

pH also plays an important role for growth. The most favourable pH ranges between. 6 and 7 in which total dry weight of mycelium varies between 1.27 and 1.38g.



Graphical representation of Mycelial dry weight of *Trichoderma asperellum* at different pH

### Conclusion

*Trichoderma asperellum* were evaluated on five different solid media for assessing growth. The maximum radial growth was found in Potato Dextrose agar and the lowest starch agar. Effect of different temperature and pH was observed on *Trichoderma asperellum*. The excellent growth of *Trichoderma* was found at temperature range of 25-35°C, while 6-7 pH was found the most favourable for the growth of *Trichoderma asperellum*.

### Acknowledgements

The author is thankful to RGNF Fellowship, University Grant Commission, Government of India for financial support to carry out research work.

### REFERENCES

- Amaresh, Y. S., Naik, M. K., Chennappa, G., Shruthi, P., Divya, N., Ravikiran and Meti, S. K. 2016. Characterization of *Trichoderma* isolates of different cropping ecosystem of Karnataka. IPS (New Delhi), 14<sup>th</sup> International Workshop on *Trichoderma* and *Gliocladium*, 27-30 Nov, 2016. , Nagpur. pp: 67.
- Ghisalberti, E.L. and Rowland, G.Y. 1993. Antifungal metabolites from *Trichoderma harzianum*, J. Nat. Prod. 56: 1799-1804.
- Harman, G.E., Latorre, B., Agosin, E., San Martin, R., Riegel, D.G., Nielsen, P.A., Tronsmo, A. and Pearson, R.C. 1996. Biological and integrated control of Botrytis bunch rot of grape using *Trichoderma* spp. Biological control 7: 259-266
- Manoj Kumar Maurya\*, Mukesh Srivastava, Anuradha Singh, Sonika Pandey and Ved Ratan Effect of Different Temperature and Culture Media on the Mycelia Growth of *Trichoderma viride* Isolates *Int.J.Curr.Microbiol.App.Sci* (2017) 6(2): 266-269.
- Maurya *et al.* 2017. examined the potential application value of *Trichoderma* isolates in culture media on different pH and favourable growth was seen at pH 5.5 and 7.5.
- Singh, A., Pandey, S., Srivastava, M., Shahid, M., Kumar, V., Trivadi, S. And Ratan, V. 2015 a. Physiological and biochemical analysis of *Trichoderma* species isolated from different location U. P. *African J. Agric. Res.*, 10(53): 4837-4843.
- Singh, O.P. and Kumar, S. 2009. *Trichoderma* spp. Growth as influenced by Temperatures. *Ann. Pl. Prot. Sci.*, 17(1): 225-274.
- Srivastava, M.Singh, V., Shahid, M., Singh, A. and Kumar, V. 2014b. Determination of biochemical and physiological aspects of a biocontrol agent *Trichoderma harzianum* Th azad. *Internat. J. Adv. Res.*, 2(3): 841-849.

\*\*\*\*\*