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SHORT COMMUNICATION **OPEN ACCESS**

Effect of different Temperature and pH on the growth of *Trichoderma asperellum* isolates

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ABSTRACT
The main objective of this study was to conduct an experiment to determine physical conditions which are suitable for the growth of Trichoderma. Seven isolates of Trichoderma asperellum have been observed for the effect of temperature and pH variation. Maximum growth of Trichoderma was found at temperature 25^{0}C all the seven Trichoderma isolates were evaluated on different pH and are correlated with the maximum mycelial weight. It was observed that in pH range 3.5 – 9.5 maximum mycelial growth was observed at pH 6.5.
Keywords: *Trichoderma asperellum, pH, Temperature, mycelial growth.*

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INTRODUCTION

Trichoderma species are filamentous soil borne Ascomycetes, well known as a bio-control agent against many economically important soil borne pathogens [1, 6, 7]. The use of these microbial inoculants as a bio-control agents are effective approach against the phytopathogens. In order to stop the adverse effects caused due to use of chemicals up to large extent [9-12]. The effectively of *Trichoderma* sp. has been greatly influenced by the physiological parameters such as temperature, pH, moisture and nutrients [12]. It has been revealed in previous studies by several authors [2, 3] that at different pH ranging from 2.0 to 7.0 *Trichoderma* sp. show optimum growth and sporulation. Singh and Kumar [13] reported that temperature is a vital factor which affects the growth of *Trichoderma*. Most suitable temperature for the growth of *Trichoderma* was in between 25^0 C to 30^0 C.

MATERIAL AND METHODS

Isolates of *Trichoderma* were isolated from soil sample which are collected from rhizospheres of Tomato field, from different places of Kanpur, Uttar Pradesh, India. All the isolates were isolated on Potato Dextrose Agar (PDA) medium by following serial dilution plate technique as described by Johnson and Curl [8] and isolates were identified up to species level based on phenotypic characters like colony colour and growth; size and shape of conidiophore, phialides and conidia. The cultures were identified using the available literature [11, 4, 5] and confirmed by morphological characters and also confirmed by ITCC, Division of Plant Pathology IARI, New Delhi.

Effect of temperature on the mycelial growth of *Trichoderma asperellum* was studied in vitro. Seven days old culture of *Trichoderma asperellum* isolates were inoculated in the form of 5mm disc at the centre of the petri plates with the help of sterile cork borer. These petri plates contained autoclaved PDA medium. The cultures were incubated at temperature range from 15^{0}C, 25^{0}C, 30^{0}C, 35^{0}C and 45^{0}C in BOD incubator and were observed daily for the mycelial growth of *Trichoderma asperellum* at every 24 hours up to Seven days. The temperature that promoted the highest mycelial growth was used for the subsequent steps of the investigation.

Seven isolates of *Trichoderma* were assessed for biomass production on *Trichoderma* Specific Medium (TSM) for the optimization study at pH level 3.5, 5.5, 6.5, 8.5 and 9.5. To find out the effect of pH on *Trichoderma*, Potato Dextrose Broth (PDB) was set at different pH levels with HCl or NaOH prior to sterilization of the medium. Then this PDB was sterilized at 121^0 C for 15 minutes in an autoclave. 5mm disc of *Trichoderma asperellum* were placed in this PDB flask and then this PDB flask was incubated in BOD at 25 ±1^0 C for ten days. The influence of initial medium pH on fungal growth was investigated at pH

3.5, 5.5, 6.5, 8.5 and 9.5. The pH that promoted the highest myelial growth was used for further steps of the investigation.

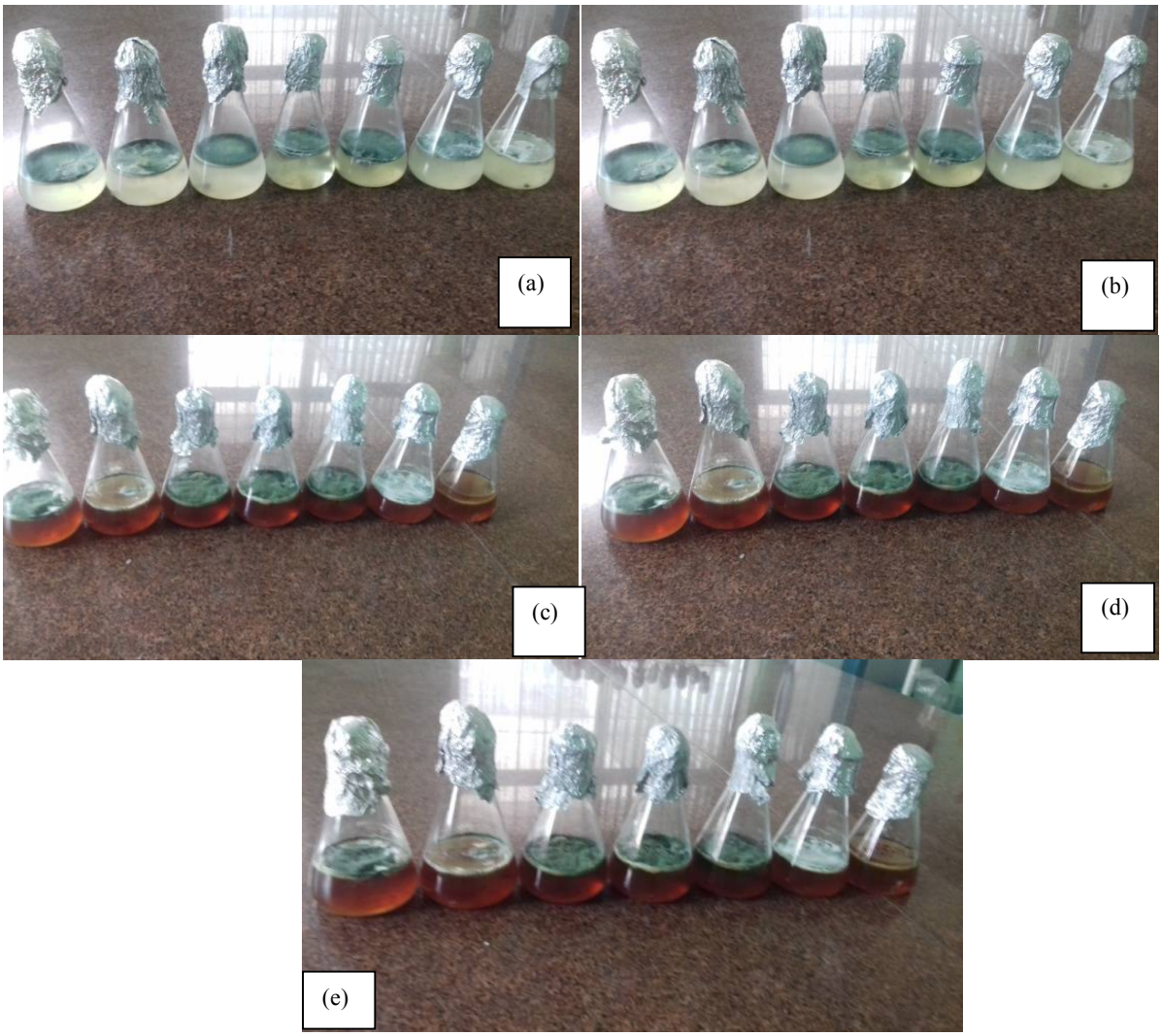

Figure 1: Different Trichoderma isolates at pH (a) 3.5 (b) 5.5 (c) 6.5 (d) 8.5 and (e) 9.5

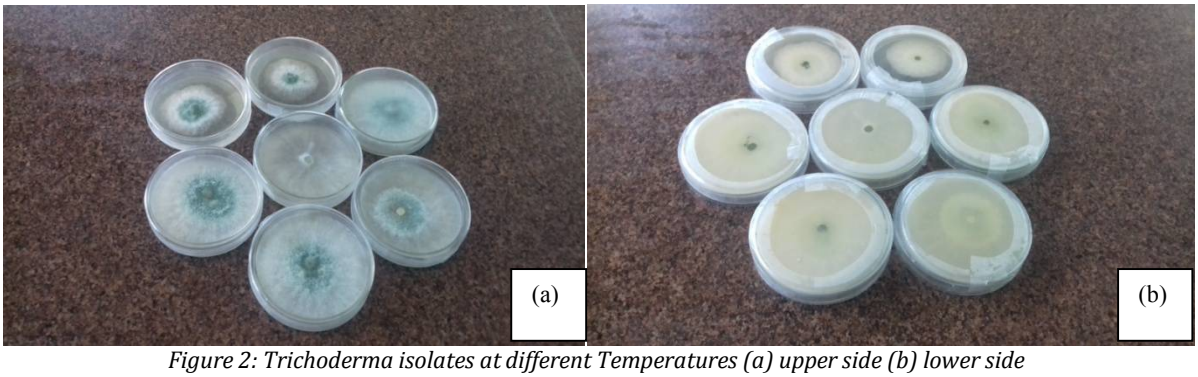

Figure 2: Trichoderma isolates at different Temperatures (a) upper side (b) lower side

Statistical analysis: The results obtained were analyzed statistically and the means were compared using one-way ANOVA to indicate any significant difference among parameters and the variables. The result was considered significant if $p<0.05$.

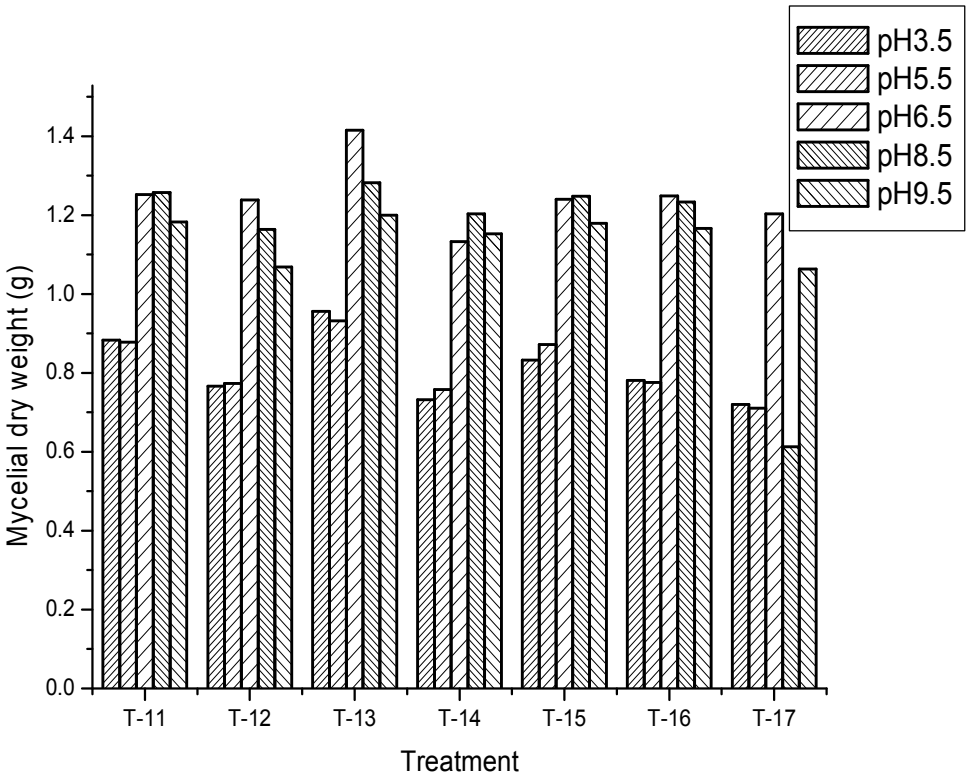

Figure 3: Dry mass of Trichoderma isolates on different pH

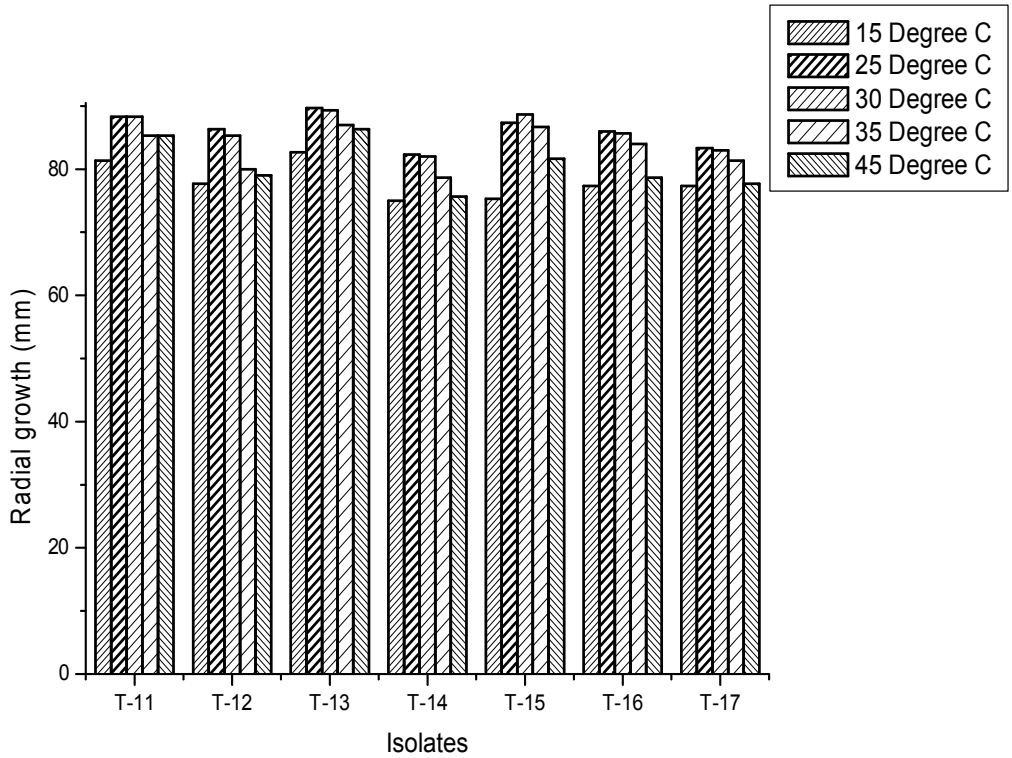

Figure 4: Radial growth of Trichoderma isolates on different Temperature

RESULT AND DISCUSSION

The mycelial growth was observed among all isolates of *Trichoderma asperellum* at all tested values of pH. Maximum number of isolates showed high bio mass production at pH 6.5. All the species of *Trichoderma* showed good mycelial growth at different temperatures, maximum mycelial growth was observed at 25^0C. It was also observed that the growth of *Trichoderma* continues progressing upto 30^0C, thereafter

the growth starts decreasing. Thus the growth of the bioagent is affected with either increasing or decreasing of temperature. The best growth was recorded at temperature range between 25^0C to 30^0C. All the isolates of *Trichoderma asperellum* showed sufficient mycelial growth at different temperature. Although Singh and Kumar [13] conducted an experiment on physiological aspects of *Trichoderma* sp. against different temperature, pH and liquid media. In this experiment they found the most favourable temperature for growth and sporulation of *Trichoderma harzianum* to be 30˚C followed by 25˚C and the most favorable pH range from 6.5 to 7.5.

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