

**Antagonistic Activity of *Trichoderma Harzianum* on Fungi of Onion  
(*Allium cepa* L.)**

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**Abstract**

The present study with Antagonistic activity of *Trichoderma harzianum* on fungi. Fungi were isolated from different varieties of onions by agar plate method. 6 species of fungi were selected to study their Antagonistic activity of *Trichoderma* on six fungi. Antagonistic activity of *Trichoderma harzianum* was checked against onion fungi by dual culture technique. *Trichoderma harzianum* restricted the growth of *Botrytis squamosa* followed by *Alternaria porri*, *Fusarium equiseti* and *Penicillium digitatum*.

**Keywords:** Antagonistic activity, *Trichoderma*, onion, fungi.

**Introduction**

Onion (*Allium cepa* L.) is the important commercial vegetable crops grown in worldwide. India is the second largest producer country of onion after the china and leader in production. In India occupies an area of 1.05 million hectare with the production of 16.81 million tones (D A and C H D. 2013). The major onion growing states in India is the Maharashtra, Bihar Orissa, Andhra Pradesh, Karnataka, Rajasthan Tamil Nadu, Haryana and Madhya Pradesh. Maharashtra is the pioneer state in onion production contributing 25% of country's onion (Gadge *et.al.* 2012). In Maharashtra the major onion producing districts are Pune, Ahmadnagar, Satara, Solapur, Dhulia and Nashik. Nashik district contributes 35 to 40 % of the onion production. Onions are cultivated in three different seasons' *Kharif* and *rabbi*. In Maharashtra, the production of onion likewise season late *Kharif* (35-40%) and *rabbi* (40-45%) *Kharif* (20%) respectively. (Data source: NHRDF, Nashik 2006) and (Pawar *et al.* 2016).

Chemical composition of onion is anti-inflammatory, anticancer anticholesterol and antioxidant properties such as quercetin (Slimestad *et al*, 2007)The fungicidal and insecticidal properties of onion are also well identified. (Mishra R. K 2014). The onion also losses due to the causes of same Virus, Bacterial, Mycoplasma Nematode and fungi is the major field bulb diseases of onions. These concept understanding, chosen the most important think is antagonistic activity of *Trichoderma harzanium* on fungi of onion.

## Materials and Methods

### Collection of samples

Collected sample were damage of the onion leaf, field bulbs and storage condition were collected from the different variety and different location. Collection of infected plant materials in the separate polythene bags and carries in to the laboratory conditions. Then the preliminary observation under the microscope.

### Isolation and Identification causal pathogen:

The infected onion leaves and bulb were collected from different places in polythene bags from fields and storage places from different areas of Maharashtra like Nasik, Pune and Aurangabad districts. These collected samples were cleaned and washed by sterilized water then surface sterilized with 2% Sodium hypochlorite solution for two minutes the rinsed several times in sterilized water and dried, the surface sterilized sample were placed on to Potato Dextrose Agar (PDA) medium and incubated at 27<sup>0</sup>C . After 4-5 days incubation period the developed fungal colonies were purified by hyphal tip and single spore isolation technique. Identification of the fungal isolates was carried out by using the morphological characteristic of mycelia and spore as described by (Ellis M.B 1971 and Kritzman G.1983).Then selected fungi was using to the antagonistic activity of *Trichoderma harzianum* against fungi of onion.

### Antagonistic activity of *Trichoderma harzianum* against fungi.

*Trichoderma harzianum* was grown on PDA. A mycelial disc (1.2 cm diameter) obtained from the peripheral region of 5-7-day-old cultures of *Alternaria porri*, *Aspergillus niger*, *Botrytis squamosa*, *Colletotrichum circinans*, *Fusarium oxysporum* and *Penicillium digitatum* was placed

on a fresh PDA plate (3 cm from the centre) and incubated at 28°C for 48 h to initiate growth. Then a 1cm diameter mycelial disc obtained from the periphery of a 5-7day old culture of *Trichoderma harzianum* placed 3 cm away from the inoculum of the pathogen, the plates were incubated at 28°C and measurements were taken after 7 days. In the control experiment a sterile agar disc (1.2 cm diameter) was placed in the dish. At the end of the incubation period, radial growth was measured. Radial growth reduction was calculated in relation to growth of the control (Edington *et al.*, 1971) as follows:

$$\frac{C-T}{C} \times 100 = \% \text{ Inhibition of radial mycelial growth}$$

Where, C = radial growth measurement of the pathogen in control

T =radial growth of the pathogen in the presence of *Trichoderma*

## Experimental Results

### Evaluation of *Trichoderma harzianum* as an antagonistic against onion fungi

Antagonistic activity of *Trichoderma harzianum* was checked against onion fungi by dual culture technique and obtained results are summarized in table no.1

It is clear from the table that, *Trichoderma harzianum* restricted the growth of *Botrytis squamosa* followed by *Alternaria porri*, *Fusarium equiseti* and *Penicillium digitatum*.

**Table no.1 Evaluation of *Trichoderma harzianum* as an antagonistic agent against onion fungi**

Fungi	Control in (mm)	Inhibition zone(mm)	% Inhibition
<i>Alternaria porri</i>	40	16	60.00
<i>Aspergillus niger</i>	44	23	47.72
<i>Botrytis squamosa</i>	28	08	71.42
<i>Colletotrichum circinans</i>	34	20	41.17
<i>Fusarium oxysporum</i>	40	16	60.00
<i>Penicillium digitatum</i>	36	16	55.55

## Discussion

Antagonistic activity of *Trichoderma harzianum* was carried out against selected fungi. *Trichoderma harzianum* restricted the growth of *Botrytis squamosa* followed by

*Alternaria porri*, *Fusarium equiseti* and *Penicillium digitatum* and then followed by *Colletotrichum circinans* and *Aspergillus niger* similarly results are reported obtained by Bell *et al.*, (1982); Papavizas (1985); Elad (2000); El-Katatny *et al.*, (2001) and Howell (2002). Several workers have reported the effectiveness of *Trichoderma harzianum* in control of diseases caused by *Alternaria* (Sastrahidayat, 1995; Mathivanan *et al.*, 2000; Kumar *et al.*, 2005; Rao, 2006) and Pawar and Chavan (2016). Hussain, *et al.*, (2009) and Hussein *et al.*, (2014).

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