

# Efficacy of *Trichoderma* spp. against chickpea *Fusarium* wilt and Tomato *Fusarium* wilt in field with production

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## Abstract

The objective of this work was to evaluate the efficacy of *Trichoderma* spp. The present on production against chickpea and Tomato *Fusarium* wilt in field. The present experiment was performed from October 2016 to March 2017 in Rajaula, Agriculture Department, M.G.C.G.V, Chitrakoot (M.P.). Moreover, 11 treatments had been designed in a Column. Series of 11 treatments was carry 11 microplot (2x1.5 cm). During experiment, *Fusarium oxysporum* f.sp. *Ciceri* and *Fusarium oxysporum* f.sp. *Lycopersici* was mixed in soil. However, plants did treated with nine isolate of *Trichoderma* spp. The production of microplot, T<sub>1</sub>, T<sub>2</sub>, and T<sub>3</sub> was best for tomato production and only T<sub>4</sub> was better in chickpea production then tomato product. T<sub>6</sub> was represented very low efficacy in production with comparison to other treatment. Consistently, experiment was proved that different *Trichoderma* spp. have different efficacy and provide defence from wilt.

Keywords: *Trichoderma* spp., *Fusarium* wilt, Efficacy.

Biological control is advantageous over conventional pesticides (Mahmood et al. 2015; Howell et al. 1997). It provides a good alternative of agrochemical (Thiele-Bruhn et al. 2012), without harmful effects on the environment.

Soil dwelling filamentous *Trichoderma* species are robust (Carpenter et al. 2008), known as BCA (Khan et al. 2014). Therefore, its use as BCAs is limited due to their unpredictable underpin efficacy that is affected by biotic and abiotic factor in the soil.

Among the potential BCA in rhizosphere (Zachow et al. 2009), strains of the genus *Trichoderma* are reported as strong effective in controlling of fungal plant diseases (Saba et al. 2012; Gerhardson 2002). Instead, the parasitic behavior (Fiers et al. 2012) has retained as inherited character, known as (Saba et

al. 2012). Its species are effective biocontrol agent (Akila et al. 2011) against a broad range of diseases in many economically important crops.

A *Fusarium* wilt (Mahmood et al. 2015; Thatcher et al. 2012) is a disease in plant and nomenclature is a host specific. Moreover, chickpea are affected *Fusarium* wilt, known species as *Fusarium oxysporum* f.sp. *ciceri* (Mahmood et al. 2015). Therefore, it affect to Tomato plant, known as *Fusarium oxysporum* f.sp. *lycopersici* (Chakrabarti et al. 2011). Both plants are economically important crops in India. India is a major producer and import of chickpea. It is a filamentous fungi that contains many agronomically important plant pathogens (Ma et al. 2013), mycotoxin producers (Ma et al. 2013), and opportunistic human pathogens (Saba et al.

2012). Diseases appear in either early stage or during reproductive stage of crop.

My present investigation was determined to efficacy of isolate *Trichoderma* spp. (Thangavelu, Palaniswami, and Velazhahan 2004) based on product with against *Fusarium oxysporum* f.sp. *ciceri* and *Fusarium oxysporum* f.sp. *lycopersici* in field. This report will be underpin in determine to efficacy of *Trichoderma* spp. in future.

## Material and method

*Trichoderma* was isolated from healthy plant of chickpea and tomato, Chitrakoot(U.P.) and (M.P.).

*Fusarium oxysporum* f.sp.*ciceri* and *Fusarium oxysporum* f.sp. *lycopersici*, both were isolated from infected plants.

### 2.1 Experiment Design

The experiment was performed in Rajaula, Department of Agriculture, MGCGV, Chitrakoot(M.P.) during October 2016 to march 2017 . Moreover, design was split plot. Each Colum was carry 11 microplot (2x1.5cm).Both pathogen *Fusarium oxysporum* f.sp.*ciceri* and *Fusarium oxysporum* f.sp. *lycopersici* was inoculate in soil(El-Mohamedy 2009). However, plant seedling was treated with different *Trichoderma* spp. by root dip method(El-Mohamedy 2009). Both plant treated seedling was transfer in microplot according to design series.

### 2.2 Statistical Analysis

Further, graphical analysis did use to XLSTAT 2017. Each microplot was different in product value. The average value was represented as graph. Product of both plant (chickpea and Tomato) was represent to significant level at  $p < 0.05$ .

## Results and Discussion

According to result, figure.1 presented the data of efficacy of production between chickpea and tomato. T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> was high in production of tomato but T<sub>4</sub> was good for chickpea production. T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, were inoculate species as *T. longibranchiatum* and T<sub>4</sub> also. T<sub>10</sub> had been treated with *Fusarium oxysporum* f.sp. *ciceri* and *Fusarium oxysporum* f.sp. *lycopersici*. T<sub>10</sub> was lowest in production. T<sub>11</sub> was control without inoculate, better production than T<sub>10</sub>. Most least product was provided by T<sub>6</sub> (*T. longibranchiatum*) in comparison to other treatment product. T<sub>8</sub> was *T. harzianum*. As T<sub>8</sub> was good than T<sub>10</sub> and T<sub>11</sub>. T<sub>9</sub> was *T. viride*. T<sub>5</sub> and T<sub>7</sub> (*T. longibranchiatum*), in T<sub>8</sub> and T<sub>9</sub> was not much more difference found

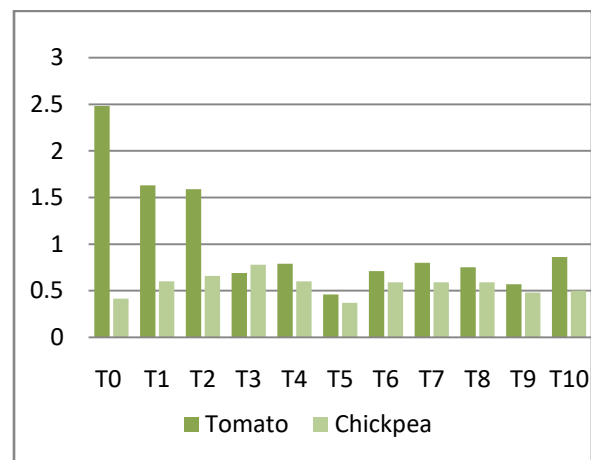


Figure: Production among strain of *Trichoderma*

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Column 1	11	11.33	1.03	0.37484		
Column 2	11	6.085	0.553182	0.013361		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.250456	1	1.250456	6.442304	0.019568	4.351244
Within Groups	3.882014	20	0.194101			
Total	5.132469	21				

Figure.2 Summary of stastical analysis

product. Constitutively, observe result did not affected only by different strain of *Trichoderma* sp. to productivity, had been also affected by edaphic factor. Edaphic factor have a crucial role for agriculture. This factor had been applicable here due to field was not equal. As different strain of *Trichoderma* and edaphic factor had been play significant role in crop productivity. According to stastical analysis, null hypothesis was rejected. It mean, level of significance was presence in experiment on efficacy.

## Conclusion

According to finding, two factors (*Trichoderma* sp. and edaphatic factor) did influence to productivity of chickpea and Tomato. Firstly, *Trichoderma* sp. had been provided health and defence to both plants against *Fusarium* wilt. Other was edaphatic factor which did affect to both plant (Tomato and Chickpea).

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