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Antagonistic Activity of *Pseudomonas fluorescens* against *Fusarium oxysporum f sp lycopersici* (FLO)

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Abstract: ***The study was conducted to know the Antagonistic effect of Pseudomonas fluorescens on Fusarium oxysporum f sp lycopersici. A 7 days old pathogenic fungus F. oxysporum f sp lycopersici was placed on PDA at periphery of the Petriplate and 100 µl of bacterial culture suspension was streaked in the centre of Petri plates and control plate also maintained. After 7 days of incubation the experimental results showed 89.04 % inhibition in the growth of F. oxysporum f sp lycopersici.***

Keywords: Antagonistic activity, Bio-control, Pseudomonas

1. Introduction

Pseudomonas fluorescens is a potential antagonist gram-negative bacterium it helps in controlling diseases by inhibiting growth of disease causing pathogens. *Pseudomonas fluorescens* improves soil quality with successive uses and effectively protects the plant from root rot, wilt, soft rot, and blight and damping off effects and It also controls rice blast and sheath blight of paddy.

Pseudomonas fluorescens were found very effective in disease management with ability of plant growth growth promotion (Tiwary and Thirmurthy, 2007). Pseudomonas are most widely used biocontrol agents since they are reported to have antifungal, antinematode, plant growth promoting and plant defence activities (Zaidi et al, 2004). *Pseudomonas fluorescens* suppress the pathogens by various modes of actions namely competition for nutrients and space, antibiosis by production of various antibiotics, siderophores and lytic enzems (Defago et al 1990).

The Present study was conducted to know the Bio-control activity (BCA) of *P. fluorescens* on *Fusarium oxysporum f sp lycopersici* in tomato by dual culture technique.

Morphological studies of *Pseudomonas fluorescens*
The *P. fluorescens* culture was brought from the University of Agricultural Sciences, Bangalore and sub cultured by streaking on petriplates containing King's Broth medium and incubated at 25° C for 2 days, after 2 days of incubation the growth of *P. fluorescens* were observed on Petriplates, The colonies were greenish yellow in colour smooth in edges and fluorescent under UV light. Further from isolated colonies *P. fluorescens* was sub cultured in slants containing KB and used for further studies.

Culture of *Fusarium oxysporum f sp Lycopersici*
F. oxysporum f sp lycopersici is a soil borne pathogenic fungus common in soil and that causes Fusarium wilt a deadly vascular wilting syndrome in plants. We have sampled the leaves and soils of a symptomatic *Solanum* (sect. *Lycopersicon*) plant and isolated *F. oxysporum f sp lycopersici.* Further it has sub cultured by inoculating a loopful of inoculum to petriplates containing PDA and maintained the culture for more studies. Later the colony morphology was studied and observed Chlamydospores formation through microscope (Plate 1).

Dual Culture Test
The antagonistic bacteria were tested to inhibit the growth of Pathogenic fungi *F. oxysporum f sp lycopersici* by using dual culture test. A pathogenic fungus *F. oxysporum f sp lycopersici* was placed on PDA at periphery of the Petriplate and 100 µl of bacterial culture suspension was streaked in the centre of Petri plates. Further incubated the plates at 37° C for about 5-7 days and observed the plates for the zone of inhibition. A clear zone around the well was formed and inhibition of fungus growth measured in cm (Plate 2).

2. Results and Discussion

The study was conducted to know the Antagonistic effect of *P. fluorescens* on *F. oxysporum f sp lycopersici*. Pathogenic fungi *FOL* is a soil borne pathogen common in soil and that cause Fusarium wilt a deadly disease in most of the plants. Microscopic observation of *FOL* fungus showed white to pink mycelia and Chlamydospores terminally in pairs and also in chains form (Plate 1).

A 7 days old culture of pathogenic fungi discs was cutted separately with the help of sterilized cork borer (5 mm), further the culture discs of pathogen transferred aseptically at edge of the Petri plate contains the PDA medium and 100 µl of bacterial culture suspension was streaked in the centre of Petri plates. Later the cultured plates were transferred to an incubator and incubated at 37° C for about 5-7 days. After incubation observation was taken from time to time for growth of the pathogen and antagonist in Petri plates and measured the colony growth (diameter) in both dual culture plate and control plate. In Addition, the percent inhibition of pathogen growth was calculated by using percent inhibition formula (R1-R2/R1*100) while the pathogen growth is full in the control plates. The experimental results showed 89.04% inhibition in the growth of pathogen in dual culture plates (Plate 2) & (Table 1).
R1= radial growth of pathogen towards opposite side in control plate
R2= radius of the radial growth of the pathogen towards the opponent antagonistic in test plate,
RI= 7.3cm

R2=0.8cm
Percent inhibition=R1-R2/R1*100=89.04%

$$\text{Per cent inhibition} = \frac{\text{Radial growth in Control (C) - Radial growth in the treatment (T)}}{\text{Radial growth in control (C)}}$$

Conclusions

Antagonistic effect of *P. fluorescence* on *F. oxysporum f sp lycopersici* (FLO) was showed 89.04 % inhibition in the growth in comparison with control.

Table 1: Evaluation of microbial bio-agent *P. fluorescens* on Pathogenic fungi *F. oxysporum f sp lycopersici* (FOL) by dual culture technique

Treatment	Radial growth of pathogen (cm)	Percent Inhibition over control (%)
P. fluorescens + *F. oxysporum f sp lycopersici* (FLO)	7.3	89.04

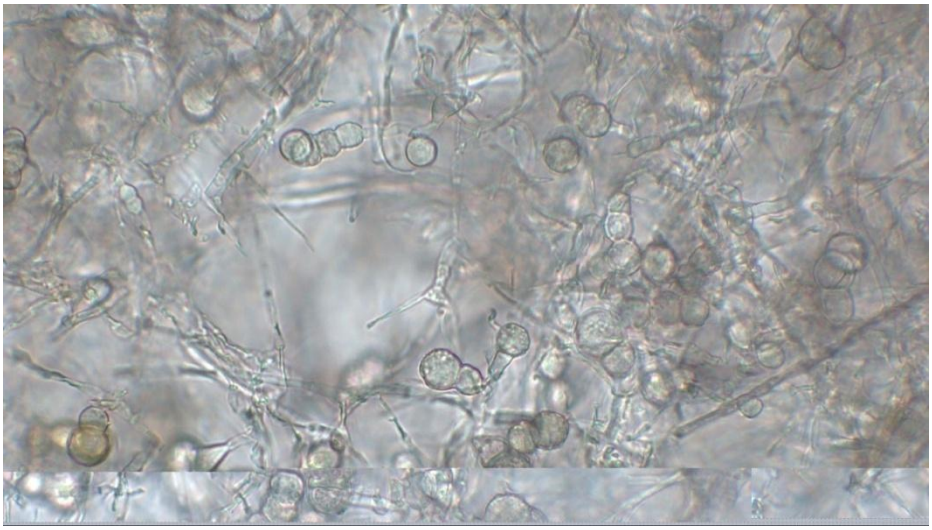

Plate 1: Microscopic picture showing chlamydospores formation (*F. oxysporum f sp lycopersici)*

Plate 2: Inhibition caused by *P. fluorescens* against *F. oxysporum f sp lycopersici* (left) on PDA medium and control (Right)

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