

Antagonistic Activity of *Enterobacter* sp. against *Fusarium oxysporum* f. sp. *melonis*

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Abstract

This research was carried out to investigate the antagonistic activity of *Enterobacter* sp. against *Fusarium oxysporum* f. sp. *melonis*. To investigate the antagonistic activity of *Enterobacter* sp. to *F. o. f. sp. melonis*, the dual culture method was conducted. Ten days after inoculation, inhibitory halos were observed in the dual culture dishes. The inhibition zone was 5.0 mm and the average percentage growth inhibition was 11.43%, suggesting that *Enterobacter* sp. can significantly inhibit the growth rate of fungal pathogen *F. o. f. sp. melonis*.

Keywords: antagonism, *Enterobacter* sp., *Fusarium oxysporum* f. sp. *melonis*, growth inhibition.

Introduction

Enterobacter species are gram-negative rod-shaped bacteria of the family *Enterobacteriaceae* [1]. *Enterobacter* species has antagonistic effects against *Phytophthora cactorum* [2], *Fusarium*

oxysporum f. sp. *piperis* [3], *F. solani*, *F. tricinctum*, *F. sporotrichioides*, *F. moniliforme*, *F. oxysporum*, *F. culmorum*, and *F. graminearum* [4] in dual cultures.

The purpose of this study is investigation of antagonistic activity of *Enterobacter* sp. against *F. o. f. sp. melonis*.

Materials and Methods

Enterobacter sp. was obtained from the Keshtkar gostar Nojan company, Iran. *Fusarium oxysporum* f. sp. *melonis* was isolated from melon plants of the Sistan region and its pathogenicity was confirmed. A bacterial isolate was grown in nutrient broth on a rotary shaker at 37 °C and 170 rpm for 24 h. The suspension was centrifuged in sterile 50-ml plastic tubes at 6000 rpm for 10 min. The pellets were re-suspended in sterile distilled water to obtain a final concentration of 1×10^8 cells per ml (OD = 0.5) at 600 nm. One 5-mm disk of pure *F. o. f. sp. melonis* culture was placed in the center of a Petri dish containing potato dextrose agar (PDA). Four drops of the bacterial suspension were placed around the fungal inoculums at a distance of 2 cm. In the control, sterile distilled water was used in place of the suspension [5]. Plates were incubated for 10 days at 25 °C. The antagonistic activity of *Enterobacter* sp. against *F. o. f. sp. melonis* was calculated by using the formula [6]:

$$\text{Percentage inhibition (\%)} = \frac{C-T}{C} \times 100$$

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

T = radial growth of pathogen in the presence of *Enterobacter* sp.

The results recorded as the mean of three replicates. Statistical analyses were

performed with anova using the SPSS software. When the effect was found to be significant, the LSD was performed for mean separation at $P \leq 0.05$.

Results and Discussion

To study the antagonistic property of *Enterobacter* sp. against *F. o. f.sp. melonis*, the dual culture method was conducted. Ten days after inoculation, inhibitory halos were observed in the dual culture dishes (Fig. 1). The inhibition zone was 5.0 mm and the average percentage growth inhibition was 11.43%, suggesting that *Enterobacter* sp. can significantly inhibit the growth rate of fungal

pathogen *F. o. f.sp. melonis*. Brewster et al. [2] reported that *E. aerogenes*, strain B8 inhibited mycelial growth of *Ph. cactorum* in vitro, which was similar to the results of this research. Edward et al. [3] reported that *Enterobacter* sp. showed in vitro antagonistic activity against *F. o. f.sp. piperis*. Lević et al. [4] reported that *E. cloacae* strains reduced growth of *Fusarium* cultures, which was similar to the results of this research.

The results showed that *Enterobacter* sp. could control the melon damping off disease caused by *F. o. f.sp. melonis* in vitro experiment. Therefore, *Enterobacter* sp. can be used in the management of the disease, but greenhouse and field researches are required.

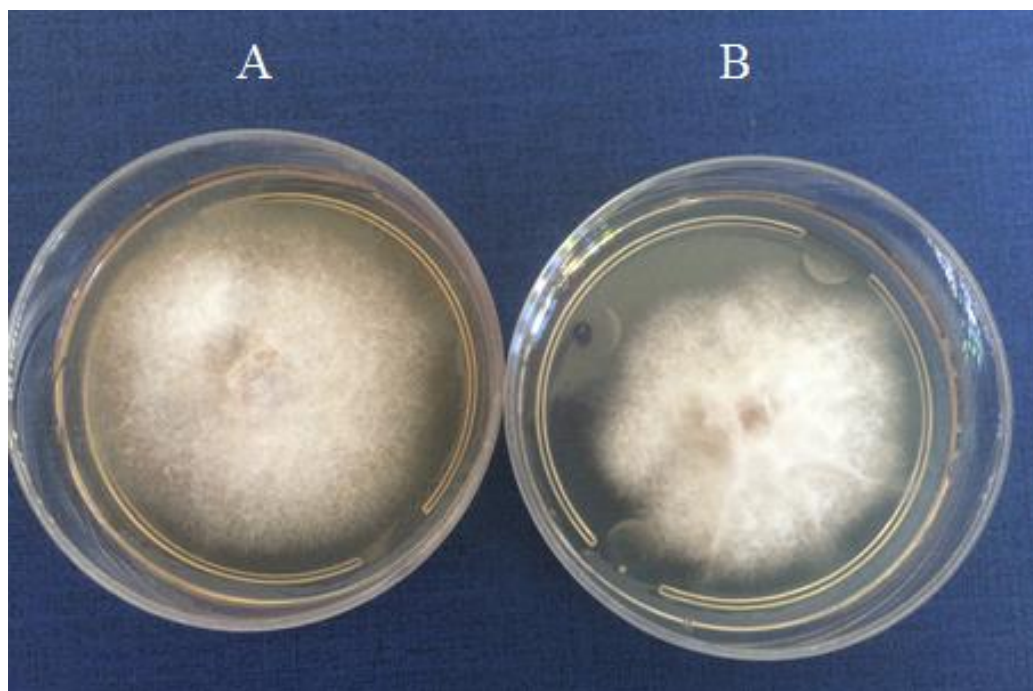


Figure (1) *Enterobacter* sp. (B) showing significant antagonistic activity in dual culture study against *Fusarium oxysporum* f. sp. *melonis* (F) on PDA. Untreated control (A).

Conclusions

Enterobacter sp. can significantly inhibit the growth rate of fungal pathogen *F. o. f. sp. melonis*.

References

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