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6 authors, including:

Mazen Salman
Palestine Technical University- Kadoorie

Basima Abu Rumaila
Palestine Technical University- Kadoorie

Muhammad Jawabrih
Palestine Technical University- Kadoorie

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Mazen Salman[1,2*], Nawaf Abu-Khalaf[1,2] , Basima Abu Rumaileh[2], Mohammad Jawabrih[2], Nabil Shahin[2] and Ruba Abuamsha[3]

[1]College of Agricultural Sciences and Technology, Palestine Technical University-Kadoorie (PTUK), Tulkarm, Palestine.
[2]Technical and Applied Research Center (TARC), Palestine Technical University-Kadoorie (PTUK), Tulkarm, Palestine.
[3]National Agriculture Research Centre (NARC), Ministry of Agriculture, Qabatya, Jenin, Palestine.

*salman_mazen@daad-alumni.de

Abstract:

Fusarium oxysporum f. sp. *niveum* (Fon) is one of the most destructive fungi on watermelon (*Citrullus lanatus*). Due to high infestation rates of the disease in Palestine, farmers are avoiding growing water melon in different regions. The use of fungicides is not always feasible due to economical and ecological reasons. Biological control using soil inhabitant microorganisms might be a realistic approach as an alternative to chemical fungicides. The aim of this work is to evaluate the efficacy of antagonistic bacteria as biocontrol agents against the pathogen.

Soil and plant samples were collected from naturally infected fields at NARC's experimental field station. Isolated fungal strains were identified using PCR specific primers Fn-1 (5'-TACCACTTGTTGCCTCGGC-3') and Fn-2 (5'-TTGAGGAACGCGAATTAAC-3') were used to amplify PCR products of 327 bp of the fungus. Koch's postulates were then applied to recover pathogenic strains of the fungus. The antagonistic activity of the bacteria against Fon was determined using the dual culture technique. The effect of each bacterial strain was determined by measuring the inhibition zone of mycelial growth. Pot experiments were also performed to investigate the effect of antagonistic bacterial strains. Watermelon seeds were soaked in bacterial solution (1×10^9 cfu/ml) and planted in soils infected with Fon.

PCR products proved that three fungal isolates were *F. oxysporum* f.sp. *nievum.* The bacterial isolates were identified as *Pseudomonas auroginosa* and *Pseudomonas fluorescenc*. Results of the work revealed that two bacterial isolates have potential antagonistic efficacy under in vitro conditions with strong inhibition zones. Seedlings grown in infected soil showed no disease symptoms after treatment with bacteria. In conclusion, the bacteria might be used as control agents against Fon. Further experiments are needed to evaluate the efficacy of the biocontrol under field conditions.