
Bacterial antagonists against tomato (*Solanum lycopersicum* L.) early blight causal agent *Alternaria alternata*

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Seven selected bacterial antagonists isolated from healthy tomato rhizosphere and phyllosphere were evaluated *in vitro* for their biocontrol efficacy against *Alternaria alternata*, the causal agent of tomato early blight. *A. alternata* was isolated from a tomato leaf sample which showed early blight symptoms and verified by their spore morphology according to literature. Disease-free tomato rhizosphere soil and phyllosphere extracts were used as the potential sources of antagonists from which 30 bacterial isolates and 22 bacterial isolates could be isolated using the serial dilution technique in order. Out of those, 24 different isolates were subjected to screening procedure of antagonists against *A. alternata*. It was observed that, 20 bacterial isolates out of 24, inhibited the growth of *A. alternata* significantly ($p < 0.05$) in co-cultivation and dual culture plate assays showing an average radial growth inhibition of 69%. Seven different bacterial isolates coded as RA 8, RA 12, RA 17, RA 18, RA 29, PA 4 PA 12 were selected for further studies. Microscopic observation of *A. alternata* hyphae dual cultured with bacterial antagonists showed alterations in hyphal characteristics such as thickening, swelling and vacuolation. Inhibition of *A. alternata* spore germination by selected antagonists was significant ($p < 0.05$) in which the average percent inhibition was 64%. All the selected antagonists produced diffusible antifungal substances and showed hyperparasitism and competition as their potential mechanisms in antagonizing the fungal pathogen *A. alternata*. These results suggested that above mentioned seven bacterial isolates can be further studied as potential biocontrol agents in controlling early blight disease of tomato.

Keywords: Antagonism, *Alternaria alternata*, Bacteria, Early blight, Tomato

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