

Molecular identification and biological control of isolated soilborne Streptomyces in Eastern Azarbaijan province

Abstract

Plant pathogenic fungi in economically important agricultural crops are creating worldwide serious problems. In order to combat against plant diseases in agriculture, the chemical fungicides are currently used. Extensive use of chemical fungicides in agriculture are a threat to human health, environmental pollution, increased resistance to fungal pathogens and degradation of ecosystems and populations at different levels of the food chain. Biological activity has been developed as an alternative method instead of chemicals agent in plant disease control. These materials are not accumulating in food products and they are cheap and convenient for utilizing in industrial scale. It is proven that actinomycetes, especially species of Streptomyces are broad-spectrum biological control agents against plant pathogenic fungi. Streptomyces with production of various enzymes such as chitinase are able to hydrolyze chitin wall pathogenic fungi. Chitinase produced by Streptomyces belong to both glycosyl hydrolases families 18 and 19. Generally, the family 19 chitinase show antifungal activity in plants. In the present study, an attempt has been made to find antifungal potential of Streptomyces bacteria isolated from soils of Eastern Azerbaijan province, relying on the ability of the family 19 of enzyme chitinase. Primary isolation of bacteria was performed by morphological characteristics. Proliferations of protected sequence 16SrDNA showed 31 isolated bacterial. Out of 31, four isolated streptomyces showed positive result to the gene encoding enzyme chitinase, and among of them 3 isolated bacteria were selected for antagonistic cultures. Strains of AE9 were identified as effective streptomyces strains in controlling the growth of the fungus Alternaria. As a result, it seems that Eastern Azerbaijan province soils are subjected to species of Streptomyces bacteria that have the ability to biological control of plant pathogenic fungi and have the potential for the introducing and applying for the biological toxin.

Key words: Streptomyces, chitinase genes, biological control.



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