عنوان مقاله:

Ectoines Mitigate the Reduction of Antagonistic Activity of Bacteria against Phytophthora drechsleri Tucker in Saline Conditions

محل انتشار:

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خلاصه مقاله:

The objective of the present study was to evaluate antifungal activities of ۱۸ native Bacillus strains against Phytophthora drechsleri Tucker in saline and normal conditions. Besides, the effect of exogenously provided bacterial osmoprotectants (ectoines) on biocontrol activity of three selected Bacillus strains with the highest biocontrol activity and three antagonistic bacteria from two different genera (Pseudomonas fluorescens, Streptomyces rimosus and Streptomyces monomycini) was studied in normal and saline conditions. To reveal the effects of ectoines on the mode of action of antagonism, amylase, protease, lipase, cellulase, chitinase and Hydrogen Cyanide (HCN) activity, biofilm formation and intracellular ectoines of the selected strain (Bacillus amyloliquefaciens UTB۹۶) were investigated in normal and saline conditions. Phylogenetic tree based on the ۱۶S rRNA gene sequences divided Bacillus strains into two groups: one clade included strains that were tolerant up to ۵% and the second ۱۳% NaCl. Salt (۰.۳M NaCl) reduced the antagonistic activity of selected Bacillus strains (۱۰.۳۹-۳۸.۳۴%) and P. fluorescens (۲۵.۷۷%) compared to the control. Exogenously provided ectoines adjusted the biocontrol drop caused by NaCl in Bacillus and Pseudomonas strains and increased biocontrol activity of S. monomycini. Salinity (۰.۳M NaCl) reduced amylase activity of UTB۹۶ up to ۱۷% and ectoines prevented the reduction. Salt also decreased biofilm formation to about ۳-fold and ectoines significantly ameliorated the reduction. The HPLC assay indicated that UTB۹۶ accumulated ectoine and hydroxyectoine ۰.۱۶ and ۰.۱۰ µg/mg cell dry weight, respectively. Exogenously added ectoine and hydroxyectoine led to a significant increase in UTB۹۶ intracellular ectoines concentrations.

کلمات کلیدی:

Antifungal activity, Bacillus amyloliquefaciens UTB۹۶, Hydroxyectoine, biocontrol.