عنوان مقاله:

.The effect of silver nanoparticles on the growth of nitrogen fixing and ACC deaminase producing bacteria isolated from sunflower rhizosphere

محل انتشار:

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خلاصه مقاله:

Regarding the role of nitrogen fixing microorganisms in soil fertility and plant growth, the use of biological fertilizers is a potential process in agriculture. Regarding toxic effects of silver nanoparticles on soil beneficial bacteria, the purpose of this study was to isolate and identify free-living nitrogen fixing bacteria from sunflower rhizosphere and investigation of the toxic effect of silver nanoparticles on the growth of isolated bacteria. In order to isolate nitrogen fixing bacteria, soil samples were obtained from sunflower rhizosphere and cultured in nitrogen-free medium at ۳۰°C for ۴۸ hrs. Then the production of ۱-Aminocyclopropen-۱-carboxylate (ACC) deaminase by the isolates was assayed by photometric method after growing in minimum DF medium containing ACC and aluminum sulfate. Phylogenetic identification of the selected bacteria was done using the amplification and sequence analysis of ۱۶SrRNA gene. Finally minimum inhibitory concentration (MIC) of colloidal suspensions of silver nanoparticles on the isolated bacteria was evaluated. The isolated bacteria from the soil samples of sunflower rhizosphere were included two species of nitrogen fixing bacteria with the ability for ACC deaminase production. Phylogenetic analysis of ۱۶SrRNA gene resulted in identification of Azotobacter nigricans and an Azorhizophilus pasali. MIC of silver nanoparticles on both bacteria was evaluated as the concentration of ۶۲.۵ ppm. Silver nanoparticles with the concentration above ۶۲.۵ ppm had lethal effect on both studied nitrogen fixing strains. According to the importance of these bacteria in soil fertility and increasing utilization of silver ,nanoparticles in different industries

کلمات کلیدی:

Nitrogen fixation, Sunflower, silver nanoparticles, MIC, Rhizosphere