ABSTRACT

The symbiotic effectiveness of two *Bradyrhizobium* strains (USDA 3456 and USDA 3339), four local isolates (ARC 601, ARC 617, isolate 1 and isolate 2) was evaluated with six peanut cultivars (*Early bunch*, *Gregory*, *NC*, *Giza 5*, *Giza 6* and *Ismailia 1*) under greenhouse conditions to address the most efficient N_2 fixing Bradyrhizobia. The results showed that all tested rhizobia exhibited prolific nodulation patterns with peanut cultivars. The obtained results showed significant increases in plants shoot dry weight and shoot N-content with a range of 4.8- 62% and 5.9- 123%, respectively compared to the un-inoculated control. Also, the results clarified that the *Bradyrhizobium* strain USDA 3456 was the highly efficient strain with all tested peanut cultivars. The antagonistic activity of five isolates of *Serratia marcescens* sp. (SER4, EG10, GT, BF9 and BEF91) and three isolates of *Pseudomonas* sp. (*P. putida*, *P. aeruginosa* and *P. fluorescens*) were tested *in-vitro*, by assaying their ability to inhibit the mycelial growth of *Aspergillus flavus* fungus. The results demonstrated that GT isolate of *S. marcescens* sp. and *P. putida* sp. exhibited the highest antagonistic effect. The conjugation process between the highly efficient N_2 fixing bradyrhizobia, USDA 3456 as a recipient and the most antagonistic rhizobacteria, *S. marcescens* (GT) and *P. putida* as donors was carried out. Two bradyrhizobial transconjugants, DiM 71 and DiM 73 were obtained. The symbiotic effectiveness and antagonistic activity of the DiM 71 and DiM 73 were evaluated. The obtained results showed that both transconjugants acquired the antagonistic traits as well as maintained their N_2 fixation effectiveness. The electrophoretic proteomic analysis showed a high level of similarity among all tested bradyrhizobia. The conjugation process was tracked on proteomic level. The SDS-PAGE analysis of the new transconjugants, DiM 71 and DiM 73 expressed different proteins of their related parents, individually. However, intensive level of similarity was found between the new transconjugants, DiM 71 and DiM 73 and their parent *Bradyrhizobium* strain, USDA 3456.