Title: Assessing the biotechnological potential of rhizosphere bacteria conserved in culture collections to improve crops yield.

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Abstract

Feeding 9.1 billion people in 2050 makes necessary to develop strategies that allows the sustainable intensification of crops. Using plant growth-promoting bacteria (PGPB) represents a friendly environmental alternative to improve both crop yield and soil quality. Since 1997, in Corpoica, we have been preserving isolates of rhizosphere bacteria in stab culture at the Bacterial Collection Bank. This study aimed at assessing the potential of a set of 60 isolates as potential PGPBs. The studied strains were obtained from *Glycine max, Phaseolus vulgaris, and Pisum sativum* roots. In order to identify the molecular identity of our isolates, *16S* rRNA genes were sequenced, then forward and reverse sequences trimmed and merged, chimeras detected using the Pintail software, sequences analyzed using BLASTn, and the phylogenetic trees constructed using the Maximum-Likelihood method. Bootstrap analyses, using 500 replicates, were performed to assess the support of the clusters. The ability of the isolates to solubilize phosphorous was evaluated by the quantification of soluble phosphorous using the molybdate-blue method, and indole acetic acid production by the Salkowski's reagent technique. Finally, a protectant solution with 10% of sacarose and 1% of jelly was used to lyophilize the isolates. We identified bacterial genera belonging to *Bradyrhizobium, Rhizobium, Mesorhizobium, Pseudomonas, Serratia, Microbacterium, Burkholderia, Beijerinckia,* and *Ochrobactrum. Rhizobium* and *Burkholderia* showed the highest values of solubilized phosphorus, and *Pseudomonas* showed the highest production of indole compounds. We conclude, therefore, that the evaluated isolates exhibit potential as plant growth-promoting bacteria, and these isolates are potential candidates to further assess their PGP capabilities under greenhouse conditions.

Keywords: Culture collections, Plant growth-promoting bacteria, sustainable agriculture.

Funding source: Ministerio de Agricultura y Desarrollo Rural. Colombia.