

Isolation and identification of phytobeneficial properties of rhizobacteria isolated from banana rhizosphere

Ileperuma J.C., Abeysinghe S.* and Sripal D.D.N.

Department of Botany, University of Ruhuna, Matara, Sri Lanka

Identification of phytobeneficial properties of rhizobacteria is an important strategy to screen plant growth promoting rhizobacteria (PGPR) that can be utilized to increase crop yield and thereby fulfill the increasing demand for global food production. In this study rhizobacteria were isolated from the rhizosphere of Silk banana (*Musa acuminata* × *Musa balbisiana*) growing in Matara and Galle area and assessed their potential of phytobeneficial properties. Out of the 32 rhizobacterial isolates, 17 isolates including 4 endorhizosphere bacteria were identified as plant growth promoting rhizobacteria based on their phytobeneficial properties. Among them, 13 isolates possessed indole-3-acetic acid production ability and 9 isolates possessed phosphate solubilizing ability. Among the top 5 isolates with highest potential to produce indole-3-acetic acid, 2 were shown biofilm formation ability. According to the preliminary investigation, 6 isolates showed the ability to fix atmospheric nitrogen. Following established biochemical tests, the characterized plant growth enhancing rhizobacteria were identified as the members of genera *Staphylococcus*, *Streptomyces*, *Bacillus*, *Pseudomonas* and *Azotobacter*. Isolates belong to genera *Staphylococcus* and *Streptomyces* had high potentials in plant growth promoting properties than the other isolates. Inoculation of seeds of selected legume species with these selected plant growth promoting isolates resulted in significant enhancement in seed germination (60% increment) and significant enhancement in root and hypocotyl length (3.74 fold increment) compared to control experiment. It is important to focus our consideration for the development of biofertilizers using these selected rhizobacterial strains as they have shown multiple growth promoting characteristics.

Keywords: Rhizobacteria, Rhizosphere, Indole acetic acid, Seed germination, Biofertilizer

* Corresponding Author: saman@bot.ruh.ac.lk