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Authors: Luisa F. Posada, J.C. Álvarez, Magally Romero-Tabarez, Luz de-Bashan, Valeska Villegas-Escobar

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Enhanced molecular visualization of root colonization and growth promotion by *Bacillus subtilis* EA-CB0575 in different growth systems

Luisa F. Posada[1,2], J. C. Álvarez[3], Magally Romero-Tabarez[2], Luz de-Bashan[4,5], Valeska Villegas-Escobar[3]

[1]Grupo de Investigación en Ciencias Biológicas y Bioprocesos (CIBIOP), Department of Process Engineering, Universidad EAFIT, Cra. 49 # 7 Sur-50, Medellín, Antioquia, Colombia.

[2]Universidad Nacional de Colombia, Calle 59A # 63-20, Medellín, Antioquia, Colombia.

[3]Grupo de Investigación en Ciencias Biológicas y Bioprocesos (CIBIOP), Department of Biological Sciences, Universidad EAFIT, Cra. 49 # 7 Sur-50, Medellín, Antioquia, Colombia.

[4]The Bashan Institute of Science, 1730 Post Oak Ct, Auburn, AL 36830, USA

[5]Environmental Microbiology Group, Northwestern Center for Biological Research (CIBNOR), Av. IPN 195, 23096 La Paz, B.C.S, Mexico.

Abstract

Bacillus subtilis EA-CB0575 is a plant growth-promoting bacterium (PGPB) associated with banana and tomato crops. Root colonization is an important trait for PGPB microorganisms and potentiates the bacterial effect related to the mechanisms of plant growth promotion. Therefore, detection of bacterial colonization of roots in different culture systems is important in the study of plant–microorganism interactions. In this study, fluorescent *in situ* hybridization (FISH) and catalyzed reporter deposition–FISH (CARD–FISH) were evaluated to determine the colonization ability of *B. subtilis* EA-CB0575 on banana and tomato roots planted on solid and liquid Murashige and Skoog medium ($MS_{(S)}$ and $MS_{(L)}$, respectively) and in soil for tomato plants. Results showed *B. subtilis* colonization 0–30 days post inoculation for banana and tomato plants in different culture systems with differential distribution of bacterial cells along tomato and banana roots. FISH and CARD–FISH methodologies were both successful in detecting *B. subtilis* colonies, but CARD–