



### **Maize roots endophytic bacteria and their potential as plant growth promoting and biological control agents**

João A. C. Vieira<sup>1</sup>, Natalia L. S. Alves<sup>1</sup>, Christiane A. O. Paiva<sup>2</sup>, Vera Lúcia Santos\*<sup>1</sup>

*<sup>1</sup>Laboratory of Applied Microbiology, Microbiology Department, Institute of Biological Science, Federal University of Minas Gerais, Brazil, <sup>2</sup>Embrapa Milho e Sorgo Empresa Brasileira de Pesquisa Agropecuária (Embrapa), Brazil*

Studies have shown that many endophytic microorganisms, which live asymptotically within plants causing no signs of harm to the host, may work as plant-growth promoters and/or biocontrol agents which has made them valuable for agriculture for improving crop performance. In this work, endophytic bacteria were isolated from roots of Pioneer 30F35 Herculex hybrid corn crops, cultivated with and without phosphorus fertilization. After identification by partial sequencing of the 16S rDNA gene, a total of 80 bacteria was evaluated regarding solubilization of inorganic phosphate (CaPO<sub>4</sub>), antagonizing bacterial (*Bacillus subtilis* and *Pantoea ananatis*) and phytopathogenic fungal (*Fusarium verticillioides* and *Coletotrichum graminicola*) growth, mineralization of phytate and production of IAA (indole-3-acetic acid). There was an equal distribution of the isolates from Actinobacteria, Firmicutes and Proteobacteria clades, and only one isolate (*Flavobacterium acidificum* RT3B- 41) of Bacteroidetes phylum was found. The strains were grouped into 26 genera, which the most frequent were *Bacillus*, *Leuconostoc*, *Pseudomonas*, *Serratia* and *Enterobacter*. From the total, 32 isolates were able to solubilize inorganic phosphate (dosages between 10 and 527 mg/l) and 45 showed production of IAA (4.5 to 111 µg/ml). In the plate antagonism test, 10 isolates inhibited the growth of *B. subtilis*, 6 of the gram negative pathogen *P. ananatis*, 11 of the fungus *C. graminicola* and 4 of *F. verticillioides*. In plate qualitative tests, 52 isolates also had the ability to mineralize phytate. This work demonstrates the enormous potential application of these isolates, which must still be confirmed by *in vivo* and field tests.