Sociedad Argentina de Microbiología General

XIX CONGRESO DE LA SOCIEDAD ARGENTINA DE MICROBIOLOGÍA GENERAL

22 al 25 de octubre del 2024
Centro cultural y Pabellón Argentina de la Universidad Nacional de Córdoba, Córdoba, ARGENTINA.

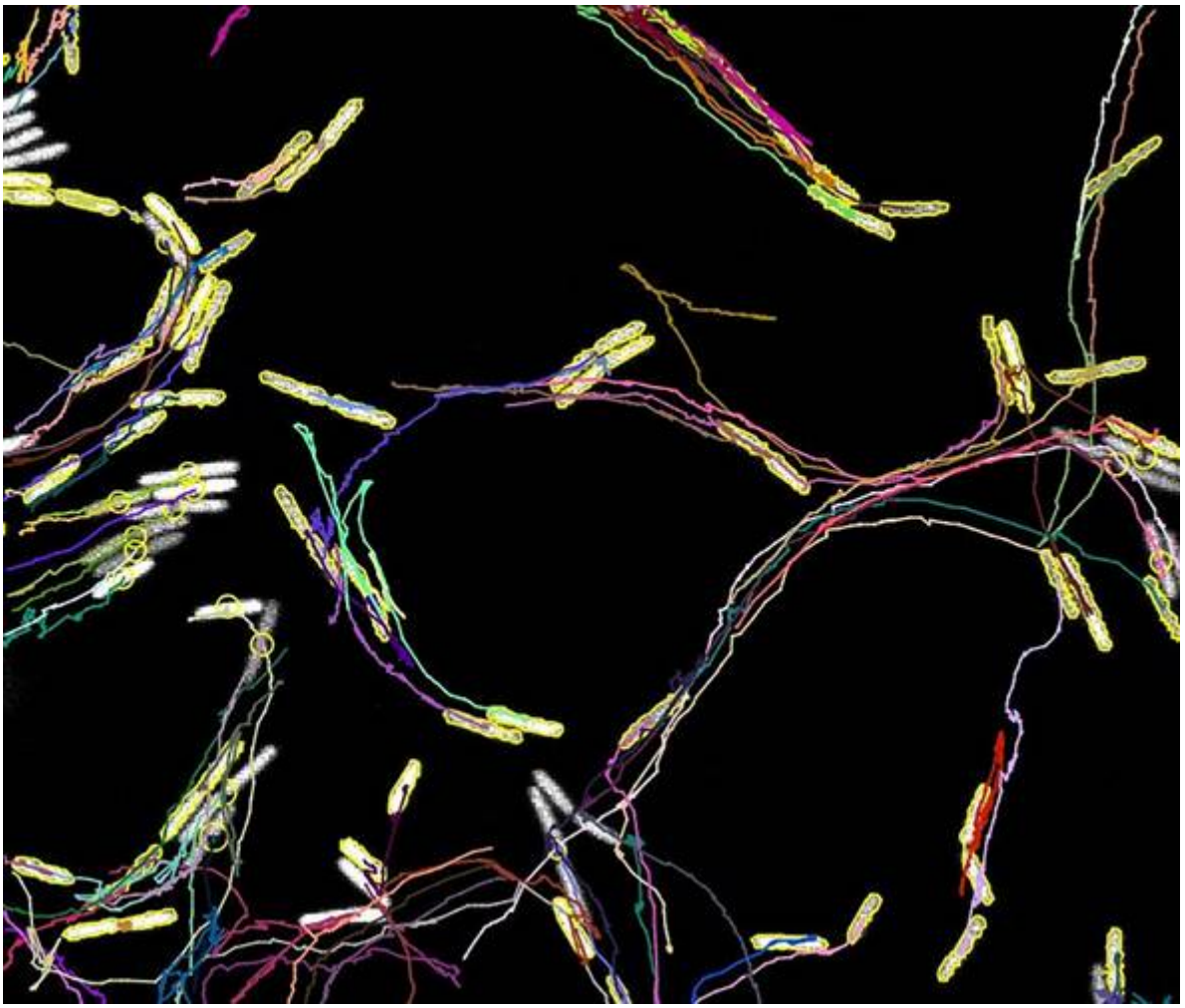

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

PHOSPHORUS DEFICIENT ENVIRONMENT MODIFIES ROOT EXUDATES COMPOSITION AND PROMOTES THE INTERACTION WITH PHOSPHATE SOLUBILIZING BACTERIA

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Phosphorus (P) is one of the most limiting nutrients for crop production in more than 40% of agricultural soils worldwide. In particular, in the agricultural area of Córdoba province, where peanut and maize crops are important, soil P deficiency has been reported. This nutrient is a key element in plant growth and the improvement of its supply through methods that reduce the demand of chemical fertilizers is critical. Thus, phosphate-solubilizing bacteria (PSB) are fundamental tools for the sustainability of modern agriculture. PSB can solubilize insoluble P-compounds into available sources which would then be easily absorbed and utilized by plants. The interaction between plant-PSB begins in the rhizosphere in which the plant recruits these bacteria through the release of specific molecules and compounds called root exudates (RE). PSB recruitment occurs because bacteria develop a chemotactic response to molecules present in the RE. These molecules include carbohydrates, amino acids, organic acids, flavonoids, etc. Next step is bacterial colonization of plant tissues and following this attachment, bacterial colonies can grow and develop a complex structure called bio?lm. Understanding rhizosphere colonization mechanisms by PSB is essential to develop inoculants able to compete in the rhizosphere, and therefore, to have a great impact on crop production under P-deficient environments. The aim of this work was to analyze the composition of RE of peanut and maize plants growing under P-deficient conditions and the impact of RE compounds on chemotaxis and biofilm formation of PSB *Serratia sp*. S119. For this, RE were collected from peanut and maize plants grown in P-deficient or in P-available conditions. Organic acids and flavonoids composition of the RE was determined by HPLC at the Institute of Physical Chemistry Research of Córdoba (UNC) and the National University of San Luis, respectively. Chemotaxis and biofilm of S119 were analyzed by the capillary assay described by Rudrappa et al. (2008) and Bais et al. (2004), respectively. Results showed that all RE analyzed contained citric, malic, succinic, lactic, and gluconic acid. Quantification of these acids indicated that in peanut and maize ER, succinic acid was found in greater proportion, being even more abundant in the sample from plants grown under P deficiency. Qualitative detection analysis of flavonoids indicated that only peanut RE presented luteolin and apigenin. Positive chemotaxis of S119 strain was observed when grown in the presence of citric, succinic, and malic acids. In addition, all the organic acids evaluated, regardless of the concentration tested increased S119 strain´s biofilm index. In conclusion,

peanut and maize RE have different composition of organic acids and flavonoids and this composition differs depending on the availability of P. Besides, malic and citric organic acids attract *Serratia sp*. S119 and stimulate its rhizosphere establishment and colonization.

Palabras clave: organic acids – chemotaxis – biofilm – root exudates – P deficiency