# XVII Congreso Argentino de Microbiología General

## Sociedad Argentina de Microbiología General
SAMIGE


25 al 28 de octubre del 2022
HOTEL UTHGRA
Los Cocos
Córdoba
Argentina

designed to amplify the fragment in the genus *Pseudomonas*. The PCR-pqqE products were sent to Macrogen Inc. laboratories. The expected PCR products of amplification using the specific primers were observed in all soil samples analyzed, with exception of SRLC. On the other hand, by using the pair pqqEF-317/1019 the amplification of the expected fragment was observed in the samples SRRC, SRSS, SRR, SRG, SRSA and SRI. The *pqq*E sequences from the different samples showed a high identity with sequences of *pqq*E bacterial gene from genera *Pseudomonas* in those PCR fragments obtained with specific primers. The sequences of the fragments obtained with degenerated primers showed identity with sequences belonging to the genera *Pseudomonas*, *Serratia*, *Pantoea*, *Enterobacter*, *Klebsiella* and *Acinetobacter*. It is possible to conclude that *pqq*E gene was detected in rhizospheric and non-rhizospheric soil samples, rhizospheric soil with peanut plants inoculated with BSP and notinoculated. Therefore, the *pqq*E gene is a potential molecular marker for Gram-negative bacteria with a phosphate-solubilizing phenotype in soil samples.

**AS19-FERTIGATION WITH ENRICHED VINASSE: A STUDY OF THE IMPACT ON PRODUCTIVE SOIL IN THE SHORT TERM**

*Torres MA[1] , Lacosegliaz MJ[1] , Raimondo EE[1,2] , Angelicola MV[1] , Pajot HF[1,3] , Nieto Peñalver CG[1,4]*

*1) PROIMI, CONICET (Planta Piloto de Procesos Industriales Microbiológicos) – San Miguel de Tucumán – Tucumán – Argentina. 2) Instituto de Física, Facultad de Bioquímica, Química y Farmacia, Universidad Nacional de Tucumán – San Miguel de Tucumán – Tucumán – Argentina. 3) Instituto de Microbiología, Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Catamarca – Catamarca – Argentina. 4) Instituto de Microbiología, Facultad de Bioquímica, Química y Farmacia, Universidad Nacional de Tucumán – San Miguel de Tucumán – Tucumán – Argentina.*

Vinasse, a byproduct from the sugar-alcohol industry, is a brown effluent with an acid pH, high chemical and biological oxygen demand and a high content of mineral salts. 13 liters of polluting vinasse are generated from every liter of ethanol. Legislation allows the use of vinasse to irrigate sugarcane crops or non-productive soils. This activity, known as fertigation, can enrich the soil providing minerals, organic matter and important elements including nitrogen and phosphorus. However, uncontrolled fertigation has detrimental effects: salinization, acidification and alteration of the soil microbiota. According to the circular economy, it is important to consider new strategies to increase agricultural production, to diversify industrial production and to reduce the environmental impact. Considering this model, we propose the use vinasse as culture medium for the growth of microorganisms of agricultural relevance. The objective of this work was to determine the impact in short term in the soil of fertigation with spent vinasse used as a medium for culturing bioinoculants. 55% vinasse was used for the growth of *Trichoderma harzianum* MT2 (T-MT2) alone and in co-culture with *Pseudomonas capeferrum* WCS358 (P-WCS358) or *Rhizobium* sp. N21.2 (R-N21.2). Subsequently, the cultures were gauze-filtered and the residual vinasses were used to irrigate soil not previously fertigated. Irrigation was repeated twice in the amount and frequency recommended by EEAOC. After 21 days, the physical-chemical and microbiological characteristics of the treated soil were determined. The results showed pH and toxicity identical when irrigated with water, control vinasse and residual vinasse. Increases in conductivity and salinity were observed when irrigated with control and residual vinasse. Catalase activity and FDA hydrolysis showed no variations, while urease showed large differences between water and vinasse; treatment with residual vinasse showed intermediate values. Total heterotrophic counts with water showed the lowest values. In the case of vinasse and residual vinasse, slight increases were observed, though only significant with residual vinasse from the T-

MT2+R-N21.2 culture. Finally, the average metabolic diversity (BIOLOG EcoPlates) with control and residual vinasse from T-MT2+R-N21.2 presented the highest values. In opposite, the soil irrigated with water produced the lowest values. In general, the soils irrigated with residual vinasses enriched with microorganisms showed similar physico-chemical characteristics to the vinasse irrigation and better microbiological characteristics than the water irrigation. These results indicate that fertigation with vinasse utilized for the culture of agronomically important microorganisms does not damage the soil properties in short terms. At the same time, they give added value to a problematic effluent obtaining at the same time a new product that could be applied to the soil in an environmentally friendly way.

**AS20-IMPACT OF NaCl ON THE MACROMOLECULAR COMPOSITION OF UNSATURATED *Pseudomonas capeferrum* WCS358 BIOFILMS**

*Lacosegliaz MJ[1] - Torres MA[1] , de Cristóbal RE[2,3] , Nieto Peñalver CG[1,4]*

*1) PROIMI, CONICET (Planta Piloto de Procesos Industriales Microbiológicos) – San Miguel de Tucumán – Tucumán – Argentina. 2) Instituto Superior de Investigaciones Biológicas (INSIBIO, CONICET-UNT) – San Miguel de Tucumán – Tucumán – Argentina. 3) Instituto de Química Biológica "Dr. Bernabé Bloj", Facultad de Bioquímica, Química y Farmacia, Universidad Nacional de Tucumán – San Miguel de Tucumán – Tucumán – Argentina. 4. Instituto de Microbiología, Facultad de Bioquímica, Química y Farmacia, Universidad Nacional de Tucumán – San Miguel de Tucumán – Tucumán – Argentina.*

High NaCl concentrations in soils affect negatively the production, nutritional, and economic value of crops, as well as its biodiversity. In response to this problem, a large number of studies on plant growth-promoting rhizobacteria (PGPR) have been developed, as they may improve the uptake of water and nutrients and alleviate different types of stresses in plants. These bacteria colonize the rhizosphere forming biofilms that are exposed to constant fluctuations in water availability. For this reason, in this work, we utilize an unsaturated biofilm model as an approximation to the conditions to which rhizobacteria are exposed. *Pseudomonas (P.) capeferrum* WCS358 produces pyoverdine and induces a systemic response in plants. Its Quorum Sensing (QS) system regulates physiological processes relevant to the colonization of the host and survival. The aim of this work was to analyze the impact of salt stress on growth and the characteristics of the unsaturated biofilm of *P. capeferrum* WCS358, and the influence of QS regulation. For this, we employed polycarbonate membranes and an artificial root exudates culture medium supplemented with 0.2 M NaCl as saline stress. Membranes were inoculated with bacterial suspensions (0.1 $OD_{600}$) and incubated at 30 °C for 72 hours. Unsaturated biofilms were broken up by vigorously vortexing the membrane in 1 mL physiological solution. CFU mL-1 was determined after plating serial dilutions. Carbohydrates were quantified using the phenol–sulfuric method with glucose as a standard, extracellular proteins were quantified using the Bradford method. Acyl homoserine lactones (AHLs) production was determined after solvent extraction, separation by thin-layer chromatography, and subsequent detection with bioassays developed with *Agrobacterium (A.) tumefaciens* NT1 (pZLR4). Results showed that neither saline stress nor QS activity decreased biofilm growth of *P. capeferrum* WCS358. While the attenuation of the QS activity augmented 13% of the exopolysaccharides in the unsaturated biofilms, NaCl decreased by 28% of these values. Proteins in the matrix were not affected by QS. However, saline stress increased by 30% the protein concentration. RP-TLC developed with *A. tumefaciens NT1* (pZLR4) showed smaller and weaker spots of AHLs. We conclude that saline stress and the QS system modify the characteristics of the unsaturated biofilms of *P. capeferrum* WCS358. At the same time, NaCl modulates the QS activity of this microorganism. These results are relevant for a PGPR, considering the large surfaces of saline soils in our country.