**MS-006**

## SELECTION, CHARACTERIZATION AND EVALUATION OF PLANT GROWTH PROMOTING BACTERIA ISOLATED FROM ANDEAN VEGETATION IN SOYBEAN CROPS

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In a global scale, Argentina is the leading exporter of soybean oil and flour and the third largest producer of soybeans. Therefore, the cultivation of soybean is of great importance for the national economy. The production of soybean depends upon the soil as their main natural resource to ensure a good productive capacity. Therefore, the physical, chemical and biological properties of the soil need to be preserved. These properties are altered by the indiscriminate use of chemical fertilizers. Their negative environmental impact, and the continuous increase in their price as an agricultural resource, leads us to look for new alternatives that reduce the negative impact on the soil and, in turn, allow us to continue achieving optimum crop yields. This has led to a trend towards "clean production", aimed at reducing the use of chemical in fertilization and controlling phytopathogens. One of these cleaner alternatives is the one that involves biological means that do not harm the ecology, through the use of plant growth promoting bacteria. These bacteria can be free-living, and when they are associated with roots, near or inside the tissues, they increase the absorption of nutrients, fix atmospheric nitrogen, solubilize phosphates, produce growth regulators and siderophores, as well as reduce the attack of pathogenic microorganisms and insects. In this way, co-inoculation techniques in soybean with plant growth promoting rhizobacteria (PGPR) are of great interest since they would allow a reduction in the use of fertilizers, increase crop yields, decrease production costs and reduce environmental impact. The general objective of this work was to evaluate the growth promoting effect of previously isolated bacteria from the Andean vegetation rhizosphere, on soybean seeds grown in saline soil. For this purpose, the characterization and identification of 55 bacterial strains were carried out. This allowed selecting those with the higher potential for growth promotion, for later germination tests in the laboratory. The characterization consisted of the following biochemical tests: siderophores production, catalase activity, fixed nitrogen, protease production, solubilized phosphorus, and indoleacetic acid production. The results of these tests determined that from the 55 bacterial strains, 51 of them produce siderofores, 43 possess the catalase enzyme, 22 fixate nitrogen, 35 produce the protease enzyme, 41 solubilize phosphorus, and 48 produce indoleacetic acid. These results allowed the selection of 17 bacterial strains that were considered to have the potential of promoting plant growth, to be inoculated in soybean seeds and then, cultivated in soil. The differentstrains were identified by sequencing of 16sDNA genes. In addition, the following plant growth parameters were evaluated on the germinated plants: root length, stem diameter, fresh and dry weight, and nodule production. The most favorable results allow establishing those bacterial strains with better potential for plant growth promoting.

**MS-007**

## EFFECT OF DIFFERENT NUTRIENT SOURCES IN THE BIOREMEDIATION OF SOILS CHRONICALLY CONTAMINATED WITH HYDROCARBONS AT CARLINI STATION, ISLA 25 DE MAYO, SOUTH SHETLAND ISLANDS, ANTARCTICA

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The logistics involved in the operation of Antarctic stations and the development of scientific activities entail the risk of contamination by fuels. Previous studies have shown that biostimulation of soils chronically contaminated with Antarctic Gasoil (AGO) produces significant increases in the removal of hydrocarbons (HC). In this work, we report on the effect of amendment with N and P in different formulations: inorganic salts, NH4NO3 y Na2HPO4, with (IN) and without (ANA) oxygenation by mixing; Nitrofoska® granular fertilizer (NPK) and OSEII® commercial product (CP), on the efficiency of HC removal from soils with chronic contamination by gasoil, compared to a system without nutrient addition (CC). The soil was collected from an area affected by the dripping of a connection between two diesel fuel pipes. Treatments were done in triplicate, simulating biopiles containing 15 kg of soil, which were sampled over 50 days, analyzing the changes in the bacterial communities involved and the quality and quantity of the remaining HC. Total heterotrophic aerobic (THAB) and hydrocarbon degrading bacteria (THDB) counts were performed on CPS agar and Gasoil agar. The quantification of hydrocarbons was performed by infrared spectrophotometry (modified ASTM D066 method) and by GC-FID. The V3-V4 region (GC-341F and 518R primers) of the 16S rRNA gene was partially amplified in all soil samples to obtain a fingerprinting of the bacterial communities by DGGE (45% -60% denaturing urea/formamide gradient, gels run at 60V and 65 °C for 16h). Both the presence of numerous bacterial populations and changes in their relative proportions in the community throughout the trial as well as the decrease in HC concentration in CC systems indicate that, even without nutrient aggregation, the native microbiota can metabolize HC with just aerating the soil and at the expense of the few available nutrients. However, biostimulated systems resulted in markedly higher HC removal with respect to CC, with CP as the most efficient. Bacterial counts supported these results, showing a greater proportion of degrading populations in biostimulated systems. With respect to the communities involved, although it is expected that any intervention in the microenvironment of microorganisms will influence its structure, particularly the aggregate of inorganic salts (IN, ANA) and granular fertilizer (NPK) selected communities less diverse than in CC, while the addition of OSEII® (CP) product led to the development of more diverse communities. Although natural attenuation contributes to the removal of HC in Antarctica, the activity of microorganisms plays a key role in accelerating this process, which is important in Antarctica given the short periods in which the soils are thawed and accessible to carry out a treatment. The addition of nutrients to balance metabolism favors the biodegradation of HC and increases their removal in shorter times.