Código de Resumen: BB-001

Sección: Bioremediación y Biocontrol

Modalidad: Oral

MICROBIOLOGICAL DIVERSITY AND FUNCTIONALITY OF A CHRONICALLY HYDROCARBON CONTAMINATED SOIL POST CHEMISTRY OXIDATION

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In situ chemical oxidation (ISCO) is increasingly used for the remediation of soil containing organic contaminants such as polycyclic aromatic hydrocarbons (PAH). However, the impact on the soil microbial community has not been thoroughly elucidated. The aim of the study was to analyze the effect of the ammonium persulfate application followed by a bioremediation process on the matrix, microbial community and the PAH removal of the soil. Chronically contaminated soil (*S*) was collected from a petrochemical area (214 ppm PAH). Ammonium persulfate (PS) was sprayed as aqueous solution on contaminated soil by three additions (1% wt/wt) every two days and incubated at 30°C (*SOx*). *S* and *SOx*were further incubated at 25°C, 25% moisture content, mixed and monitored for 28 days. These microcosms were named *SB* and *SOxB* respectively. The PAH concentrations were determined by GC-FID. No PAH elimination was detected in *SB*. A significant elimination (35%) was observed in *SOx* while no additional decrease was detected *SOxB*. Alkaline extraction was performed to obtain an aqueous solution of natural organic matter of the soil. The Total Organic Carbon contents (TOC, TOC-5000 Shimadzu) and the Fluorescence Excitation Emission Matrixes (FEEM, Perkin-Elmer LS-50B) were determined for *S*and *SOx*. FEEM of *S*presents two zones of emission. The zone on lexc ~ 320 nm and lem ~ 440 nm could be assigned to the presence of PAH. These emissions were absent in *SOx* in line with the PAH elimination, and a significant increment on TOC values was also detected. A significant decrease in the microbial counts was observed in *SOx*. The subsequent bioremediation only increased the heterotrophic bacterial population which suggested that the available organic carbon allowed the growth of this population. To evaluate the microbial activity, four enzymes lipase, aril sulphatase, urease and protease were analyzed. All of them were slightly expressed in *S* microcosms and only lipase activity was significantly increased in *SOx*. Seed germination test using *Lactuca Sativa* on water extracts was performed to evaluate the soil toxicity. The toxicity detected in *S* was exacerbated in *SOx* and it was not reversed in *SOxB*. The dynamics of the bacterial community structure, analyzed by 16S rRNA PCR DGGE, evidenced a great change due to the oxidation. The clustering among the *S* and *SOxB* profile bands suggested the tendency of *SOxB* to recover the original structure. The pyrosequence analysis showed that members of actinobacteria, bacilli and acidimicrobiia classes were the predominant populations in *SOx.* Members of the actinobacteria became the dominant population in *SOxB*. This group was considered as k-strategist microorganisms and a major component in the later stages of successions in bioremediated soils. The initial PAH elimination provoked by PS was not followed by an additional elimination under bioremediation condition. However, a microbial succession of generalist populations was observed

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ASSESSMENT OF AFLATOXIN B1 IN INTERACTING MIXED CULTURES OF *Aspergillus* section *Flavi* AND NON-TOXIGENIC *Aspergillus*

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Aspergillus species are important contaminant of several oilseeds as peanut in pre, post harvest and stored stage. Furthermore, *A. flavus* is the main species isolated from peanuts in Argentina followed by *A. niger* aggregate strains. A previous study shown that aflatoxin B_1 (AFB_1) levels in peanut destined to human consumption in Argentina exceed the acceptable maximum levels, being *Aspergillus flavus* and *A. parasiticus* the main aflatoxigenic strains isolated from peanut ecosystem. The aim of this study was to determine inhibition of AFB_1 production on interactive mixed cultures in solid medium, between ten non-toxigenic *Aspergillus* section *Flavi* and *Nigri* strains, respect to their ability to prevent AFB_1 production by *A. flavus* and *A parasiticus* strains. *Aspergillus flavus* (AFS 56) and *A. parasiticus* (APS 55) as active producers of AFB_1, and ten non-toxigenic tested strains of *Aspergillus* spp.: *A. niger* aggregate (5 strains), *A. flavus* (2 strains), *A. oryzae* (3 strains) isolated from soil destined to peanut crop, used as biocompetitive agents in this study. Medium containing 150 g of sucrose, 20 g of yeast extract, 10 g of soytone was made. The water activities (a_W) of the basic media were adjusted to 0.980 and 0.930 with known amounts of glycerol. Plates were inoculated centrally by needle single point with *A. flavus* and *A. parasiticus* strains, as controls. Interactive