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Assessing the impact of sucrose foam amendments on soil bacteria communities

IRIA JANEIRO-TATO[1], MARINA RIESGO-MAZAIRA[1], ALEXANDER PROSENKOV[1], JOSÉ LUIS R GALLEGO[1], **MARIA ANTONIA LOPEZ-ANTON**[2] AND ANA ISABEL PELAEZ[1]

[1]University of Oviedo

[2]Carbon Science and Technology Institute (INCAR-CSIC), Francisco Pintado Fe 26, 33011, Asturias (España).

Presenting Author: marian@incar.csic.es

Soil remediation by chemical stabilization is a widely studied technique that aims to reduce the availability and mobility of contaminants. This type of decontamination processes falls within the framework of nature-based solutions (NBS) that aim to treat soil *in situ* while preserving natural ecosystems and their physicochemical and biological characteristics. However, it is often noted that the use of such amendments can have negative impact on native soil microbiota and their consequences for biogeochemical cycles are yet to be fully investigated [1].

In this work, soil prokaryotic communities in a metal(loid)-contaminated soil treated with carbon foams, a novel amendment based on sucrose and impregnated with FeOOH nanoparticles [2], were studied during a 21-day microcosm experiment. During the treatment, metal(loid) availability was monitored using TCLP assay, and soil prokaryotic communities were studied with Illumina 16S rRNA amplicon sequencing and subsequent alpha and beta diversity and taxonomy analysis.

The results showed that these amendments reduced the mobility of As, Cu, Zn and Pb during treatment, especially in the case of impregnated foams, while incurring only minor changes to the soil bacterial communities and their diversity. A slight decrease in bacterial community evenness was observed after treatment with FeOOH impregnated foams, without significant impact on alpha or beta diversity. These changes were mainly attributed to the increase of relative abundance of bacteria from the order Micrococcales, especially of the genus *Paenarthrobacter*.

This study emphasises further need to analyse specific interactions and possible cytotoxicity of new amendments for them to be effectively applied in contaminated soils at larger scale.

References

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