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INTERNATIONAL SYMPOSIUM

MICROBE-ASSISTED CROP PRODUCTION – OPPORTUNITIES, CHALLENGES & NEEDS

JULY 11 – 14, 2022

SCHLOSS SCHÖNBRUNN - ORANGERIE, APOTHEKERTRAKT
VIENNA, AUSTRIA

ABSTRACTBOOK 2022

ÖGMBT

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

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ORGANIZING COMMITTEE: Angela Sessitsch, Islam Abd El-Daim, Friederike Trognitz, Walter Glaser & Andrea Bauer

SCIENTIFIC COMMITTEE: Islam Abd El-Daim, Matthieu Barret, Gwyn Beattie, Gabriele Berg, Davide Bulgarelli, Victor Carrión Bravo, Marcel van der Heijden, Adriana Hemerly, Euan James, Vadim Kessler, Elisa Korenblum, Ena Šečić, Pankaj Trivedi, Friederike Trognitz, Marko Vincekovic, Maggie R. Wagner, Angela Sessitsch & Zhong Wei

PS1-S1-PP13 Effect of microbial and biochar application on sunflower growth and metal accumulation

Mariana Godinho[1], **Helena Moreira[1]**, Isabel Henriques[2], Paula Castro[1], Sofia Pereira[1]

[1] Universidade Católica Portuguesa, Portugal
[2] Universidade de Coimbra, Centre for Functional Ecology Science for People & the Planet – Departamento de Ciências da Vida, Faculdade de Ciências e Tecnologia, Calçada Martim de Freitas,3000-456 Coimbra, Portugal

Mining activities result in large amounts of metal-contaminated waste materials and tailings, which are often dispersed to the surrounding agricultural and residential areas. This causes negative impacts on several environmental compartments, resulting in the disruption of natural ecosystems. Therefore, the application of green technologies for pollution control and soil restoration in mining areas is of utmost importance. Phytotechnologies use plants and microorganisms, such as plant-growth promoting bacteria (PGPB) and arbuscular mycorrhizal fungi (AMF), to recover contaminated areas. Organic amendments (*e.g.,* biochar) can also be used to enhance phytotechnologies efficiency.

The main objective of this work was to evaluate the effect of biochar and microbial inoculants on sunflower biomass and metal accumulation. Sunflower seedlings were grown in a Cu-contaminated mining soil amended with increasing doses of biochar (0, 2.5, 5% (wt/wt)) and inoculated with: the bacterial strain *Pseudomonas reactans* EDP28 (B); the AMF *Rhizophagus irregularis* (F); and a mixture of both beneficial microorganisms (MIX).

Overall, microbial inoculation improved sunflower growth, particularly when a mixture of both inoculants was applied (MIX treatment). Biochar addition significantly decreased the biomass of sunflower plants, irrespectively of the dose applied, which is likely related to the higher accumulation of Cu in plant tissues (especially in roots). Therefore, the addition of biochar must be carefully analyzed, especially when dealing with plants whose biomass are intended to be used for energy purposes, since a reduced productivity due to a high accumulation of metals in plant tissues should be prevented.