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P-126 - VALORISATION OF MINING AREAS USING PHYTOTECHNOLOGIES – A FIELD EXPERIMENT

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Background

Mining operations are one of the major soil disruptors. The release of hazardous compounds, such heavy metals and metalloids (HM), pose serious risks to human health and contribute to the decline of soil's quality. The use of phytotechnologies (application of plants and microorganisms) in mine areas has the potential of reducing the amount or the toxicity of deleterious HM, promoting ecological restoration. Moreover, they can provide relevant economic revenues by using these brownfields to produce bioenergy crops.

The Borralha mine is a past producer of tungsten in Portugal, integrating soils with high HM concentrations (e.g. Cu and Cd) and can benefit from the application of phytotechnologies on its requalification. In this context, the main goals of the work are to evaluate the growth of a bioenergy crop (sunflower) assisted with arbuscular mycorrhizal fungi (AMF) in such soils, and assess its phytostabilization capacity.

Method

The field experiment was performed in Borralha mine (northern Portugal) and consisted on 9 m^2 plots sown with sunflower under 2 treatments (n=3): control and inoculated with *Rhizophagus irregular*is (AMF). Plants were harvested after 4 months and rhizosphere soil was collected to determine metal content. Plant biomass was determined after shoots and roots were oven dried. Plant tissues were then grinded for acid digestion. Metal content (Cu, Ni, Cd, Mn, Cr, Zn and As) and N and P levels in each plant section were assessed. Bioconcentration and translocation factors were calculated.

Results & Conclusions

Sunflower establishment was affected by AMF inoculation. The presence of AMF improved the phytostabilization capacity of sunflower contributing to the reduction of the spreading of HM. Overall results show that the production of sunflower in Borralha mine is an advantageous option to increase the value of this area to stakeholders, while mitigating the risk deriving from the soil contamination.

References & Acknowledgments

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