Soil microbiota benefits from phytoremediation coupled to metal-resistant rhizobacteria

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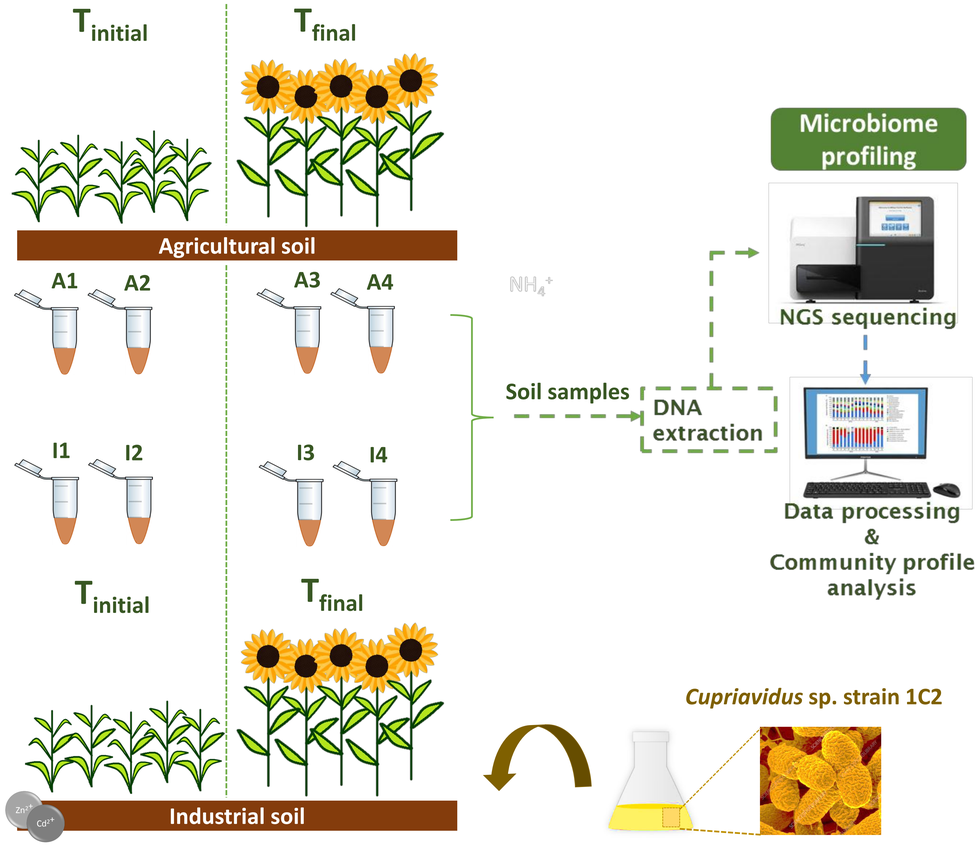
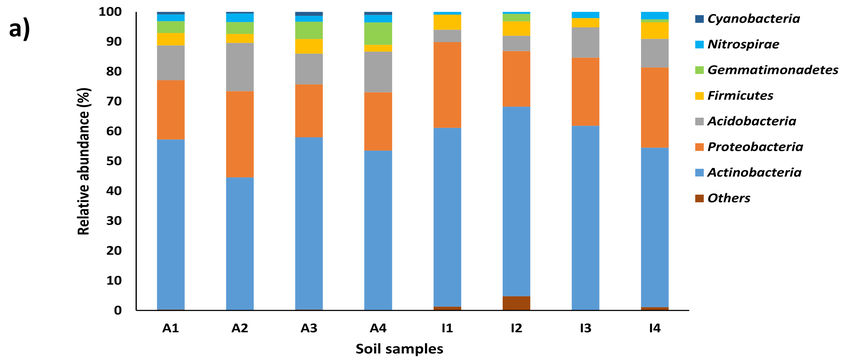
Introduction

Phytoremediation is used for requalifying soils contaminated with **heavy metals** (HM). Sunflower (*Helianthus annuus L.)* is one of the most studied species for the remediation of HM-contaminated soils. To increase the bioavailability of nutrients and of metals in soils, **metal-resistant plant growth promoting rhizobacteria (PGPR)** can be associated to phytoremediation strategies. **Soil microbiota** can benefit from this association due to the reduced exposure to HMs toxic effect. In this study, **next-generation sequencing (NGS**) was applied for investigating shifts in microbial communities of an industrial soil, inoculated with ***Cupriavidus* sp. strain** 1C2, before and after HMs remediation using sunflowers. A non-contaminated soil (agricultural) was used as control.
The main objective of this study was to investigate the relationship between soil microbiota and phytoremediation strategies achievements.

Methods



Results



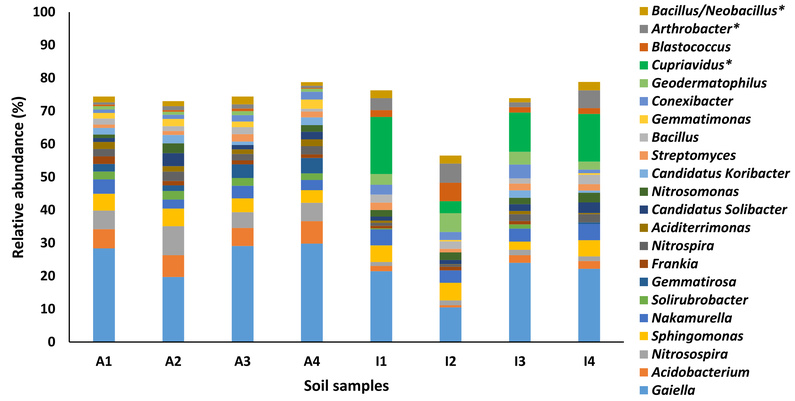


Figure 1 – Relative abundance of bacterial phyla (a) and top 10 bacterial genera (b) presenting the highest relative abundances in the soil samples at the beginning and end of plant growth; *Bacterial genera identified using BLAST from NCBI.

Conclusions

- *Actinobacteria* were dominant while *Proteobacteria* was the second most abundant phylum in both soils;
- *Acidobacteria* and *Nitrospirae* were present in higher relative abundance in the control soil;
- *Cupriavidus* sp. strain 1C2 remained in the contaminated soil until the end of plant growth;
- Phytoremediation associated to PGPR induced changes in the contaminated soil microbial community: *Acidobacterium* (*Acidobacteria* phylum) and *Nitrospira* (Nitrospirae phylum) bacterial genera increased their abundance at the end of plant growth, in the industrial soil, possibly resulting in the improvement of the microbial diversity in this contaminated soil.

Acknowledgements

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