STUDY OF ENDOPHYTIC AND SOIL FUNGI FROM TAILING MINES METALLOPYTES PLANTS: DIVERSITY AND POTENTIAL IN BIOREMEDIATION

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Introduction. Mine tailings deposits are waste as a result of the extraction process of mining, the result of this process is the contamination of soil by heavy metals such as Cu, Zn, Pb, Cd, Co, Ni, Cr, Mn and anionic components as the As.

Plants growing in this mixture of heavy metals and low organic matter can release CO2 and root exudates that may increase the activity of microorganisms between soil and root. Despite the toxicity of heavy metals and changes in the environment, the organisms living in these disturbed sites (plants and microorganisms) have evolved mechanisms that confer resistance to high concentrations of toxic metals. The fungi have an ability to mobilize and take up nutrients, plays a role in the aggregation of the particles in soils and they can take symbiotic associations with plants for helping on the growth and detoxification mechanisms in heavy metal pollution environmental. The objective work aims to understand the diversity of endophytes and rhizosphere from native plants growing on mine tailings, and the association of these fungi in the soil, to understand the possible participation in heavy metal resistance on plant-microorganism relationship

Methods

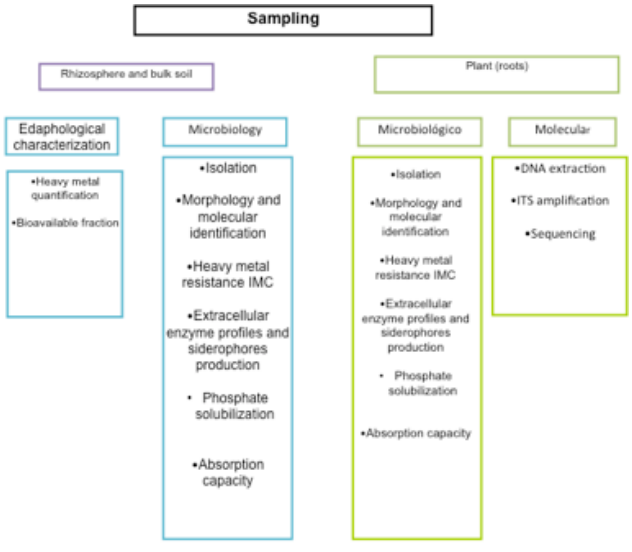

Fig.1 General methodology

Results. Six plants were collected (*Prosopis strombulifera, Sphaerealcea angustifolia, Thitonia diversifolia, Flaveria angustifolia, Bahia absinthifolia and Asclepia linaria*) The concentrations of heavy metals in the soil samples were also analyzed and the values varied from 296.7 to 4332.7 mg / kg soil for arsenic, 233.4 to and 301.0 to 2193.2 mg / Kg for zinc. The amount of heavy metals in plants was quantified in order to know whether they are hyperaccumulators, the results show that the plants are not heavy metal accumulators because the plant/soil ratio of heavy metal concentration is less than 1. However the aerial parts/root ratio of heavy metal concentration demonstrated that all plants except *P. strombulifera* have the ability to accumulate heavy metals. A total of 147 filamentous fungi and 29 rhizospheric yeasts were isolated from plants or soils collected in two zones of Villa de la Paz. The evaluation of enzymatic activities of the isolates revealed that the microorganisms originated from the mining area have the highest metabolic activity. The metabolic activities of isolates from *S. angustifolia* and *P. strombulifera* plants showed the highest activities independent to the sampling site. The morphological identification of the fungi put them into the genera *Alternaria, Cladosporium, Paecilomyces, Penicillium* and *Aspergillus*.

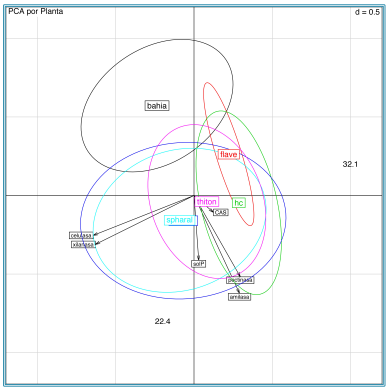

Fig.2 Principal components analysis (enzyme profile, and siderophore production

Conclusions.

All plants except *P. strombulifera* can acuulate As, Cu, Pb and Zn in aerial parts. The evaluation of enzymatic activities of the isolates revealed, *S. angustifolia* and *P. strombulifera* plants showed the highest activities independent to the sampling site. Pleosporal and Hypocreal orders of fungi are dominant in this ecosystem

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