PHYTOREMEDIATION IN THE PROXIMITY OF TAILINGS OF A CHILEAN'S COPPER MINE

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ABSTRACT

Mining is by far the most productive business in Chile. Nowadays Chile has about 700 mining tails and holds the biggest deposit of mining waste in Latin America. Whenever a tailing pond wall collapses the heavy metals and chemical materials captive in them are rapidly released contaminating rivers and creeks in the surrounding region. For this reason it is mandatory to develop research that incorporates sustainable solutions for mining closures, ensuring safety for local communities and ecosystems.

The proposed research can help develop soil and water recovery strategies for sites next to mining tails through 'Phytoremediation'. This biotechnology uses plants and their associated microbes to remove pollutants promoting environmental clean up for in situ soil remediation. There is evidence that 420 species, 28% of the native regional flora of the Coquimbo Region of Chile has potential for mine stabilization. A polyculture of native local species that spontaneously colonize tailings on the area is chosen to investigate the tolerance limits of these species in a fieldwork experiment under heavy metal contaminated substrates. Species with superior performance will be analyzed for photosynthesis, stomatal behavior, WUE and elemental composition, along with anatomical traits and copper localization within leaf, stem and root tissues. These plants will have something in common in terms of microanatomy that will allow them to overcome the various stresses in situ: pH, Cu levels, organic mater content thought to be the most important ones. This research aims to address if: Species that sequester the most metals in leaves have higher evapotranspiration rates relative to those that storage them in the roots, Plants will be sequestering metals at cell wall and vacuoles, and HM tolerance reflects species' ability to exclude or sequester metals at the whole plant or organ level.

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