

TITLE: EVALUATION OF MAXIMUM TOLERABLE CONCENTRATION (MTC) OF NICKEL IN ACTINOBACTERIA ISOLATES FROM BRAZILIAN SERPENTINE SOILS

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ABSTRACT:

Actinobacteria is a diverse phylum formed by Gram positive bacteria with a high G+C content. They have been studied and prospected for various biotechnological and industrial applications, including biomining and bioremediation. Heavy metals are one of the major environmental problems that followed industrial revolution and technological development. However, some soils naturally contain high concentration of them, like serpentine soils, which can be found in the Brazilian Cerrado. A previous study has evaluated the microbial community from these soils and some isolates had their MTC tested for nickel salts (NiSO₄ and NiCl₂). Two isolates from the genus *Streptomyces* (strain LAT A10) and *Nocardia* (strain SAP E5) tolerated the maximum concentration tested, which was 64 mM. The present study aimed to reevaluate the MTC from those isolates with higher concentrations of nickel than used in prior works. The identity of these isolates was confirmed by the analysis of the 16S rRNA gene sequence. The amplicons sequences were analyzed with the Classifier tool of the RDP database and a phylogenetic tree was obtained. R2A agar medium containing 50 to 100 mM of nickel salts, with concentration intervals of 10 mM were prepared, as well as controls without nickel salts added. Spore suspensions of the isolates were prepared in 20 % glycerol. A volume of 10 µL of the spore suspension were streaked on R2A solid medium. The plates were incubated at 30 °C for one week. The 16S rRNA gene sequences showed that strain LAT A10 is closely related to *Streptomyces flavotricini* whereas SAP E5 is closely related to *Nocardia concava*, *Nocardia* sp. SAP E5 grew at concentrations of 100 mM of both nickel salts tested. In the other hand, *Streptomyces* sp. LAT A10 grew in concentration up to 70 mM of both nickel salts. Nevertheless, it grew less when compared to the *Nocardia* sp. SAP E5 in all tested concentrations of nickel salts, since it presented a lower number of colonies. Further studies can potentially contribute for bioremediation and biomining processes, since the resistance mechanisms for nickel exhibited by these two strains can be exploited for such applications.

Keywords: Actinobacteria, nickel, MTC, serpentine soils

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