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OPTIMIZATION OF BACTERIAL GROWTH CONDITIONS FOR THIOCYANATE BIODEGRADATION.

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In 2015, as part of an environmental monitoring in the Veladero mining influence area, water and sediment samples were analyzed to detect the presence of cadmium (Cd), chromium (Cr), nickel (Ni), copper (Cu), zinc (Zn), aluminium (Al), and manganese (Mn). These metals were selected as representative of the contaminants present in mining effluents as they are control parameters established by environmental regulatory bodies. The pH of the effluent is also considered a relevant factor, since it affects metal bioavailability. In previous studies, *Pseudomonas veronii* M3 and *Pseudomonas mandelii* M1 demonstrated their ability to degrade thiocyanate (SCN⁻). Since mining effluents loaded with SCN⁻, also contain metals that may interfere with or alter bacterial growth and their degradative pathways, the objective of this work was to optimize the parameters to improve the design of an appropriate and sustainable biotreatment process. As a first approach, Cd, Cr, Ni, Cu, Zn, Al, and Mn Minimum Inhibitory Concentration (MIC) was determined. Once the MICs were determined, the optimal growth conditions were established in the presence of the mentioned metals in a range of 0.01 to 5 mM, at 15, 20, and 30 °C in a planktonic growth environment. In addition, the strains were cultured adjusting the initial pH values to 6, 7 or 8 with appropriate phosphate buffers. The medium used was M9SCN-CI-25 mM supplemented with glucose (10 g/L) and with thiocyanate as the sole source of sulphur and nitrogen. Preliminary optimal conditions were analyzed using the Design Expert 13 software, performing a multilevel categorical factor analysis in custom designs as a screening to assess which factors and level combinations could affect growth. Among the results obtained, it was found that both strains exhibited high growth and significant production of siderophores at pH 8, good growth at pH 7, and low growth at pH 6. It was observed that both microorganisms exhibited growth across the entire range of Cu, Zn, Mn, Ni, Cd, and Al concentrations. Multivariate analysis revealed that both strains behaved slightly differently, with an optimal growth temperature of 20 °C under the same selective conditions. *Pseudomonas veronii* M3 was found to be more sensitive, showing a greater range of variability in the presence of different metals, while *Pseudomonas mandelii* M1 demonstrated a more stable behaviour. It was observed that Cd and Cu have a notable inhibitory effect, especially on *Pseudomonas veronii* M3. These results contributed to determine the optimal biotreatment conditions to be applied on mining effluents.

Palabras clave: Keywords: thiocyanate degradation