

**The global cobalt-market and exploitation of new cobalt sources by the development of environmentally sustainable biohydrometallurgical methods.**

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The global cobalt (Co) market is currently in a relaxed situation for consumers with relatively low prizes. High Co production in Africa and Indonesia with over 200 ktpa since 2022, slightly exceeds the demand. The EV sector is currently the strongest performer, contributing nearly half of the total Co demand and other battery applications record further 25%. Despite changing cathode chemistry and the shift to higher Ni and lower Co amounts, the Co demand will double to triple by 2030 due to increasing EV sales. Brazil has significant Co potential, especially in Ni laterite deposits, but has not produced Co industrially for some years due to the low recovery of the mineral processing method used, high energy demand and the environmental impact during the recovery of Co from these oxide ores.

For this reason, environmental friendly microbial bioleaching methods are being tested in the BioProLat cooperative research project between Germany and Brazil. Stirred-tank bioreactor and percolation column laboratory experiments were carried out to optimize parameters including pH, temperature, aeration, and finding the most suitable bacterial consortium for the bioleaching of Ni and Co. Various ores from three different Ni laterite deposits in Brazil were used for the experiments. Stirred-tank laterite bioleaching experiments starting at pH 1.5 under aerobic conditions with a consortium of different *Acidithiobacillus thiooxidans* strains resulted after 15 days in maximum extraction of 83 % Co and 83 % Ni, for 10 % (w/v) pulp density of a laterite sample. Column bioleaching with another laterite sample achieved 95 % Co and 66 % Ni extraction after one month. An upscaling of the method with several 100 kg samples is planned, possibly also with other ores from further lateritic deposits in Brazil.