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Conclusions

- The present work presented the results of the research made for the study of the behavior of *Rhodococcus ruber* bacterial strain as bioreagent for the hematite system.
- Zeta potential results showed that for a constant ionic strength (10^{-3}M NaCl), the IEP of *Rhodococcus ruber* cells are located in a pH 3; for hematite is at pH 4,8, and for the hematite-*Rhodococcus ruber* system is around pH 2,8.
- The zeta potential evaluation of hematite particles before and after interaction with bacterial cells showed the modification of hematite zeta potential profile.
- The biomass adhesion was found more strongly attached for a pH around 3, at a concentration of 0,6 gr.L^{-1} (or 10^9 cells).
- The surface groups on *R. ruber* are similar to the groups for fatty acids. Therefore, it is possible to use this strain as a collector for hematite separation from hematite ores.
- FTIR results demonstrated that adsorption of *R. ruber* on hematite surface occurs mainly by chemical adsorption due to the presence of carboxylic groups.
- Bioflotation of hematite using *Rhodococcus ruber* strain was performed for the first time in the modified Partridge-Smith flotation cell, achieving successful results, showing that this device can be applied to further research in Biobeneficiation.
- The bioflotation of hematite using *Rhodococcus ruber* as bioreagent depends on the pH value, bacterial concentration and particle size. The higher floatability of hematite was found at a pH value around 3, with a percentage of 89%, using 0,6 g.L^{-1} and a particle size range between -53+38μm.

- Also, were performed bioflotation studies using a commercial frother for iron ores. Flotanol showed its effectiveness for the smaller particle size range.
- The scanning electron images showed the presence of *Rhodococcus ruber* cells adhered onto hematite surface. Also, SEM studies of the hematite sample allowed determining the experimental procedure for the treatment of hematite sample.
- As all the studies described before, it can be concluded that *Rhodococcus ruber* strain effectively work for the hematite system. The adsorption of *Rhodococcus ruber* onto hematite could possibly led to formation of hydrophobic agglomerates of micro-fine hematite particles. This is the premise behind separation of micro-fine hematite from hematite ores by flotation and is also the basis on which R. *ruber* can be used as a flotation collector for hematite.