

Jatropha curcas L. Oil Selectivity in Froth Flotation

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Abstract : In Brazil, most soils are acidic and low in essential nutrients required for the growth and development of plants, making fertilizers essential for agriculture. As the biggest producer of soy in the world and a major producer of coffee, sugar cane and citrus fruits, Brazil is a large consumer of phosphate. Brazilian's phosphate ores are predominantly from igneous rocks showing a complex mineralogy, associated with carbonites and oxides, typically iron, silicon and barium. The adopted industrial concentration circuit for this type of ore is a mix between magnetic separation (both low and high field) to remove the magnetic fraction and a froth flotation circuit composed by a reverse flotation of apatite (barite's flotation) followed by direct flotation circuit (rougher, cleaner and scavenger circuit). Since the 70's fatty acids obtained from vegetable oils are widely used as lower-cost collectors in apatite froth flotation. This is a very effective approach to the apatite family of minerals, being that this type of collector is both selective and efficient (high recovery). This paper presents *Jatropha curcas* L. oil (JCO) as a renewable and sustainable source of fatty acids with high selectivity in froth flotation of apatite. JCO is considerably rich in fatty acids such as linoleic, oleic and palmitic acid. The experimental campaign involved 216 tests using a modified Hallimond tube and two different minerals (apatite and quartz). In order to be used as a collector, the oil was saponified. The results found were compared with the synthetic collector, Fotigam 5806 produced by Clariant, which is composed mainly by soy oil. JCO showed the highest selectivity for apatite flotation with cold saponification at pH 8 and concentration of 2.5 mg/L. In this case, the mineral recovery was around 95%.

Keywords : froth flotation, *jatropha curcas*, microflotation, selectivity

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