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SYNTHESIS AND CHARACTERIZATION OF MAGNETIC NANOPARTICLES (Fe₃O₄) COATED WITH BACABA OIL

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ABSTRACT

The used increasingly frequent of nanomaterials for biomedical applications such as controlled drug delivery, image contrast and treatment of cancer [1]. It generates a great demand for high quality nanomaterials in terms of crystallinity, morphology and functionality for biomedical applications, which makes the use of nanoparticles of different materials subject of study by many researchers [2]. Samples of iron oxide nanoparticles (Fe₃O₄) were synthesized by variations of thermal decomposition method using bacaba oil, with the intention to obtain high quality nanoparticles [3, 4]. The oil used in the synthesis of nanoparticles was obtained by the extraction with carbon dioxide in the supercritical state from the bacaba fruit (*Oenocarpus bacaba Mart.*), original species of the Amazon forest, whose oil is rich in fatty acids (oleic acid, palmitic acid, and linoleic acid) present in different proportions [7]. The synthesized samples were characterized by X-ray diffraction (XRD), it was possible to verify the formation of magnetite nanoparticles by the position of the intensity peaks. The synthesized nanoparticles have a possible spherical morphology with a diameter of 10 to 20 nm, obtained by transmission electron microscopy images. The thermogravimetric (TG) and derivate thermogravimetric (DTG) analyzes show a mass loss between the temperature range of 298 K to 823 K related to the evaporation of the hydroxyls and the possible degradation of the oil that covers the surface of the magnetite, and the second mass loss of 823 K to 973 K, associated to Fe₃O₄ reduction.

Keywords: Nanomaterials, thermal decomposition, iron oxide, bacaba oil.

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