

Study zinc ferrite nanoparticles for nanoemulsion formulations

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Abstract

Nanoemulsions droplets are formed by complex between 20 and 300 nm diameter. Are developed for various applications and formulations such as nanoemulsions constituted of magnetic nanoparticles coated with various oils that may be used for the formulation of cosmetics, medicines and others. In this work were prepared nanoparticle based nanoemulsions obtained by co-precipitation method in acidic and thermal stress. The process allows to control the morphology, size, magnetic properties of these nanoparticles. In this work were developed nanoemulsions of $ZnFe_2O_4$ nanoparticles prepared using distilled water, copaiba oil and surfactants such as Tween 20 and oleic acid. Were used for the preparation of zinc salt and zinc sulfate and sodium hydroxide 6 mol at a temperature of 80 °C. After precipitation and sedimentation steps, nanoparticles have been incorporated into copaiba oil and subjected to homogenization ultrason 2 W for 1 minute. This mixture was observed under infrared spectroscopy (NIR) , Atomic Force Microscopy (AFM) , transmission electron microscopy (TEM) and scanning (SEM). The NIR spectra identified by functional groups present on the nanostructures such as carbonyl group (C = O) and hydroxyl (OH) group , among others. With the topographic images obtained by AFM , it was possible to identify nanostructures with 50 nm height. The images obtained by SEM and TEM confirmed the presence of crystalline structures with about 30 to 90 nm diameter. Were identified nano rods in sectors of nanoemulsions. Nanoemulsions developed in this work will be applied to skin lesions and will be subject to the diffusion behavior and treatment. Other techniques such as X-ray diffraction, EPR and high frequency performance liquid chromatography (HPLC) , are necessary for the proof of stability and other magnetic characteristics for use of these nanostructured materials in biological applications .

References

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Figure 1: Nanoemulsion formulations Zinc Sulfate (A) and zinc acetate (B) at concentrations of 0,005g images obtained by TEM (C) SEM and (D).

