Magnetic core-shell nanoparticles with dendritic mesoporous arhitecture used as drug delivery system

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The acceleration for development of materials capable to be used as drug delivery systems is a consequence of the rising of problems that threaten human existence. The magnetic nanoparticles are one of this type of novel materials used in targeted drug delivery especially for their properties such as hyperthermia which enhance the release of bioactive compounds. [1] In our study we try to develop nanoparticles with a magnetic core and a last shell based on mesoporous dendritic architecture where we loaded in it an antibiotic. For the synthesis of Fe_3O_4@SiO_2 nanoparticles we used two methods, first is based on obtaining the core through co-precipitation, then coating it with a compact SiO_2 shell through a sol-gel method [2] and the second one method is based on directly synthesis in a microfluidic installation. [3] To obtain the second shell based on mesoporous dendritic architecture we used a bi-phase stratification method developed by Yang et al. [4] After the synthesis of the material we try to load the amoxicillin in them through absorbtion [5] and solvent evaporation [6] mehods. The samples were characterized through SEM, TEM, XRD, N_2 adsorption/desorption, FT-IR, TG-DSC analysis. The last one being used to quantify the loading content. The release of amoxicillin was done in SBF(Simulated Body Fluid) and this process was evaluated according to a HPLC-DAD method [7]

References

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