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MAGNETIC EXTRACTION OF DNA USING A POLYANILINE/CHITOSAN/Y-Fe₂O₃ HYBRID NANOCOMPOSITE

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Currently, there are several methods for the extraction of nucleic acids, however, most methods have limitations as requires a long time, use of substances harmful to the operator or the environment. In this work, we present preliminary results of the use of polyaniline/Chitosan/y-Fe₂O₃ magnetic nanocomposites (PANI/CHI/y-Fe₂O₃ MNC) as active agents for efficient DNA retrieval from aqueous solutions. First, CHI/y-Fe₂O₃ nanoparticles (NPs) were synthesized by a chemical co-precipitation method. Then was prepared the MNC through the emulsion polymerization of the aniline monomer. The model system used for the retrieval experiments was sodium salt of salmon sperm DNA. UV-Vis spectroscopy was employed to estimate the concentration of DNA present in the solution before and after the interaction with the MNC, by examining the intensity of the specific 260 nm absorption band. We determined the capacity of DNA retrieval as a function of contact time, amount of dissolved MNC and initial DNA concentration. The best results corresponded to a maximum relative amount of adsorbed DNA of 40 mg/g after 60 min of interaction. A simple and fast DNA desorption was achieved by changing the pH of the solution. After comparing the adsorption capacity of our results to those of other DNA retrieval systems reported in the literature, we suggest that these PANI/CHI/y-Fe₂O₃ MNCs appear as a promising low-cost material for use in a simple and efficient protocol for DNA isolation and purification.