Absorption of labelled I –125 albumin on magnetic polymeric microspheres MnMagBead.

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Abstract

Magnetic nanoparticles are finding an ever-increasing range of applications in biology and medicine, from force transduction, to cancer therapy, and biosensing. One of the most widespread uses of magnetic nanoparticles is, in biological systems, as magnetic cell and protein separation.
In this work composite beads consisting of polymer-coated manganese ferrite nanoparticles are prepared by the precipitation reaction of manganese ferrite into the channels of methyl methacrylate beads polymer by sodium hydroxide, MnMagBead. The composite was characterized by infrared spectra (FTIR), thermalgravimetric analysis of TGA/DTG and indicate the presence of –CO (carbonyl) groups and $MnFe_2O_4$ on the beads. Magnetization measurements were obtained at room temperature in magnetic fields up to 10 KOe using a vibrating sample magnetometer. Biological tests of protein adsorption were processed using labeled I –125 albumin, and the activity was measured in a gamma counting spectrometer.
Magnetic microbeads are prepared encapsulating the magnetic particles within performed polymer by precipitation reaction with NaOH inside the polymer channels. The material was characterized by transitions on ν_{O-H}3439, νass_{CH2} 2966, $\nu_{C=O}$ 1731,δ_{O-H}1637, δ_{CH3} 1477, 1394, δ_{CH}1157, δ_{O-H} 966, and ν_{MeOMo} 580 cm^{-1}. In figure 1 it is showed a picture of MnMagbead attracted by a magnetic field. MnMagbead exhibited superparamagnetic behavior and strong magnetization at room temperature (Fig 2). These superparamagnetic beads present capability to bind biological molecules as proteins like albumin with good capability ($5x10^{-6}$ μg/100mg) of beads.

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