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Curcumin-loaded dual pH- and thermo-responsive magnetic microcarriers based on pectin maleate for drug delivery

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HIGHLIGHTS

- ▶ N-isopropyl acrylamide was grafted on pectin maleate chains.
- ▶ Magnetic microparticles based on pectin maleate were developed.
- ▶ Magnetic microparticles were pH and thermo-responsive.
- ▶ Magnetic microparticles acted as drug carrier matrices for curcumin delivery.

Abstract

Magnetic microgels with pH- and thermo-responsive properties were developed from the pectin maleate, N-isopropyl acrylamide, and Fe₃O₄ nanoparticles. The hybrid materials were characterized by infrared spectroscopy, scanning electron microscope coupled with X-ray energy dispersive spectroscopy, wide angle X-ray scattering, Zeta potential, and magnetization hysteresis measurements. Curcumin (CUR) was loaded into the microgels, and release assays were carried out in simulated environments (SGF and SIF) at different conditions of temperature (25 or 37 °C). A slow and sustainability CUR release was achieved under external magnetic field influence. Loaded CUR displayed stability, bioavailability and greater solubility regarding free CUR. Besides, the cytotoxicity assays showed that magnetic microgels without CUR could suppress the Caco-2 cells

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