

IRON OXIDE NANOPARTICLES AND DOXORUBICIN LOADED GUAR GUMBIOPOLYMERS FOR CHEMOTHERAPY

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Iron oxide nanoparticles (Fe₃O₄ NPs) have shown the great potential in cancer diagnosis and therapy. Fe₃O₄ NPs functions as an MR imaging, magnetic targeting drug delivery, and hyperthermia applications. In this report, synthesised Fe₃O₄ NPs and doxorubicin (DOX) loaded on guar gum (GG) crosslinked with CaCl₂ to form the nanocomposites (Fe₃O₄-DOX@GG) for cancer theranostics. The formed Fe₃O₄-DOX@GG nanocomposites were characterized by TEM, XRD, VSM and EDS. The cytocompatible is confirmed by in vitro cytotoxicity (MTT) with NIR effect, apoptosis (Live & dead) and cellular uptake on HeLa, A549 and WI-38 cells. The magnetic properties of Fe₃O₄ NPs, and Fe₃O₄-DOX@GG nanocomposites are confirmed by VSM analysis. The in vitro cell studies of Fe₃O₄-DOX@GG nanocomposites showed enhanced cytotoxic effect on the cancer HeLa and normal WI-38 cells. In vitro MRI investigation of Fe₃O₄-DOX@GG nanocomposites shows behaviour T₂ contrast agent.

Keywords: Iron oxide, nanoparticles, chemotherapy, doxorubicin, guar gum, biopolymers

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