

The in vitro therapeutic activity of ellagic acid-alginate-silver nanopreintss on breast cancer cells (MCF-7) and normal fibroblast cells (3T3)

ABSTRACT

The present work involves the development of EA-Alg-AgNPs nanocomposite based on ellagic acid (EA) as active compound. Silver nitrate was taken as the metal precursor (AgNPs) and sodium alginate (Alg) as a reducing agent. The EA-Alg-AgNPs nanocomposite was characterized using transmission electron microscopy (TEM), zeta potential, and in vitro release kinetics. The particles thus obtained were spherical in shape and having an average particles size of 10 nm, zeta potentials of -8.2 mV, and the release kinetics of EA from nanocomposite was following Hixson-Crowell kinetics models with $R^2 = 0.9956$. The cytotoxicity potential of free EA, Alg-AgNPs and the EA-Alg-AgNPs nanocomposite may be determined using a normal mouse fibroblast cells (3T3) and breast cancer cells (MCF-7). EA-Alg-AgNPs nanocomposite demonstrated a increased cytotoxicity effect when compared to free EA on MCF-7 cells with 15.3% cell viability at 128 $\mu\text{g/mL}$; compared to 33.5% cell viability in a direct EA exposure. It is worth mentioning the cytotoxicity of Alg-AgNPs against MCF-7 shows 28% viability at 128 $\mu\text{g/mL}$.

Keyword: 3T3 Cells; Ellagic acid; MCF-7 Cells; Silver nanoparticles; Sodium alginate; Sustained release