

Cytotoxicity effect of solid lipid nanoparticle on human breast cancer cell lines.

ABSTRACT

Recently more focus has been put to the development of innovative drug-delivery systems that includes liposomes and solid lipid nanoparticles (SLNs). An in vitro study was conducted to determine the effect of solid lipid nanoparticle on the human breast cancer cell lines (MCF-7 and MDA-MB231). The SLNs based on palm oil were prepared using the high pressure homogenization method and were characterized by the particle size and polydispersity index (particle sizer), zeta potential (zetasizer), ultrastructure [transmission electron microscopy (TEM)] and MTT assay and natural red assay. Homogenization of solid lipid nanoparticles at 1000 bar for 20 cycles produced particles with 145.00 ± 3.39 nm in size and zeta potential of -19.50 ± 1.80 mv. The SLNs were generally round and uniform in shape. The cytotoxicity of the components of the SLN formulation was low: SLN with 1% oleyl alcohol displayed no significant cytotoxicity effect on breast cancer cells. In the light of these findings, SLN stabilized with 30% lecithin and 1% oleyl alcohol as nonionic co-surfactant in aqueous phase was found to be safe for cells and the acceptable for the incorporation lipophilic drugs.

Keyword: Solid lipid nanoparticle; Cytotoxicity; Human breast cancer cells.