

Abstract

# Development and Characterization of Paclitaxel-loaded PLGA Nanoparticles and Evaluation of Cytotoxicity on MCF-7 Cell Line by MTT Assay <sup>†</sup>

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**Abstract:** Paclitaxel (PTX), cytotoxic agent extracted from *Taxus brevifolia* has significant antineoplastic activity against breast cancer. Poly d,l-lactide-co-glycolide (PLGA) has been widely used for the preparation of nanoparticles carrying cytotoxic drug agents. The aim of this study was to evaluate the effect of PTX solution and paclitaxel-loaded PLGA nanoparticles (PTX-PLGA-NPs) on MCF-7 cell line. PTX was encapsulated within PLGA nanoparticles by nanoprecipitation method as described by Fessi et al. (1989). Particle size, polydispersity index, zeta potential and encapsulation efficiency of nanoparticles were investigated. Cytotoxic effects of the various concentrations of PTX and PTX-PLGA-NPs on MCF-7 cell line were determined by MTT assay. The cells were treated with various PTX and PTX-PLGA-NPs concentrations (1–10 µg/mL) for 24 h. Particle size, polydispersity index, zeta potential and encapsulation efficiency were found as 267 ± 14 nm, 0.29, -28 ± 3 mV and 76% respectively. According to MTT results, the cytotoxic effect of PTX-PLGA-NPs on MCF-7 cells significantly increased in comparison to PTX solution at all concentrations. This can be attributed to adsorption of PLGA nanoparticles on to the MCF-7 cells to serve a drug reservoir around the cell membrane. It can be concluded that PTX-PLGA-NPs can be promising carriers for anticancer drug delivery.

**Keywords:** PLGA; nanoparticle; MCF-7; MTT; Cytotoxicity



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