

## Drug-Based Nanoparticles: Comparative Study of the Effect Drug Type on Release Kinetics and Cell Viability

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**Abstract :** The conventional methods for the diagnosis and treatment of breast cancer include bulk systematic mammography, ultrasound, dynamic contrast-enhanced fast 3D gradient-echo (GRE) magnetic resonance imaging (MRI), surgery, chemotherapy, and radiotherapy. However, nanoparticles and drug-loaded polymer microspheres for disease (cancer) targeting and treatment have enormous potential to enhance the approaches that are used today. The goal is to produce an implantable biomedical device for localized breast cancer drug delivery within Africa and the world. The main advantage of localized delivery is that it reduces the amount of drug that is needed to have a therapeutic effect. Polymer blends of poly (D,L-lactide-co-glycolide) (PLGA) and polycaprolactone (PCL), which are biodegradable, is used as a drug excipient. This work focuses on the development of PLGA-PCL (poly (D,L-lactide-co-glycolide) (PLGA) blended with based injectable drug microspheres and are loaded with anticancer drugs (prodigiosin (PG), and paclitaxel (PTX) control) and also the conjugated forms of the drug functionalized with LHRH (luteinizing hormone-releasing hormone) (PG-LHRH, and PTX- LHRH control), using a single-emulsion solvent evaporation technique. The encapsulation was done in the presence of PLGA-PCL (as a polymer matrix) and poly-(vinyl alcohol) (PVA) (as an emulsifier). Comparative study of the various drugs release kinetics and degradation mechanisms of the PLGA-PCL with an encapsulated drug is achieved, and the implication of this study is for the potential application of prodigiosin PLGA-PCL loaded microparticles for controlled delivery of cancer drug and treatment to prevent the regrowth or locoregional recurrence, following surgical resection of triple-negative breast tumor.

**Keywords :** cancer, polymers, drug kinetics, nanoparticles

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