

# Evaluation of the co-delivery of diagnostic and therapeutic agent in polymeric micelles for triple negative breast cancer treatment.

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## Abstract:

Triple-negative breast cancer (TNBC) is characterized by its higher incidence of recurrence and more aggressive clinical course. Due to higher rate of recurrence, early detection is urgently needed as well as an effective delivery of anticancer drug to tumor sites to increase patient survival. In this study, we develop theranostic nanoparticles loaded with anticancer drug (docetaxel) and diagnostic agent (iron oxide) to achieve simultaneous effect of therapeutic and diagnostic. Vitamin E TPGS was used as the nanocarriers, it has amphiphilic structure which is useful in the preparation of nanoparticles to encapsulate hydrophobic drug. This docetaxel-iron oxide loaded TPGS micelles were synthesized using solvent casting method. These micelles were characterized for its nanoparticles properties such as size, surface charge, morphology and drug loading. The synthesized micelles size found to be between the range of 15nm and 100nm for single drug and dual drug loading respectively. These micelles have uniform size distribution with polydispersity index less than 0.3. The surface charged of the micelles is negative between -7 mV and -20 mV. Whereas, the micelles have smooth spherical shape as observed under cryo-TEM. Overall, our micelles have higher drug loading which is suitable to use for effective delivery for triple negative breast cancer treatment.

**Keywords** : Dual Drug Delivery; Biomaterial; Nanomedicine; Pharmaceutical; Cancer

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