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Development and characterization of different solid lipid nanocarriers loaded with tamoxifen citrate/ coenzyme Q10 biotherapy for treatment of breast cancer

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Nanotechnology based combinatorial therapy has emerged as an effective strategy for cancer treatment due to anticancer synergistic activity, reduction of drug-related toxicity, suppression of multi-drug resistance and overcoming biomedical barriers against successful delivery of anticancer drugs. Tamoxifen citrate (TC) and coenzyme Q10 (CoQ10) loaded into different types of solid lipid nanocarriers (SLNs) were developed for delivering anticancer/antioxidant drug biotherapy into cancerous cells. Stearic acid (2% w/v) and poloxamer 188 (3%w/v) were selected as optimal lipid matrix and surfactant, respectively for developing biotherapy SLNs. Particle size, polydispersity index (PDI) and zeta potential were 266 nm, 0.741 and -27.5 mv, respectively while, the % encapsulation efficiency (%EE) of TC and CoQ10 were 87% and 38%, respectively. Incorporation of lecithin into lipid matrix has significantly reduced particle size and increased %EE of CoQ10 to 45%. Nanostructured lipid carriers (NLC1) decreased particle size to 81nm and increased %EE to 94% and 56% for TC and CoQ10, respectively. Lipid nanocarriers offered controlled drugs release profiles. Formulations contain phospholipid (SLN11 and NLC1) showed good fitness to Higuchi model with prominent controlling effect for NLC1. Lipid nanocarriers significantly improved TC/CoQ10 permeation through intestinal mucosa with a prominent efficacy to formula SLN11. The study greatly suggests use of TC/CoQ10 solid lipid nanocarriers as potential delivery systems in breast cancer treatment.

Biography

Eman Saddar Inbrahim El-Leithy has completed her PhD from Faculty of Pharmacy, Cairo University, Egypt and obtained Postdoctoral fellowship at Faculty of Pharmacy, University de Montreal, Canada, sponsored by Egyptian Government. She is a Professor of Pharmaceutics and Head of Pharmaceutics Department Faculty of Pharmacy, Modern Sciences and Arts University (MSA). She has published 23 papers in reputed journals.

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