



Preparation and in vitro characterisation of a novel Curcumin loaded Plga nano drug delivery system

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Abstract

Nanotechnology is currently used to eliminate the disadvantages arising from the physical and chemical properties of pharmaceuticals, such as low bioactivity and low pharmacokinetic profile. Succeeded anticancer therapy is still a big question mark because of the lack of targeting, and, consequently, expected side effects. Curcumin is a promising chemopreventive and chemotherapeutic agent, while insolubility in water is the major bioactivity problem. Nonetheless nanoformulation strategy would enhance curcumins potential to a considerable extent.^{1,2} Therefore, the specific development of a bioavailable nanoparticulate system that can deliver curcumin into tumor tissue in an aqueous environment and be stable enough to stay tuned in vivo is required.

This study aims to develop a novel poly (d,l-lactide-co-glycolide) enhancing the hydrophobic capacity of PLGA.³ We systematically tuned the amount (PLGA) based polymer lipid hybrid nanocarrier with improved physical features like stable in vitro release, enhanced loading capacity and encapsulation efficacy. By this means, Curcumin's two in vivo features would improve; (1) bioavailability through better pharmacokinetic profile in aqueous environment and (2) specificity through the targeted area by enhanced permeability and retention (EPR) effect.

In this study, we synthesized a novel PLGA NPs by using DSPE as a complexing reagent for of lipophilic compartment (DSPE) used for NP preparation. Then characterization and optimization studies made using different physicochemical methods.⁴ We used computational analysis to understand drug-polymer, drug-lipid and polymer-lipid interactions and optimized the formulation in silico. Computer analysis is the original value of this study which identifies optimal drug concentration and best method. Our new PLGA nanoparticles with a significant amount of lipid molecule provide an efficient therapy strategy to overcome the bioactivity problem of curcumin.



Biography

Fatmanur Babali Balibey completed her pharmacy degree in 2018 and continued Ph.D. program in Pharmaceutical Biotechnology at Bezmialem University, Turkey. Her research interests are mainly polymer based nano drug delivery systems and nanobiotechnology.

Speaker Publications

1. Antigenotoxic and antioxidant potentials of newly derivatized compound naringenin-oxime relative to naringenin on human mononuclear cells; *Drug and chemical toxicology* 39 (1), 66-73.
2. Formulation, Characterization And Evaluation Of Curcumin-Loaded PLGA-TPGS Nanoparticles For Liver Cancer Treatment, *Drug Des Devel Ther.* 2019; 13: 3569–3578.

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