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Quercetin Loaded Lecithin/Chitosan Nanoparticles: Physicochemical Characterization

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Quercetin is an abundant flavonoid in food plants and has been extensively investigated for its pharmacological effects that include anti-tumor, anti-inflammatory, antioxidant, and hepatoprotective activities. Being sparingly soluble in water and subject to degradation in aqueous intestinal fluids, the absorption of quercetin is limited upon oral administration. The aim of this study was to encapsulate quercetin on lecithin/chitosan nanoparticles by auto-assembled technique for improvement its solubility, stability and oral bioavailability. The nanoparticles were obtained injecting a solution of lecithin (2.0 $mg.mL^{-1}$) and quercetin (70 $\mu g.mL^{-1}$) in ethanol (99%) into a chitosan (0.1 $mg.mL^{-1}$) aqueous solution (pH 3.0), under mechanic stirring. The nanoparticles were characterized by measuring particle size, zeta potential and encapsulation efficiency. The morphology of nanoparticles was evaluated by transmission electron microscopy. Antioxidant activity of nanoparticles and free quercetin was also evaluated using the scavenging of 1,1-diphenyl-2-picrylhydrazyl radical and anti-lipid peroxidation. The nanoparticles showed mean diameter of 168.58±20.94 nm, with polydispersity index of 0.26±0.02, zeta potential of +56.46±1.94 mV, and encapsulation efficiency of 96.13±0.44%. The nanoparticles showed spherical shape and an antioxidant activity more effective than free quercetin. This work demonstrated that the quercetin was successfully encapsulated suggesting that the lecithin/chitosan nanoparticles is a promising delivery system to enhance the oral absorption and water solubility of quercetin.

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