Nano-encapsulation of Protein Drugs by Electrospraying: Feasibility

이종휘*, 김기현[1], 유지연, 이종찬[1]
중앙대학교; [1]서울대학교
(jong@cau.ac.kr*)

Protein stability has been the most critical formulation issue in the protein drug delivery. It often limits the applicability of various drug delivery systems such as sustained release ones. Once protein drugs could 'safely' be encapsulated into nanoparticles without using organic solvents, high temperature, severe mechanical energies, etc., the nanoparticles can serve as primary particles to be incorporated into various drug delivery systems with retaining the bioactivity of protein drugs. Electrospraying was recently reported as an optimistic processing technique to 'safely' prepare nanoparticles. In this study, electrospraying of protein and polymer mixture solutions into coagulation media was carried out to prepare the sustained release formulation of a protein drug. Encapsulated particles were obtained in a range of charge, flow speed, separation between electrodes, polymer concentration, etc. Comparison between the weights of input materials and recovered particles showed material loss to be negligible. The conductivity of medium seemed to primarily determine resulting particle size. Water based systems produced much larger particles than organic solvent based systems.