CHITOSAN/CARBOXYMETHYL CELLULOSE-STABILIZED POLY(LACTIDE-*CO*-GLYCOLIDE) PARTICLES AS BIO-BASED DRUG DELIVERY CARRIERS

Supharat Inphonlek[1], Panya Sunintaboon[1], Michèle Léonard[2], Alain Durand[2]
1 Department of Chemistry, Faculty of Science, Mahidol University, Rama 6 Road, Bangkok 10400, Thailand
2 Université de Lorraine, CNRS, LCPM, F-54000 Nancy, France
alain.durand@univ-lorraine.fr

Poly(lactide-*co*-glycolide) (PLGA) colloidal particles stabilized by an electrostatic complex of two oppositely charged polysaccharides, chitosan (CS, cationic) and carboxymethyl cellulose (CMC, anionic), have been successfully prepared following a two-step procedure. In the first step, an oil-in-water emulsion was prepared by dispersing a solution of PLGA in dichloromethane into a mixture of CS and CMC in water. Dichloromethane was then evaporated from the emulsion, leading to the formation of a suspension of CS/CMC-covered PLGA particles. It has been shown that CS and CMC contents affected not only the characteristics but also the stability of resulting PLGA particles. Stable CS/CMC-covered PLGA particles had diameters between 480 and 700 nm, when prepared with convenient CS (150 to 450 ppm) and CMC (50 to 150 ppm) concentrations in the aqueous phase. Turbidity measurements demonstrated that CS/CMC-covered PLGA particles exhibited colloidal stability over a wider pH range as compared to PLGA particles covered by CS alone. Curcumin (CUR), a hydrophobic model drug, was encapsulated into the particles at the maximum of 10% by weight of PLGA so as to remain in the domain of complete miscibility as established by dynamic scanning calorimetry. The efficiency of encapsulation of CUR into CS/CMC-covered PLGA particles was found to be 99.6%. When using electrostatic complex of CS/CMC for covering PLGA particle the pH sensitivity of the kinetics of release of CUR was modified as compared to that observed with CS-covered particles. CS/CMC-covered PLGA particles exhibited delayed of CUR release in mildly acidic conditions and faster release in neutral and basic conditions. Thus, these bio-based particles have a potential to be further investigated as pH-sensitive drug carriers.

Back to Programme