

Thesis Title	Preparation, Characterization and Release Profile of Microcapsule Made of Poly(L-lactide)- <i>block</i> -poly(ethylene glycol)
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## ABSTRACT

Poly(L-lactide)-*block*-poly(ethylene glycol) (PLLA-*b*-PEG) was synthesized by bulk copolymerization of LLA : PEG (MW 1,500) with feed ratios = 300 : 0, 300 : 1, 300 : 2 and 300 : 3 respectively. The obtained PLLA-*b*-PEG was then used for preparing microcapsule by a solvent-evaporation technique of water in oil in water (w/o/w) emulsion. FITC-dextran with MW 4,400 was encapsulated in the PLLA-*b*-PEG. The entrapment efficiency was found to decrease with increasing the feed mole ratio of PEG. The release profile for all formulations showed 2 patterns, consisting of an initial fast release (burst effect) which was the release of dextran from the internal cores located closed to the surface of microcapsule, followed by the slow release which was due to the diffusion of dextran through the matrix membrane. However, in the case of the microcapsule 300 : 3, the third pattern of release followed after those 2 patterns was observed. This was attributed to the chain scission of ester linkage between lactyl and lactyl in PLLA-*b*-PEG. The degradation of microcapsule was found to depend on the mole ratio of PEG. PEG segment which is hydrophilic polymer, induced the water molecule through the microcapsule's matrix and this could accelerate the scission of ester linkage between lactyl and PEG, the free PEG segment was then dissolved out, causing a sudden decrease of total MW. Thereafter, the chain scission of ester linkage between lactyl and lactyl occurred and this could be seen obviously in the microcapsule of 300 : 3. This caused the re-occurrence of fast release during it's third period.