

# Pengaruh variasi komposisi polipaduan poli(D,L-Asam Laktat) dan polikaprolakton pada mikrokapsul captopril terhadap efisiensi enkapsulasi dan uji disolusi secara in vitro = Effect of polyblend poly(D,L-Lactic Acid) and polycaprolactone composition in captopril microcapsule on the encapsulation efficiency and in vitro dissolution test / Farah Rahmatika

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## Abstrak

Captopril merupakan salah satu obat hipertensi golongan angiotensin-converting enzyme (ACE) yang telah banyak digunakan untuk pengobatan hipertensi dan gagal jantung kongestif. Captopril memiliki waktu paruh yang pendek yaitu 1,6-1,9 jam. Waktu paruh captopril yang pendek membuat captopril perlu dikonsumsi secara berulang. Teknik mikroenkapsulasi dapat digunakan untuk menutupi kekurangan captopril. Mikrokapsul captopril dibuat menggunakan polimer biodegradable yaitu polipaduan poli(D,L-Asam laktat) dengan polikaprolakton sebagai penyalut menggunakan metode evaporasi pelarut tipe emulsi w/o/w dengan span 80 dan tween 80 sebagai surfaktan. Mikrokapsul dibuat dengan variasi komposisi polipaduan untuk melihat pengaruhnya terhadap efisiensi enkapsulasi, morfologi mikrokapsul dan uji disolusi secara in vitro pada pH 1,2 dan pH 7,4. Mikrokapsul yang diperoleh berbentuk spheris dan permukaan yang halus seiring dengan banyaknya komposisi PCL dalam polipaduan. Didapatkan persen perolehan berat mikrokapsul berkisar 87% dengan rata-rata ukuran 0,489  $\mu\text{m}$  – 0,516  $\mu\text{m}$ . Hasil efisiensi enkapsulasi yang didapat sebesar 4,94%- 20,69%. Selama uji disolusi, setiap komposisi polipaduan mikrokapsul dapat menahan pelepasan captopril selama 55 jam. Sebanyak 75% captopril lepas pada komposisi PDLLA/PCL 40:60 (% w/w) diakibatkan oleh degradasi matriks polipaduan. Sedangkan pada komposisi 20:80 (% w/w) dan 30:70 (% w/w) captopril lepas sebesar 43% dan 46% melalui proses difusi.

Captopril is one of the angiotensin-converting enzyme (ACE) class hypertension drugs that has been widely used for the treatment of hypertension and congestive heart failure. Captopril has a short half-life of 1.6-1.9 hours. The Short half-life of captopril makes captopril need to be consumed repeatedly. Microencapsulation techniques can be used to cover the lack of captopril. Captopril microcapsules were made using biodegradable polymers, namely poly(D,L-lactic acid) with polycaprolactone as coating using double emulsion (w/o/w) solvent evaporation method with span 80 and tween 80 as surfactant. Microcapsules were made by varying the composition of the polymers in polyblend to see the effect on encapsulation efficiency, surface properties and in vitro dissolution test at pH 1.2 and pH 7.4. The microcapsules were all spherical and had a smooth surface as more PCL was added to the composition in polyblend. Percent yield of microcapsules obtained was about 87% with an average size of 0.480  $\mu\text{m}$ -0.516  $\mu\text{m}$ . The results of the encapsulation efficiency were 4.94%-20.69%. In the dissolution test of each polyblend composition, microcapsules could withstand the release of captopril for 55 hours. 75% of captopril released in the composition of PDLLA/PCL 40:60 (% w/w) was caused by degradation of the polyblend matrix. While the composition of 20:80 (% w/w) and 30:70 (% w/w) captopril was released about 43% and 46% through the diffusion process.