Uji efisiensi enkapsulasi dan disolusi in vitro mikrokapsul simvastatin dengan variasi komposisi polipaduan poli(d,l-asam laktat) dan metil selulosa = Encapsulation efficiency and in vitro dissolution test of simvastatin microcapsule by polyblend poly(d,l-lactic acid) and methyl cellulose composition variation.

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Abstrak

Simvastatin (C25H38O5) merupakan obat golongan statin yang dapat menghambat aktivitas enzim HMG-CoA reduktase dan telah banyak digunakan untuk menurunkan kolesterol dalam darah. Simvastatin memiliki waktu paruh yang cenderung singkat sekitar 2-3 jam. Obat simvastatin umumnya dikonsumsi dengan rute oral konvensional. However, administering drugs like this can cause drug fluctuations in the body which will cause side effects. Sistem pelepasan obat terkontrol digunakan untuk mengatasi masalah tersebut, salah satunya dengan teknik mikroenkapsulasi, yaitu penyalutan material obat dengan material polimer menghasilkan suatu mikrokapsul. Pada penelitian ini dilakukan penyalutan obat simvastatin dengan polipaduan poli(D,L-asam laktat) (PDLLA) dan metil selulosa (MC) melalui metode penguapan pelarut. Mikrokapsul dibuat dengan variasi komposisi massa PDLLA dan MC. Mikrokapsul yang dihasilkan dihitung efisiensi enkapsulasi dan pelepasan obatnya melalui uji disolusi secara in vitro. Didapatkan persen padatan mikrokapsul tertinggi pada 63,79% dengan rata-rata ukuran 0,1331 0,0031 m. Efisiensi enkapsulasi tertinggi yaitu pada komposisi PDLLA/MC 90:10 (%b/b) sebesar 93,13 0,04 % dan terendah pada PDLLA/MC 30:70 (%b/b) sebesar 82,77 1,35 %. Hasil mikroskop optik menunjukkan bahwa bentuk mikrokapsul yang terbentuk bulat dengan permukaan yang berpori dan berlubang. Selama uji disolusi, polipaduan mikrokapsul dapat menahan pelepasan simvastatin. Sebanyak 23,74% simvastatin dapat lepas dari mikrokapsul simvastatin dengan komposisi PDLLA/MC (%b/b) 90:10

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Simvastatin (C25H38O5) is a statin drug that inhibits the activity of the HMG-CoA reductase enzyme and has been widely used to reduce cholesterol in the blood. Simvastatin has a shorter lap time of around 2-3 hours. Simvastatin is generally administrated by the conventional oral route. However, administering drugs like this can cause drug fluctuations in the body which will cause side effects. Controlled drug delivery system is used to overcome this problem, one of which is the microencapsulation technique, coating the drug with polymeric materials produce microcapsules. In this research, simvastatin encapsulated by poly(D,L-lactic acid) (PDLLA) and methyl cellulose (MC) was carried out through the solvent evaporation method. Microcapsules are made with composition variations of the polyblend PDLLA/MC. The resulting microcapsules were calculated for their encapsulation efficiency and drug release through in vitro dissolution tests. The highest yield percentage was obtained at 63,79% with an average size of 0,1331 0,0031 m. The highest encapsulation efficiency is at the composition of PDLLA/MC 90:10 (%w/w) which is 93,13 ± 0,04 % and the lowest is 82,77 ± 2,38 % at PDLLA/MC 30:70 (% w/w). The results of optical microscopy show the form of a microcapsule that is spherical with porous and perforated surface. The polyblend PDDLA/MC can hold the release of simvastatin during the dissolution test. At total of 23,74% simvastatin released from the microcapsule with the composition of PDLLA/MC (%w/w) 90:10.