Pengaruh konsentrasi oleoresin ekstrak jahe (zingiber officinale) dalam mikropartikel kitosan-alginat terhadap profil pelepasan terkendali dalam fluida sintetik gastrointestinal = Effect of oleoresin concentration from ginger extract in chitosan-alginate microparticle towards the drug release profile in simulated gastrointestinal fluid

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Abstrak

Penelitian ini dilakukan untuk mendapatkan pengaruh konsentrasi oleoresin rimpang jahe merah dalam mikropartikel kitosan-alginat terhadap profil pelepasan dalam fluida sintetik gastrointestinal. Oleoresin diperoleh melalui proses maserasi dengan etanol 96 yang menghasilkan rendemen sebesar 6,34 dengan kandungan fenolik 204,59 mg GAE/g oleoresin. Mikropartikel diperoleh setelah preparasi dengan metode taut silang, dengan variasi pada penambahan massa oleoresin yaitu sebesar 0,1; 0,25 dan 0,5 g, dengan satu variasi mikropartikel dengan oleoresin sebesar 0,1 g tanpa tersalut polimer alginat. Oleoresin terdeteksi dalam matriks melalui pengujian FTIR. Efisiensi enkapsulasi dan penjerapan ditemukan meningkat seiring peningkatan massa oleoresin, dengan efisiensi enkapsulasi sekitar 91-97 dan penjerapan sekitar 1-8. Pelepasan terkendali diuji secara in vitro melalui simulasi sistem pencernaan berbasis pH dan enzim dengan simulated gastric fluid SGF pH 1,2; simulated intestinal fluid SIF pada pH 7,4 dengan enzim -amilase dan simulated colonic fluid SCF pH 6,8 dengan enzim -glukosidase. Peningkatan penjerapan oleoresin tidak menghasilkan pelepasan kumulatif yang berbeda diantara variasi mikropartikel. Penambahan alginat ditemukan mampu menghambat pelepasan oleoresin terutama pada pH rendah. Pelepasan keseluruhan mikropartikel yang relatif rendah 30 dengan alginat dan 50 tanpa alginat menunjukkan potensi yang kuat untuk aplikasi terapi dengan target pada kolon.

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The objective of this study is to find the effect of oleoresin concentrion in chitosan alginate microparticles on the release profile in simulated gastrointestinal fluids. The oleoresin was obtained through maceration using ethanol as the solvent, obtaining a yield of 6.34 containing phenolic compound concentration of 204.59 mg GAE g oleoresin. Chitosan alginate microparticles were obtained through cross linking with variations in the amount of oleoresin which were added in the process, which were as much as 0,1 0,25 and 0,5 grams, with one microparticle containing 0,1 g of oleoresin without the addition of alginate. Oleoresin was detected inside the microparticle through FTIR. Encapsulation efficiency and loading was found to increase along with increasing the amount of oleoresin added to the microparticles. Encapsulation efficiency was found along the range of 91 97 and loading was found along the range of 1 8. The release profile was tested through gastrointestinal fluid simulation based usng simulated gastric fluid SGF, simulated intestinal fluid SIF added with amylase enzyme and simulated colonic fluid SCF added with glucosidase enzyme. Based on the release profile, the increase in drug loading did not affect the release from the different microparticles. The addition of alginate was found to greatly suppress the release especially in low pH condition. The results of this study shows the potential of the formulation for targeted drug delivery to the colon.