SKRIPSI

OPTIMASI FORMULA *SELF EMULSIFYING* PEMBAWA KUERSETIN MENGGUNAKAN PENDEKATAN *SIMPLEX LATTICE DESIGN* DAN ANALISIS KEMOMETRIK

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PALEMBANG
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Optimasi Formula *Self Emulsifying* Pembawa Kuersetin Menggunakan Pendekatan *Simplex Lattice Design* Dan Analisis Kemometrik

XXIV, 135 Halaman, 19 Tabel, 13 Gambar, 28 Daftar Singkatan, 25 Lampiran

INTISARI

Latar belakang: optimasi SE dilakukan untuk mencapai hasil yang ideal dalam pengembangan kuersetin sebagai zat aktif dengan kelarutan yang rendah dalam air. Formulasi SE kuersetin terdiri dari komponen minnyak, surfaktan, dan ko-surfaktan dapat meningkatkan kelarutan obat dalam cairan gastrointestinal. **Tujuan:** menetapkan konsentrasi dan karakteristik formula optimum SE menggunakan rancangan *Simplex lattice design* dan korelasi antar respon berdasarkan pendekatan kemometrik. **Metode:** Minyak yang digunakan minyak biji anggur(*Grape seed oil*), tween 80 sebagai surfaktan, polietilen glikol 400 sebagai ko-surfaktan dan *simplex lattice design* digunakan untuk menentukan konsentrasi masing-masing komponen penyusun SE. Parameter evaluasi meliputi transmitan SE, transmitan nanoemulsi, waktu emulsifikasi aquadest, waktu emulsifikasi cairan lambung, waktu emulsifikasi cairan usus, viskositas, dan *drug load*. Evaluasi interaksi antar komponen menggunakan analisis kemometrik. Diameter *droplet*, indeks polidispersitas (PDI), zeta potensial, mobilitas elektroforensis formula optimum diuji evaluasi menggunakan *dynamic light scattering-particle size analyzer* (DLS-PSA). **Hasil:** formula optimum memiliki nilai transmitan SE 98,03±0.30%, transmitan nanoemulsi 90,06±0,09%, waktu emulsifikasi aquadest 3,71±0,07 detik, waktu emulsifikasi cairan lambung 3,68±0,12 detik, waktu emulsifikasi cairan usus 3,3±0,13 detik, viskositas 6,59±0,24 mPa.s, *drug load* 48,5±0,66 mg/mL. **Kesimpulan:** konsentrasi komponen penyusun SE optimum meliputi minyak biji anggur 10% sebagai fase minyak, tween 80 60% sebagai surfaktan, dan PEG 400 30% sebagai ko-surfaktan mempengaruhi karakteristik dan memiliki korelasi antar respon pada analisis kemometrik.

Kata kunci : SE, kuersetin, *simplex lattice design*, nanoemulsi

Daftar pustaka : 74 (2011-2022)

STIKES 'AISYIYAH PALEMBANG
UNDERGRADUATE PROGRAM OF PHARMACY

Thesis, May 2023

Amrina Atmaningtias

Optimization of Quercetin Carrier Self Emulsifying Formula Using Simplex Lattice Design Approach and Chemometric Analysis

XXIV, 135 Pages, 19 Tables, 13 Images, 28 List of abbreviations, 25 Attachments

ABSTRACT

Background: SE optimization was carried out to achieve ideal results in the development of quercetin as an active substance with low solubility in water. The SE quercetin formulation consists of oil, surfactant and co- surfactant components which can increase the solubility of the drug in the gastrointestinal fluids. **Objective:** to determine the optimum concentration and characteristics of the SE formula using the simplex lattice design and the correlation between responses based on a chemometric approach **Methods:** The oil used was grapeseed oil (Grape seed oil tween 80 as surfactant, polyethylene glycol 400 as a co- surfactant and a simple lattice design was used to determine the concentration of each SE component. Evaluation parameters included SE transmittance, nanoemulsion transmittance, aquadest emulsification time, gastric fluid emulsification time, intestinal fluid emulsification time, viscosity, and drug load. Evaluation of interactions between components using chemometric analysis droplet diameter, polydispersity index (PDI), zeta potential, electrophoretic mobility your optimal formula was tested for evaluation using a dynamic light scattering- particle size analyzer (DLS-PSA) **Result:** the optimum formula has a transmittance value of SE 98.03+0.30 transmittance nanoemulsı 90, 06±0.09%, aquadest emulsification time 3.71+0.07 de gastric fluid emulsification time 3.68+0.12 seconds, liquid emulsification time u 3.3±0.13 seconds, viscosity 6.59+0 ,24 mPa, drug load 48,5+0,66 mg/mL. **Conclusion:** the optimum concentrations of the SE components including grapeseed oil 10% as the oil phase, tween 80 60% as surfactant, and PEG 400 30% as co- surfactant affect the characteristics and have a correlation between responses in chemometric analysis.

Keyword : SE, quercetin, simplex lattice design, nanoemulsion

References : 74 (2011-2022)

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BAB V
KESIMPULAN DAN SARAN

A. Kesimpulan

1. Komponen penyusun SE pada formula optimum terdiri dari minyak biji anggur sebagai fase minyak dengan konsentrasi 10%, tween 80 sebesar 60% sebagai surfaktan, dan PEG 400 sebesar 30% sebagai ko-surfaktan.
2. Nilai dari masing-masing parameter meliputi transmitan SE sebesar 95,502%, transmitan nanoemulsi sebesar 86,870%, waktu emulsifikasi aquadest 3,57 detik, waktu emulsifikasi SGF 3,58 detik, waktu emulsifikasi SIF 3,23 detik, *drug load* sebesar 49,89 mg/mL, dan viskositas sebesar 6,863 mPa.s.
3. Respon transmitan dengan waktu emulsifikasi SIF berkorelasi positif, sedangkan respon viskositas dengan waktu emulsifikasi aquadest, drug load dengan respon transmitan dan waktu emulsifikasi aquadest, SGF, dan SIF berkorelasi negatif.

B. Saran

1. Perlu dilakukan penelitian lebih lanjut mengenai *drug content* untuk mendapatkan jumlah zat aktif yang lebih akurat dan signifikan
2. Perlu dilakukan *fitting* model terkait ukuran *droplet,* indeks polidispersitas (PDI), zeta potensial, dan mobilitas elektroforensis.

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