INTISARI

Pentagamavunon-0 mempunyai aktivitas anti-inflamasi yang poten. Ketersediaan hayati PGV-0 sangat rendah dikarenakan kelarutannya yang rendah dalam air. Penelitian ini bertujuan untuk mengoptimasi SNEDDS PGV-0 dan membandingkan disolusi, permeasi dan efek antiinflamasinya dengan PGV-0.

Optimasi SNEDDS PGV-0 dilakukan dengan menggunakan *Simplex Lattice Design*. Sebagai variabel tetap adalah jumlah asam oleat (X_1), tween 20 dan labrasol (X_2), dan PEG 400 (X_3) dan sebagai variabel tergantung adalah ukuran droplet (Y_1), konsentrasi PGV-0 yang terlarut pada menit ke-45 (C_{45}) (Y_2) dan kelarutan PGV-0 (Y_3). Formula optimum SNEDDS dibuat berdasarkan hasil optimasi dengan mencampurkan PGV-0 ke dalam campuran fase minyak, surfaktan dan kosurfaktan. Nanoemulsi yang terbentuk dievaluasi dan dikarakterisasi meliputi ukuran partikel, potensial zeta, stabilitas termodinamika dan sitotoksisitasnya. Nanoemulsi SNEDDS PGV-0 selanjutnya dibandingkan karakteristik disolusi dan absorpsinya pada media cairan lambung buatan (AGF) dan cairan usus buatan (AIF). Aktivitas antiinflamasi formula optimum diuji dengan metode udema kaki belakang tikus serta uji histopatologi melibatkan pewarnaan biru toluidin.

Formula optimum terdiri dari 18,6% asam oleat, 51,4% tween 20:labrasol 1:1 dan 30% PEG 400 dengan kelarutan PGV-0 31,80 mg/mL, ukuran droplet 75,45 nm dan C_{45} 82,20%. Nanoemulsi dari SNEDDS PGV-0 dosis 16,35 mg/mL stabil secara termodinamika, dan tidak toksik terhadap sel normal fibroblast NIH3T3. Formula optimum SNEDDS PGV-0 mampu meningkatkan disolusi sebesar 44,13% di medium AGF dan 30,37% di medium AIF serta jumlah PGV-0 terdifusi sebesar 3,7 kali lipat di medium AGF dan 3,8 kali lipat di medium AIF dibandingkan dengan serbuk PGV-0. Aktivitas antiinflamasi SNEDDS PGV-0 dosis 35,64 mg/kg BB lebih besar secara bermakna dibandingkan suspensi PGV-0 pada dosis yang sama. Jumlah sel mast kelompok kontrol negatif (suspensi Na CMC), SNEDDS PGV-0, dan kontrol positif (Na diklofenak) tidak berbeda bermakna. Aktivitas antiinflamasi PGV-0 tidak dipengaruhi oleh jumlah sel mast. Disimpulkan bahwa SNEDDS PGV-0 mampu meningkatkan kelarutan, absorpsi dan aktivitas inflamasi PGV-0.

Kata kunci: PGV-0, SNEDDS, optimasi, antiinflamasi.

ABSTRACT

Pentagamavunon-0 has potent anti-inflammatory activity. The bioavailability of PGV-0 is very low due to its low solubility in water. This study aimed to optimize SNEDDS PGV-0 and compare its dissolution, permeation and anti-inflammatory effect with PGV-0.

The optimization of SNEDDS PGV-0 was done using Simplex Lattice Design. The fixed variables were the amount of oleic acid (X1), tween 20 and labrasol (X_2), and PEG 400 (X_3) and as dependent variables were the droplet size (Y_1), the soluble PGV-0 concentration at 45 min (C_{45}) (Y_2) and the solubility of PGV-0 (Y_3). The optimum formula of SNEDDS was prepared based on the optimization results by mixing PGV-0 into the oil phase mixture, surfactant and cosurfactant. The formed nanoemulsion were evaluated and characterized for particle size, zeta potential, thermodynamic stability and cytotoxicity. The characteristics of dissolution and absorption of nanoemulsion of SNEDDS PGV-0 then was compared on artificial gastric fluid and artificial intestinal fluid. The anti-inflammatory activity of the optimum formula was tested by carrageenan- induced paw edema in the rat method and histopathology test involving toluidin blue staining.

The optimum formula consisted of 18.6% oleic acid, 51.4% tween 20 (1:1) and 30% PEG 400 labrasol with the PGV-0 solubility 31.80 mg/mL, the droplet size 75.45 nm and C_{45} 82.20%. The nanoemulsion of SNEDDS PGV-0 dose 16.35 mg/mL was thermodynamically stable, and not toxic to NIH3T3 normal fibroblast cells. The optimum formula of SNEDDS PGV-0 was able to increase the dissolution of 44.13% in AGF medium and 30.37% in AIF medium and the amount of PGV-0 diffused by 3.7-fold in AGF medium and 3.8-fold in AIF compared with PGV-0 powder. The anti-inflammatory activity of the SNEDDS PGV-0 dose 35.64 mg/mg BB was greater significantly than the PGV-0 suspension in the same dose. The mast cell amount of negative control group (NaCMC suspension), SNEDDS PGV-0, and positive control (diclofenac Na) were not significantly different. The anti-inflammatory activity of PGV-0 was not affected by the number of mast cells. It was concluded that SNEDDS PGV-0 was able to increase PGV-0's solubility, absorption and inflammatory effect.

Keywords: PGV-0, SNEDDS, optimization, anti-inflammation.