

INTISARI

Ekstrak sambiloto (*Andrographis paniculata* (Burm.F) Nees) mengandung andrografolid dan telah dilaporkan memiliki aktivitas hipoglikemik yang poten. Ekstrak terpurifikasi sambiloto dikembangkan menjadi sediaan SNEDDS (*Self-nanoemulsifying Drug Delivery System*) untuk meningkatkan kelarutan dan bioavailabilitas. Penelitian ini untuk mengevaluasi formula SNEDDS ekstrak terpurifikasi sambiloto dan pengaruh SNEDDS terhadap kadar glukosa darah dan translokasi protein GLUT-4 pada tikus resisten insulin dibandingkan dengan penggunaan dari ekstrak sambiloto tanpa formulasi.

Formula optimal SNEDDS ekstrak terpurifikasi sambiloto diuji ukuran tetesan nanoemulsi, zeta potensial, dan stabilitasnya. Hewan uji resisten insulin dibuat dengan pemberian fruktosa (1,8 g/kg BB) dan pakan kaya lemak (campuran 70% pelet, 15% kuning telur bebek dan 15% minyak babi) selama 100 hari. Penetapan kondisi resisten insulin hewan uji digunakan 3 parameter meliputi kadar glukosa darah, uji kadar lemak (trigliserida, LDL, kolesterol dan HDL), dan uji daya hipoglikemik glibenklamid. Pemberian perlakuan dilakukan selama 14 hari setelah tikus mengalami resistensi insulin. Subyek uji dibagi dalam 6 kelompok meliputi ekstrak terpurifikasi sambiloto (58,55 mg/200g BB), SNEDDS ekstrak terpurifikasi sambiloto (58,55 mg/200g BB), kontrol positif (metformin 45 mg/kg BB), kontrol negatif (CMC-Na 0,5%), kelompok plasebo (SNEDDS tanpa ekstrak terpurifikasi sambiloto) dan (kontrol normal).

Formula SNEDDS ekstrak terpurifikasi sambiloto mengandung 14,29% minyak miglyol 812N; 71,42% surfaktan (Tween 80); 14,29% ko-surfaktan (PEG 400) dengan hasil ukuran tetesan nanoemulsi 16,8 nm; PI sebesar 0,214; dan zeta potensial -44,1 mV. SNEDDS tetap stabil setelah penyimpanan selama 60 hari pada suhu kamar dan uji *freeze thaw* selama enam siklus. Hasil uji resisten insulin dengan analisis statistik *independent sample t-test* menunjukkan ada perbedaan bermakna ($p < 0,05$) antara tikus normal dengan tikus diet tinggi lemak-fruktosa pada hari ke-100. SNEDDS ekstrak terpurifikasi sambiloto dapat menurunkan kadar glukosa darah serta meningkatkan translokasi protein GLUT-4 lebih besar dan berbeda nyata dengan ekstrak terpurifikasi sambiloto tanpa formulasi ($p < 0,05$) setelah pemberian selama 14 hari.

Kata kunci : SNEDDS, Ekstrak terpurifikasi, *Andrographis paniculata*, Antidiabetes.

ABSTRACT

Extract of *Andrographis paniculata* (Burm.F) Nees herbs containing andrographolide and has been reported to have potent hypoglycemic activity. Purified extract of *A. paniculata* is developed into SNEDDS (*Self-nanoemulsifying Drug Delivery System*) to increase solubility and bioavailability. This study was to evaluate the SNEDDS purified extract of *A. paniculata* herbs formula and SNEDDS effect on blood glucose levels and the GLUT-4 protein translocation in insulin-resistance rats compared to the use of extracts without formulation.

The nanoemulsion droplet size, zeta potential and the stability of the optimal formula of SNEDDS purified extract of *A. paniculata* were tested. Insulin-resistance test animals were treated with the loading of fructose (1.8 g /kg BW) and fat-rich fodder (a blend of 70% pellets, 15% of duck egg yolk and 15% of lard) for 100 days. The determination of the insulin-resistance test animals condition used three parameters including blood glucose levels, test of fat levels (triglycerides, LDL, and HDL cholesterol), and tests hypoglycemic glibenclamide. The treatment was carried out for 14 days after the rats resistance to insulin. The test preparation were divided into 6 groups including purified extract of *A. paniculata* (58.55 mg/200g BW), SNEDDS *A. paniculata* extract (58.55 mg/200g BW), a positive control (metformin 45 mg /kg BW), a negative control (CMC-Na 0, 5%) the placebo group (SNEDDS without *A. paniculata* extract) and (normal control).

The formula of SNEDDS purified extract of *A. paniculata* containing 14.29% of miglyol oil 812N, 71.42% of surfactant (Tween 80), 14.29% of co-surfactant (PEG 400) with results of nanoemulsion droplet size of 16.8 nm, PI of 0.214, and zeta potential -44.1 mV. SNEDDS remained stable after storage for 60 days at room temperature and freeze-thawing test for six cycle. The results of the insulin resistance test with statistical analysis Independent Sample t-test showed significant differences ($p < 0.05$) between normal rats with rats induced high fat-fructose on the hundredth day. SNEDDS purified extract of *A. paniculata* could lower blood glucose levels and greater increases the translocation of GLUT-4 protein differ significantly to the extract of *A. paniculata* without formulation after giving treatment for 14 days ($p < 0,05$).

Keywords: SNEDDS, Purified extract, *Andrographis paniculata*, Antidiabetic.