

INTISARI

Ekstrak terpurifikasi temulawak (*Curcuma xanthorrhiza* Roxb.) pada tikus Wistar jantan secara per oral dilaporkan memiliki efek sebagai antihiperlipidemia, namun memiliki bioavailabilitas yang rendah. Salah satu upaya meningkatkan bioavailabilitas ekstrak terpurifikasi temulawak dengan cara formulasi dalam bentuk *Self-NanoEmulsifying Drug Delivery System* (SNEDDS). Penelitian ini bertujuan untuk mengevaluasi formula dan aktivitas farmakologi SNEDDS ekstrak terpurifikasi temulawak terhadap kadar lipid darah pada tikus resisten insulin dibandingkan dengan penggunaan ekstrak konvensional.

Pembuatan ekstrak terpurifikasi temulawak dilakukan dengan metode maserasi menggunakan etil asetat dari serbuk kering perasan temulawak dan dipurifikasi dengan *n*-heksan kemudian dilakukan analisis kualitatif dan kuantitatif secara KLT-densitometri. Formula SNEDDS ekstrak terpurifikasi temulawak dioptimasi dengan metode D-Optimal menggunakan *software Design Expert 7.1.5.*, kemudian dilakukan pengukuran tetesan nanoemulsi, zeta potensial dan uji stabilitas pada suhu kamar dan *freeze thawing*. Hewan uji resisten insulin diberikan pembebanan fruktosa (1,8 g/kgBB) dan pakan diet tinggi lemak selama 100 hari. Penetapan kondisi resisten insulin dilakukan dengan mengukur kadar glukosa darah, kadar lipid darah (kolesterol, trigliserida, LDL, HDL) dan uji daya hipoglikemik glibenklamida. Uji antihiperlipidemia dilakukan selama 7 hari dengan mengukur kadar lipid darah dengan pembagian kelompok meliputi ekstrak terpurifikasi temulawak konvensional, SNEDDS ekstrak terpurifikasi temulawak, kontrol positif (simvastatin), kontrol negatif (CMC Na 0,5%), kontrol plasebo (pembawa SNEDDS) dan kontrol normal.

Kadar kurkumin dalam ekstrak terpurifikasi dan tiap 1 g sistem SNEDDS masing-masing sebesar 27,61% dan 1,42%. SNEDDS ekstrak terpurifikasi temulawak optimal mengandung 15% Miglyol[®] 812N, 70% surfaktan (tween 80), 15% ko-surfaktan (PEG 400) dengan hasil ukuran tetesan nanoemulsi 16,4 nm, PI 0,263, dan nilai zeta potensial -38,5 mV. SNEDDS stabil dalam penyimpanan selama 60 hari pada suhu kamar dan uji *freeze-thawing*. SNEDDS ekstrak terpurifikasi temulawak mampu menurunkan trigliserida, LDL lebih efektif namun belum mampu menurunkan kolesterol total dan menaikkan HDL dibandingkan ekstrak konvensional secara signifikan pada tikus resisten insulin.

Kata kunci : *Curcuma xanthorrhiza* Roxb., SNEDDS, Miglyol[®] 812N, Antihiperlipidemia

ABSTRACT

Purified extract of turmeric java (*Curcuma xanthorrhiza* Roxb.) has been reported to have effect as antihyperlipidemia in male Wistar rats, but has a low bioavailability. One of solutions to improve its bioavailability is formulation development in the form of *Self-Nanoemulsifying Drug Delivery System* (SNEDDS). The aim of this study was to evaluate the formula and the pharmacological activity of SNEDDS of purified extract of turmeric java on blood lipid levels in insulin-resistance rats compare to use of conventional extracts.

Purified extract of turmeric java was macerated using ethyl acetate from the dry powder of turmeric java juice and purified with *n*-hexane and then analysed by TLC-densitometry. Formula of SNEDDS purified extract of turmeric java was optimized with D-Optimal method using software Design Expert 7.1.5., then measured droplets nanoemulsion, zeta potential and stability tests at room temperature and freeze thawing. Insulin-resistance rats are induced by orally treated of fructose (1.8 g/kg BW) and high-fat diet for 100 days. Determination of insulin-resistance rats condition were done by measuring blood glucose levels, blood lipid levels (total cholesterol, triglycerides, LDL, HDL) and test of hypoglycemic effect of glibenclamide. Antihyperlipidemia activity study was carried out for 7 days after the rats resistance to insulin. The study were divided into group include conventional extract, SNEDDS purified extract of turmeric java, a positive control (simvastatin), negative control (CMC Sodium 0.5%), placebo-controlled trial (carrier SNEDDS) and normal control.

Level of curcumin in the purified extract and each 1 g extract in SNEDDS system were 27.61% and 1.42%, respectively. Formula of SNEDDS purified extract of turmeric java contained 15% of Miglyol[®] 812N, 70% of surfactant (tween 80), 15% of co-surfactant (PEG 400) with a result nanoemulsion droplet size of 16.4 nm, PI value of 0.263, and zeta potential value of -38.5 mV. SNEDDS is stable in storage for 60 days at room temperature and freeze-thawing test. SNEDDS purified extract of turmeric java could lower triglycerides and LDL levels more effective and significant than conventional extract in insulin-resistance rats ($p < 0.05$), but not significant for decrease of total cholesterol and increase of HDL ($p > 0.05$).

Keywords : *Curcuma xanthorrhiza* Roxb., SNEDDS, Miglyol[®] 812N, Antihyperlipidemia