INTISARI

Minyak atsiri rimpang *Curcuma mangga* Val. diketahui memiliki efek sitotoksik pada sel kanker payudara baik secara *in vitro* maupun *in silico*; sehingga minyak atsiri tersebut berpotensi dikembangkan sebagai agen antikanker. Namun minyak atsiri tersebut tidak larut air, mudah menguap, serta tidak stabil dalam penyimpanan dan dosis pemberian; sehingga mengurangi efektifitasnya sebagai sediaan antikanker. Oleh karena itu, minyak atsiri *C. mangga* Val. perlu dibuat nanoemulsi. Tujuan penelitian ini untuk mendapatkan formula optimum SNEDDS minyak atsiri *C. mangga* Val., mengetahui stabilitasnya dan mengevaluasi efek antikankernya pada tikus yang diinduksi DMBA.

Formulasi nanoemulsi minyak atsiri *C. mangga* Val. dilakukan dengan teknik *self nanoemulsifying drug delivery system* (SNEDDS) dengan komponen migliol, Tween 80 dan PEG 400; serta dioptimasi dengan Design Expert Ver. 10 dengan metode *simplex lattice design* (SLD). Respon yang diuji adalah transmitan dan waktu emulsifikasi pada media akuades, *artificial gastric fluide* (AGF) dan *artificial intestine fluide* (AIF). Formula optimum kemudian dikarakterisasi, diuji stabilitasnya dan diujikan pada tikus yang diinduksi DMBA. Uji *in vivo* kemopreventif dilakukan dengan pemberian minyak atsiri, nanoemulsinya dan tamoksifen (kontrol positif) sebelum dan selama perlakuan DMBA. Uji kemopreventif dilakukan selama 14 minggu dengan pengamatan terjadinya nodul pada organ mamae, kemudian diakhiri dengan nekropsi tikus dan dievaluasi histopatologi organ mamaenya.

Formula SNEDDS optimum yang diperoleh adalah kombinasi dari Migliol (16.034%), Tween 80 (68.380%) dan PEG 400 (15.586%). Karakteristik nanoemulsi minyak atsiri *C. mangga* Val. memiliki ukuran tetesan 15.75 nm, potensial zeta -8.54 mV, dan nilai PDI 0.188; serta stabil dalam tiga tes pengujian termodinamik. Hasil uji *in vivo* menunjukkan bahwa minyak atsiri *C. mangga* Val. berpotensi kemopreventif antikanker payudara. Sedangkan SNEDDS minyak atsiri *C. mangga* Val. belum terbukti memiliki potensi antikanker lebih baik daripada minyak atsiri *C. mangga* Val.

Kata kunci: *Curcuma mangga* Val., minyak atsiri, SNEDDS, DMBA.

ABSTRACT

Essential oil of *Curcuma mangga* Val. rhizome has been proven to have cytotoxic effects on breast cancer cell lines by *in vitro* and *in silico* studies, so that it is possible to become anticancer agent. However the oil is water insoluble, very volatile, and unstable in room temperature as well as in administration dose, which cause reduce its effectiveness as an anticancer agent. Therefore the oil needs to prepare in a nanoemulsion. The aim of this study was to obtain the optimal SNEDDS formula, to find out the SNEDDS stability and to evaluate the anticancer effects in DMBA-induced rats.

The nanoemulsion formulation of the essential oil of *C. mangga* Val. was carried out using self nanoemulsifying drug delivery systems (SNEDDS) technique which contains migliol, Tween 80 and PEG 400; which was then optimized the formula using simplex lattice design (SLD) method by Design Expert Ver. 10. The response studies were the transmittance as well as emulsification times in distilled water, *artificial gastric fluide* (AGF) and *artificial intestine fluide* (AIF). The optimal SNEDDS formula was then characterized, evaluated its stabilities, and given to DMBA-induced rats. A chemopreventive study was carried out on DMBA-induced rats which given (before and during DMBA initiation) the oil, the oil's SNEDDS, and tamoxifen as positive control. Rats were necropsied after 14 week study, and the mammary organs were histopathological evaluated.

The optimum SNEDDS formula resulted was a combination of migliol (16,034%), Tween 80 (68,380%), and PEG 400 (15,586%). The nanoemulsion characteristics were 15.75 nm droplet size, -8.54 mV zeta potential, and 0.188 PDI as well as being stable in thermodynamic tests. The *in vivo* study showed that the essential oil potentially being a chemopreventive breast cancer agent. However, the oil's SNEDDS has not been proven yet to have a better anticancer-potency than the oil.

Keywords: *Curcuma mangga* Val., essential oil, SNEDDS, DMBA.