

Formulasi dan Evaluasi Serum Fitosom Ekstrak Etanol Daun Senggani (*Melastoma malabathricum* L.), serta Uji Aktivitas Anti Aging secara In Vitro = Formulation of Serum Dosage Form Containing *Melastoma malabathricum* L. Leaves Extract-loaded Phytosome and In Vitro Evaluation of Anti Aging Activity

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Abstrak

Daun senggani (*Melastoma malabathricum* L.) digunakan sebagai penyembuh luka secara empiris. Senyawa yang bertanggungjawab atas aktivitas farmakologi daun senggani adalah senyawa fenolik, flavonoid, dan glikosida. Senyawa fenolik dan flavonoid diketahui memiliki aktivitas anti-aging. Selain itu, senyawa flavonoid dan fenolik tidak stabil dan sulit terpenetrasi di kulit. Tujuan penelitian ini untuk mengetahui aktivitas anti-aging ekstrak daun senggani dan mendapatkan serum fitosom ekstrak daun senggani yang stabil dan memiliki penetrasi yang baik. Uji aktivitas anti-aging dilakukan secara in vitro terhadap dua enzim, yaitu elastase dan kolagenase. Tiga formula fitosom dibuat dengan metode hidrasi lapis tipis berdasarkan perbandingan massa ekstrak dan fosfolipid. Fitosom dikarakterisasi berdasarkan morfologi, ukuran partikel dan zeta potensial, profil spektrum FTIR, dan efisiensi penjerapan.

Formula fitosom terpilih diformulasikan ke dalam sediaan serum, kemudian diuji stabilitas dan penetrasi secara in vitro dengan sel difusi Franz. Ekstrak daun senggani memiliki aktivitas anti-elastase (IC_{50} 95,553 $\mu\text{g/mL}$) dan anti-kolagenase (62,933 $\mu\text{g/mL}$). Fitosom ekstrak daun senggani (F2, 1:1 b/b) memiliki bentuk sferis, D_{v90} 638,00 $\pm$ 62,39 nm, PDI 0,503 $\pm$ 0,05, zeta potensial (ZP) -38,3 $\pm$ 1,6 mV, efisiensi penjerapan 92,22 $\pm$ 0,31%. Spektrum IR membuktikan terjadinya kompleks antara ekstrak dan fosfolipid dalam fitosom. Serum fitosom tidak mengalami perubahan ukuran partikel, namun mengalami penurunan kadar kuersetin setelah 12 minggu penyimpanan pada suhu 25 $^{\circ}\text{C}$. Fluks serum fitosom adalah 0,56 $\pm$ 0,01 $\mu\text{g/cm}^2/\text{jam}$, sedangkan fluks serum ekstrak adalah 1,28 $\pm$ 0,02 $\mu\text{g/cm}^2/\text{jam}$. Dapat disimpulkan bahwa ekstrak daun senggani berpotensi sebagai bahan kosmetik anti-aging, fitosom ekstrak daun senggani stabil pada suhu rendah, dan serum ekstrak terpenetrasi lebih baik dibandingkan dengan serum fitosom. Penelitian lebih lanjut dibutuhkan untuk lebih meningkatkan stabilitas dan penetrasi ekstrak daun senggani.

.....Senggani leaves (*Melastoma malabathricum* L.) was used traditionally to treat wound because of flavonoids and phenolic compound. Flavonoid and phenolic compounds were known to have anti-aging activity. However, flavonoids and phenolic compounds were poor in stability and skin permeation. The aim of this study was to evaluate the anti-aging activity of the extracts, then formulate and evaluate serum dosage form containing senggani leaves extract-loaded phytosomes. Anti-aging activity was evaluated by in vitro elastase inhibitor and collagenase inhibitor. The extract was formulated into three formulations of phytosomes with thin layer method. The phytosomes were characterized in terms of particle morphology, particle size, zeta potential, profile spectra of FTIR, and entrapment efficiency. The selected phytosome formula was formulated into serum dosage form and evaluated its stability and in vitro penetration study using Franz diffusion cell. The senggani leaves extract has anti-elastase and anti collagenase with IC_{50} of 95.553 $\mu\text{g/mL}$ and 62.933 $\mu\text{g/mL}$, respectively.

The selected phytosome formula (F2, 1:1 w/w) has a spherical shape, Dv90 of 638.00 ± 62.39 nm, PDI 0.503 ± 0.05 , zeta potential of -38.3 ± 1.6 mV, and entrapment efficiency of $92.22 \pm 0.31\%$. Molecular interaction between extract and phospholipid was confirmed from FTIR spectrum. Serum phytosome was physically stable, but chemically unstable after 12 weeks storage in 25°C . According to the in vitro penetration study, the diffusion flux of quercetin as marker from phytosome and extract serum was $0.7945 \mu\text{g}/\text{cm}^2/\text{h}$ and $1.835 \mu\text{g}/\text{cm}^2/\text{h}$, respectively. In conclusion, the extract could be a potential anti-aging, the phytosomes were stable in low temperature, and the skin penetration of the extract serum was much better than the phytosomes serum. Further study was required to improve stability and penetration of the extract.