INTISARI

Beta karoten telah dilaporkan memiliki aktivitas sebagai antioksidan yang efektif. Akan tetapi, beta karoten yang diaplikasikan pada *patch* gingiva mukoadhesif tidak signifikan mengurangi jumlah mironukleus sebagai efek negatif paparan radiografi panoramik karena kelarutannya yang rendah dalam matrik *patch*. Pengembangan formulasi SNEDDS beta karoten diharapkan mampu meningkatkan kelarutan beta karoten dalam matrik *patch* mukoadhesif. Penelitian ini bertujuan mengetahui kemampuan kombinasi *Rice Bran Oil*, Tween 80 dan PEG 400 dalam menghasilkan SNEDDS beta karoten, kemampuan formula optimum SNEDDS beta karoten menghasilkan *patch* mukoadhesif, dan kemampuan pelepasannya yang diuji secara *in vitro* menggunakan sel difusi Franz.

Perbandingan komponen SNEDDS beta karoten ditentukan dengan metode optimasi *D-Optimal* menggunakan *Design Expert* versi 10. Formula SNEDDS beta karoten yang paling optimal diaplikasikan ke dalam sediaan *patch* mukoadhesif dan diuji karakteristik fisik serta uji pelepasan secara *in vitro* menggunakan sel difusi Franz.

Hasil penelitian menunjukkan bahwa *Rice Bran Oil* 8,05%, Tween 80 84,95% dan PEG 400 7% dapat menghasilkan formula SNEDDS beta karoten yang optimum dengan *loading drug* 2,82±0,02 mg/gram, waktu emulsifikasi 54,2±0,36 detik, dan persen kejernihan 92,5±0,36%. Kandungan beta karoten dalam *patch* meningkat hingga 14,39±0,52 μg/4 cm^2. Pengembangan beta karoten ke dalam bentuk SNEDDS mampu meningkatkan kelarutan beta karoten dalam matrik *patch* mukoadhesif dan mampu melepaskan beta karoten sebesar 19,7±1,74% dalam 8 jam mengikuti model kinetika pelepasan Korsmeyer-Peppas dan mekanisme Fickian.

Kata kunci : Beta karoten, SNEDDS, *patch* mukoadhesif, *D-Optimal*

ABSTRACT

Beta carotene has been shown to have an effective antioxidant activity. However, beta carotene applied to the previous mucoadhesive gingival patch did not significantly reduce the number of micronucleus as negative effects on panoramic radiographic exposure because of its low solubility in the patch matrix. The development of beta carotene SNEDDS formulations is expected to increase its solubility into the mucoadhesive patch matrix. This study aims to determine the ability of a combination of Rice Bran Oil, Tween 80 and PEG 400 to produced beta carotene SNEDDS, the ability of the optimum beta carotene SNEDDS formula to produced mucoadhesive patches, and its released ability that tested in vitro using Franz diffusion cells.

Comparison of components in beta carotene SNEDDS was determined by the D-Optimal optimization method using Design Expert version 10. The optimal beta carotene SNEDDS formula was applied to the mucoadhesive patch and tested physical characteristics and release test in vitro using Franz diffusion cells.

The results showed that Rice Bran Oil 8.05%, Tween 80 84.95% and PEG 400 7% could produce the optimum beta carotene SNEDDS formula with loading drug 2.82±0.02 mg/gram, emulsification time 54.2±0.36 seconds, and %transmittans 92.5±0.36%. Beta carotene content in the patch increased to 14.39±0.52 μg/ 4 cm^2. The development of beta carotene in the form of SNEDDS has been shown to increased its solubility in the mucoadhesive patch matrix and was able to be transported through the cellophane membrane by 19,7±1,74% in 8 hours followed the Korsmeyer-Peppas released kinetic model and the Fickian mechanism.

Keywords: *beta carotene, SNEDDS, mucoadhesive patches, D-Optimal*