INTISARI

Nanosturctured lipid carrier (NLC) merupakan sistem emulsi yang dapat mengenkapsulasi serta meningkatkan stabilitas komponen senyawa bioaktif berbasis lipid. Penelitian ini bertujuan untuk mengembangkan formula RPO-NLC yang optimal dengan kombinasi lipid padat dan lipid cair, lipid dan surfaktan serta tekanan *high-pressure homogenizer* (HPH) yang digunakan. RPO-NLC dibuat menggunakan perbandingan lipid padat dan lipid cair 6:4, 7:3, 8:2, lipid dan surfaktan 1:2,5 dan 1:3 serta *high-pressure homogenizer* (HPH) dengan tekanan 400 bar dan 600 bar. Rancangan acak lengkap (RAL) 3 faktor digunakan untuk mengetahui pengaruh antar faktor. Formula RPO-NLC dikarakterisasi berdasarkan ukuran partikel dan dipilih satu formula terbaik dengan ukuran partikel yang kecil serta kandungan RPO yang tinggi dan dikarakterisasi berdasarkan efisiensi enkapsulasi (EE), kapasitas pemuatan (LC), stabilitas penyimpanan, FTIR dan termal. Kemudian RPO-NLC diaplikasi pada produk minuman sari buah jeruk meliputi analisis evaluasi sensoris, stabilitas enkapsulasi, dan pH. RPO-NLC menghasilkan rerata ukuran diameter partikel 44,9 nm, EE 99,9±0,02%, LC 4,9±0,001% dan stabil pada penyimpanan. β-karoten teridentifikasi dalam matriks lipid RPO-NLC berdasarkan analisis FTIR, serta memiliki stabilitas termal yang baik berdasarkan hasil analisis *differential scanning calorimeter* (DSC). Hasil evaluasi sensoris menunjukkan adanya perubahan atribut sensoris warna, aroma dan rasa selama penyimpanan. Stabilitas enkapsulasi menunjukkan peningkatan yang signifikan selama penyimpanan, serta hasil pengukuran pH juga mengalami peningkatan.

Kata kunci: Red palm oil, *Nanostructured lipid carriers*, *High-pressure homogenizer*, β-karoten, minuman sari buah jeruk.

ABSTRACT

A Nanostructured lipid carrier (NLC) is an emulsion system that can encapsulate and improve the stability of lipid-based bioactive compounds. This study aimed to develop an optimal RPO-NLC formula with a combination of solid and liquid lipids, lipids and surfactants, and the use of high-pressure homogenizer (HPH). RPO-NLC was prepared using a ratio of solid lipids and liquid lipids 6:4, 7:3, 8:2, lipids and surfactants 1:2,5 and 1:3 and HPH with a 400 bar and 600 bar pressure. A Completely randomized design (CRD) with three factors was used to determine the interactions between factors. The RPO-NLC formula was characterized based on particle size. One of the best formulas was selected with small particle size and high RPO content and characterized based on encapsulation efficiency (EE), loading capacity (LC), storage stability, FTIR, thermal and applied to orange juice, including sensory evaluation, encapsulation stability, pH. RPO-NLC yielded an average particle diameter of 44.9 nm, EE 99.9±0.02 %, LC 4.9±0.001 %, was stable on storage. β-carotene identified in the RPO-NLC lipid matrix based on FTIR and has good thermal stability based on the results of differential scanning calorimeter analysis. The sensory evaluation showed changes in the sensory attributes of color, aroma, taste during storage. Encapsulation stability showed a significant increase during storage, and the pH measurement results also increased.

Keywords: RPO, Nanostructured lipid carriers, High-pressure homogenizer, β-carotene, Orange juice.