

**OPTIMASI FORMULASI SISTEM PENGHANTARAN  
NANOFITOSOM GEL FRAKSI ETIL ASETAT RIMPANG JAHE  
(*Zingiber officinale* Roscoe)**

**Tesis**



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(*Zingiber officinale* Roscoe)**

Oleh : Ulfa Ismirza (2021012004)  
(Dibawah bimbingan : Dr. Netty Suharti MS, Prof. apt. Henny Lucida Ph.D)

**Abstrak**

Rimpang jahe (*Zingiber officinale* Roscoe) mengandung 6-gingerol yang memiliki aktivitas sebagai antikanker. Namun pemberian peroral, senyawa tersebut dimetabolisme secara ekstensif oleh enzim disel epitel usus sehingga kadar didalam darah sangat rendah. Nanofitosom merupakan sistem penghantaran untuk fitokonstituen seperti 6-gingerol karena vesikel nanometer yang terbentuk dapat melindungi dan membawa senyawa tersebut melewati membran sel tubuh. Tujuan Penelitian ini untuk mendapatkan formula optimal nanofitosom fraksi etil asetat rimpang jahe (*Zingiber officinale* Roscoe) dan melakukan karakterisasi yaitu organoleptis, pH, distribusi ukuran partikel, zeta potensial, *Polydispersity Index*, stabilitas fisik dengan metoda *freeze and thaw*, fotomikroskop dengan *Transmission Electron Microscopy* dan analisis *Fourier Transform Infrared* (FTIR). Hasil menunjukkan bahwa formulasi nanofitosom fraksi etil asetat rimpang jahe : lesitin : kolesterol ( 1 : 1 : 0,2 ) memiliki ukuran partikel 181,1 nm dengan indeks polidispersitas 0,217, nilai zeta potensial -55,7 mV, perolehan kembali nanofitosom 89,023%. Spektrum FTIR menunjukkan adanya interaksi ikatan hidrogen. Formulasi nanofitosom gel menunjukkan pH antara 6,50 – 6,51, viskositas gel  $130,2 \pm 0,2$  Cp. Studi uji pelepasan [6]-gingerol dari gel nanofitosom fraksi etil asetat rimpang jahe didapatkan nilai fluks pada waktu 30,60 dan 120 menit secara berturut-turut  $134,30 \mu\text{g}/\text{cm}^2$  jam,  $149,34 \mu\text{g}/\text{cm}^2$  jam,  $225,15 \mu\text{g}/\text{cm}^2$  jam berbeda dengan non-nanofitosom gel fraksi etil asetat rimpang jahe ( $0,000 \pm 0$ )  $\mu\text{g}/\text{cm}^2$  jam.

Kata kunci : Fraksi etil asetat rimpang jahe, nanofitosom dan uji pelepasan



# OPTIMIZATION OF THE FORMULATION OF NANOPHYTOSOME GEL DELIVERY SYSTEM FOR THE ETHYL ACETATE FRACTION OF GINGER RHIZOME (*Zingiber officinale* Roscoe)

By : Ulfa Ismirza (2021012004)

(Supervised by : Dr. Netty Suharti MS, Prof. apt. Henny Lucida Ph.D)

## *Abstract*

*Ginger rhizome contains 6-gingerol which has anticancer properties. However, this compound is extensively metabolized by enzymes in the intestine after oral administration resulting in low blood levels. Nanophytosome is a suitable delivery system for phytoconstituents such as 6-gingerol because the nanometer-sized vesicles formed can protect this compound from decomposition and carry them across cell membranes. The objective of this study was to obtain an optimal formula of the nanophytosome of the ethyl acetate fraction of ginger rhizome (*Zingiber officinale* Roscoe) and to evaluate the nanophytosome by determination of organoleptic properties, pH value, particle size distribution, zeta potential, polydispersity index, physical stability by freeze and thaw method, photomicroscope by Transmission Electron Microscopy and Fourier Transform Infrared (FTIR) analysis. Results showed that the optimal formula was at the proportion of the fraction : lecithin : cholesterol of 1 : 1 : 0,2 which showed the particle size of 181,1 nm, zeta potential -55,7 mV, polydisperse index 0,217, with the recovery of 89,02%. The FTIR spectra indicated that an interaction occurred through hydrogen bonds. Formulation of the nanophytosome as a gel showed pH values of 6,50 – 6,51 with the viscosity of  $130,2 \pm 0.2$  cP. The study of [6]-Gingerol release test from nanophytosome of the ethyl acetate fraction of ginger rhizome gel with a flux at 30, 60 and 120 minutes respectively  $134,30 \mu\text{g}/\text{cm}^2$  hour,  $149,34 \mu\text{g}/\text{cm}^2$  hour,  $225,15 \mu\text{g}/\text{cm}^2$  hour which was different from a non-nanophytosome ethyl acetate fraction of ginger rhizome gel ( $0,000 \pm 0$ )  $\mu\text{g}/\text{cm}^2$  hour.*

Key words : *ethyl acetate fraction of ginger rhizome, nanophytosome and release test*

