

**Preparation Of *Zingiber Officinale* Loaded Nanostructured Lipid Carrier (Nlc) Using Ultrasonication And Microfluidizer: A Comparison**

**Nur Ayshah Rosli<sup>1</sup>, Norhayati Mohamed Noor<sup>1</sup>, Ramlan Abdul Aziz<sup>1</sup>, Azila Abd Aziz<sup>1</sup>, And Rosnani Hasham<sup>1</sup>.**  
<sup>1</sup>Institute of Bioproduct Development (IBD), Universiti Teknologi Malaysia (UTM), Johor Bahru, Malaysia.

**Abstract**

Nanostructured lipid carrier (NLC) is the blend of solid lipid, liquid lipid and suitable surfactant for the purpose of encapsulated poorly water soluble drugs. *Zingiber officinale* (ginger) extract has been discovered to have anti-oxidant, anti-inflammatory, and anti-microbial effects to the human body. The aim of this study is to develop NLC formulation for encapsulation of *Zingiber officinale* (ZO) oil and to compare the characteristics of NLC prepared using different methods, ultrasonication and microfluidizer. In this work, the prepared ZO-NLCs were evaluated in terms of particle size, zeta potential, entrapment efficiency and drug loading capacity. The morphological study was performed by using Zetasizer Nano S and the entrapment efficiency analysis of NLC was performed using HPLC by detecting [6]-gingerol as active biomarker. Based on the study, NLC prepared by ultrasonication and microfluidizer has an average particle size of 100-250 nm and 50-100 nm, respectively, for same formulation. NLC prepared using microfluidizer also exhibit superior entrapment efficiency and drug loading capacity compared to ultrasonication. Based on the analyses, both ultrasonication and microfluidizer method able to prepare NLC for ZO encapsulation, and microfluidizer appeared to have the potential to produce more stable and desirable properties of NLC.

**Keywords:** Nanostructured lipid carrier, *Zingiber officinale*, [6]-gingerol, microfluidizer, ultrasonication.