

## **Microencapsulation of Citrus grandis peel oil using interfacial precipitation chemistry technique for repellent application**

### **ABSTRACT**

Essential oil of Citrus family plant is known to have repellent effect against mosquito. Unfortunately, due to its high volatility effect, its repellency effect was compromised. The incorporation of essential oil in a microencapsulation formulation has been shown to help improve the stability and potency of the repellent. In this study, Citrus grandis peel oil (CGPO) was encapsulated by using the interfacial precipitation chemistry technique. The microencapsulated CGPO was then formulated into lotion form to produce topical repellent formulation. This study includes the characterization of microcapsules with regards to the morphology, size distribution, zeta potential, Fourier Transmission Infrared spectrophotometer (FTIR), and Thermogravimetry analysis (TGA). The effectiveness of the microencapsulated CGPO-lotion formulation against mosquitoes was evaluated in the laboratory setting. Results indicated that CGPO have been successfully encapsulated with 6.5  $\mu\text{m}$  in diameter and zeta potential values, -47.9 mV. The FTIR analysis spectrum indicated the presence of interaction between the wall materials in microcapsules. The TGA analysis demonstrated that microencapsulation improved the thermal stability of CGPO. Repellency assay revealed that microencapsulated CGPO- based formulation possessed excellent effect compared with pure CGPO. In conclusion, CGPO was successfully encapsulated and the microencapsulation aid to improve the repellency effect of CGPO against mosquito bites.

**Keyword:** Microencapsulation; Essential oil; DEET; Citrus grandis; Aedes aegypti