

## **Stabilization and release of palm tocotrienol emulsion fabricated using pH-sensitive calcium carbonate**

### **ABSTRACT**

Calcium carbonate (CaCO<sub>3</sub>) has been utilized as a pH-responsive component in various products. In this present work, palm tocotrienols-rich fraction (TRF) was successfully entrapped in a self-assembled oil-in-water (O/W) emulsion system by using CaCO<sub>3</sub> as the stabilizer. The emulsion droplet size, viscosity and tocotrienols entrapment efficiency (EE) were strongly affected by varying the processing (homogenization speed and time) and formulation (CaCO<sub>3</sub> and TRF concentrations) parameters. Our findings indicated that the combination of 5000 rpm homogenization speed, 15 min homogenization time, 0.75% CaCO<sub>3</sub> concentration and 2% TRF concentration resulted in a high EE of tocotrienols (92.59–99.16%) and small droplet size ( $18.83 \pm 1.36 \mu\text{m}$ ). The resulting emulsion system readily released the entrapped tocotrienols across the pH range tested (pH 1–9); with relatively the highest release observed at pH 3. The current study presents a potential pH-sensitive emulsion system for the entrapment and delivery of palm tocotrienols.

**Keyword:** Tocotrienols; Pickering emulsion; Self-assembly; Stability; Entrapment efficiency; Homogenization