

## Phase behaviour and formulation of palm oil esters o/w nanoemulsions stabilized by hydrocolloid gums for cosmeceuticals application.

### ABSTRACT

Palm oil esters (POEs) are wax esters derived from palm oil and cis-9-octadecen-1-ol. The excellent wetting behaviour of the esters without the oily feel make them have great potentials in the manufacture of cosmeceutical and pharmaceutical products. However, little is known about their phase behaviors in ternary systems. The purpose of this investigation was to construct phase diagram of the POEs and mixed surfactants and to consequently select nanoemulsions composition for further studies. The preparation and characterization of oil-in-water nanoemulsions stabilized by hydrocolloid gums were then studied. Two types of nonionic surfactants were selected, namely Tween 80 (T80) and Span 80 (S80). Ternary phase diagram of POEs:Tocotrienol/T80:S80 (80:20)/water system was constructed at  $25.0 \pm 0.5^\circ\text{C}$ . The emulsification properties of 2 hydrocolloids gum (xanthan gum, carbopol ultrez 20 copolymer) were investigated. Gum dispersions were prepared in water (0.8%) and emulsified with 30% oil using a Polytron homogenizer. The flow curve of the emulsions always exhibited shear thinning behavior and obeys the power law viscosity. The emulsions with carbopol ultrez 20 copolymer was the most stable emulsions which composed of very small oil droplets ( $50\% < 142.43 \text{ nm}$ ) with a narrow size distribution.

**Keyword:** Carbopol; Nanoemulsion; Palm oil esters; Power law; Xanthan gum.