

## **ABSTRACT**

### **PHYSICAL STABILITY OF TRETINOIN IN NANOEMULSION SYSTEM COMPARED WITH CONVENTIONAL EMULSION SYSTEM USING VIRGIN COCONUT OIL**

Tretinoin is a compound that has effects of prevention and treatment of wrinkles due to photoaging, acne, and skin inflammation. It is lipophilic and practically insoluble in water. To improve its solubility it was formulated into a nanocarrier, that was nanoemulsion.

The aim of this study was to compare the physical stability of nanoemulsion and emulsion. The nanoemulsion formula consisted of Virgin Coconut Oil: Span 80 & Tween 80 - Ethanol 96%: Phosphate buffer pH 6,0  $\pm$  0.5 = 1: 9: 27,5 while the emulsion formula consisted of Virgin Coconut Oil: Span 80 & Tween 80: Phosphate buffer pH 6,0  $\pm$  0.5 = 1,5: 1: 2. Both systems contained 0,1% of tretinoin.

Nanoemulsion and emulsion were physically characterized for viscosity, surface tension, droplet size, and polydispersity index. The physical stability test consisted of real time stability test, thermal cycling and centrifugation test. Real time stability test of each delivery system was determined based on visual observation, pH, particle size, polydispersity index, and surface tension variation during 8 weeks of storage in room temperature (25 $\pm$ 2°C). The results showed that there were both unstable nanoemulsion and emulsion. Thermal cycling and centrifugation test were determined based on visual observation. Both tests showed nanoemulsion was more stable than conventional emulsion.

**Keywords :** nanoemulsion, emulsion, tretinoin, stability test, thermal cycling, centrifugation test, real time stability test, Virgin Coconut Oil, antiaging