

Stability of CoQ10-loaded oil-in-water (O/W) emulsion: effect of carrier oil and emulsifier type.

ABSTRACT

Co-enzyme Q10 (CoQ10), a lipophilic compound that widely used in the food and pharmaceutical products was formulated in a κ -carrageenan coated oil-in-water (O/W) emulsion. In this work, we examined the solubility of CoQ10 in different carrier oils and effects of emulsifier type on the formation and stability of CoQ10-loaded O/W emulsion. Nine vegetable oils and four types of emulsifiers were used. CoQ10 was found significantly ($p < 0.05$) more soluble in medium chain oils (coconut oil and palm kernel oil) as compared to other vegetable oils. The O/W emulsions were then prepared with 10 % (w/w) coconut oil and palm kernel oil containing 200 g CoQ10/L oil stabilized by 1 % (w/v) emulsifiers (sucrose laurate (SEL), sodium stearoyl lactate (SSL), polyglycerol ester (PE), or Tween 80 (Tw 80)) in 1 % (w/v) κ -carrageenan aqueous solution. Particle size distribution and physical stability of the emulsions were monitored. The droplet sizes (surface weighted mean diameter, $D[3,2]$) of fresh O/W emulsion in the range of 2.79 to 5.83 μm were observed. Irrespective of the oil used, results indicated that complexes of SSL/ κ -carrageenan provided the most stable CoQ10-loaded O/W emulsion with smaller and narrower particle size distribution. Both macroscopic and microscopic observations showed that O/W emulsion stabilized by SSL/ κ -carrageenan is the only emulsion that exhibited no sign of coalescence, flocculation, and phase separation throughout the storage period observed.

Keyword: CoQ10 ; K-carrageenan; O/W emulsion; HLB; Emulsion stability; Particle size.