

Formation of stable palm kernel oil esters nanoemulsion system containing hydrocortisone

ABSTRACT

A physical and chemically stable palm kernel oil esters emulsion system with nanosized droplet was developed as a delivery system for hydrocortisone (hydrophobic drug). A simple low energy emulsification method was used in forming the nanoemulsions. The influence of added solvents (isopropanol and ethanol) on particle size and stability of oil in water nanoemulsion was investigated. Formation of nanoemulsion with solvent, increase the solubility of hydrocortisone in the oil phase and thus make the nanoemulsion more stable. Reducing the solvent to lipid ratio showed no significant difference in the mean particle size. However, after solvent removal particle size increased over time. As for zeta potential value, all nanoemulsions exhibited values below -30 mV which indicated good stability. The DSC thermograms for stable nanoemulsions proved that hydrocortisone is in a non-crystalline state, suggesting that hydrocortisone is homogenized well in the nanoemulsion system. These results showed that nanoemulsion with solvent appear to be a promising transdermal delivery vehicle for hydrocortisone.

Keyword: Oil in water nanoemulsion; Transdermal; Solvent; Binary surfactant; Isopropanol; Ethanol; Hydrocortisone