

FORMULATION AND STABILITY EVALUATION OF VIRGIN COCONUT OIL (VCO) BASED NANO-EMULSION

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Nano-emulsions are submicron size emulsions that are under extensive investigation as drug carriers for improving the delivery of therapeutic agents. These are thermodynamically stable isotropic systems in which two immiscible liquids are mixed to form an emulsion formulation by adding appropriate amount of surfactant. The droplets should be in the range of 20-500 nm to claim for nano-emulsion. Stability evaluation of newly formulated product is important in order to identify properties of the product over a certain time period. Emulsion instability involves a number of processes which take place simultaneously or consecutively, depending on environmental conditions. The objective of this study was to formulate and evaluate the stability of a nano-emulsion containing VCO as the oil phase and Tween 20[®] as the surfactant. VCO and Tween 20[®] were left under magnetic stirring for 20 min (1MLH magnetic stirrer, Rajendra Electrical Industries Limited, Mumbai, India). To the resulting mixture distilled water was added drop by drop and left it for mixing thoroughly. High shear homogenization (homogenizer OV5, VELP scientifica, Italy) was applied to the resulted formulations. The droplets size distributions of the emulsions were measured using a laser light scattering instrument (Malvern Zetasizer Ver. 6.00, Malvern Instruments, Worcestershire, UK). Stability evaluation was performed throughout the period of three months from the first day of formulation. Visual observations were carried out for phase separation, sedimentation, creaming and flocculation. The general appearance and texture of the emulsions were recorded by visual observation. Creaming indices were also measured. The results of this study indicated that average droplets size of the best formulae is 484 nm and it was stable without phase separation, sedimentation, creaming and flocculation throughout the stability evaluation period. However, the formulae showed phase separation after 128 days. None of the formulation showed creaming property, after 24 hours. Therefore, creaming indices of the formulations were zero.

As a conclusion VCO is suitable for preparation of stable nano-emulsion and it gives oil in water emulsion. Stability of the best formulae can be evaluated in different temperatures (-5°C, 40°C) to enhance the stability period of the resulting stable formulation. Under the studied conditions applying of high shear homogenization leads to give a nano-emulsion which is below 500 nm.

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