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# PRE-FORMULATION STUDY OF VIRGIN COCONUT OIL (VCO) BASED EMULSIONS BY CONSTRUCTING TERNARY PHASE DIAGRAMS

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A ternary phase diagram for preparing emulsions demonstrates the equilibrium between the various phases that are formed between three components of oil, surfactant and water. There is no published data available on emulsions consisting of Virgin Coconut Oil (VCO) as the oil phase, distilled water as the aqueous phase and Tween 80® as the emulsifier. The objective of this study was to identify the best formula for creamy formulations from ternary phase diagrams with above components. Ternary phase diagrams were constructed by formulating emulsions using VCO, Tween 80® and distilled water by titration method. In the present study, 9 g of VCO and Tween 80® mixture at predetermined weight ratios were diluted with 1g of water drop wise under moderate magnetic stirring at 600 rpm for 15 min at room temperature (~25 $^0$C). After the system was equilibrated, emulsions were assessed visually to determine the type of emulsions formed; such as cream, gel, and ointment. Creams were claimed for white and highly viscous emulsions that did not flow, if turn the spatula on angle of 90$^0$. Then, 1 g of each resultant emulsion was removed and kept in a separate container for further confirmation studies. Separated samples were subjected to dilution test to identify whether it is oil in water (O/W) emulsion or water in oil emulsion (W/O). Two different ternary phase diagrams were constructed using CHEMIX software. One ternary phase diagram represents types of emulsions, whether oil in water emulsion or water in oil emulsion. The other one demonstrates regions having different textures of emulsions, *i.e*., cream, semi solid ointment, liquid ointment, and liquid. From the constructed two ternary phase diagrams, different compositions consisting of different ratios of oil and water, which produces O/W creamy emulsions were selected. These formulations were further studied and formulae to incorporate liphophilic drugs were optimized. The construction of ternary phase diagram makes it convenient to find range of compositions for the existence of oil in water creamy emulsions.