عنوان مقاله:

Preparation and Characterization of Cyanocobalamin (Vit B۱۲) Microemulsion Properties and Structure for Topical and Transdermal Application

محل انتشار:

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خلاصه مقاله:

Objective(s): The objective of this study was to design a topical microemulsion of Vit B۱۲ and to study the correlation between internal structure and physicochemical properties of the microemulsions. Microemulsions are thermodynamically stable mixtures of water, oil, surfactants and usually cosurfactants with several advantages for topical and transdermal drug delivery. The formulation of microemulsions for pharmaceutical use requires a clear understanding of the properties and microstructures of the microemulsions. Materials and Methods: In this study, phase behavior and microstructure of traditional and novel microemulsions of Vit B۱۲ have been investigated by Small-angle X-ray (SAXS), differential scanning calorimetery (DSC) and measuring density, particle size, conductivity and surface tension. Results: WO and bicontinuous microemulsion with different microstructures were found in novel and traditional formulations. In this study, amount of water, surfactant concentration, oil/ surfactant ratio and physicochemical properties of cosurfactants influenced the microstructures. In both formulations, water behavior was affected by the concentration of the surfactant. Water Solubilization capacity and enthalpy of exothermic peak of interfacial and free water of traditional formulations were more than novel ones. This means that the affinity of water to interfacial film is dependent on the surfactant properties. Conclusion: This study showed that both microemulsions provided good solubility of Vit B۱۲ with a wide range of internal structure. Low water solubilization capacity is a common property of microemulsions that can affect drug release and permeability through the skin. Based on Vit B۱۲ properties, specially, intermediate oil and water solubility, better drug partitioning into the skin may be obtained by traditional formulations with wide range of structure and high amount of free and bounded water.

کلمات کلیدی:

DSC Microemulsion microstr- ucture Pseudo ternary phase- diagram SAXS