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Formulation of diclofenac microemulsion based on phase diagram

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Background and Aims: Diclofenac is a non steroidalanti inflammatory drug (NSAID),that is used to treat different veriety of pains like inflammation and arthritis.Diclofenac is insoluble in water. Microemulsions are isotropic, thermodynamically stable and transparent colloidal systems of oil, water and surfactant.
Methods: The phase diagram was constructed using water titration method by oil phase of isopropyl myristate ,labrazol,tween80 and polyethylen glycol 400 and poloroureic Glycol and water(2:1). Then four samples of microemulsions were prepared with full factorial design. Diclofenacmicroemulsions and non-drug microemulsions were examined for pH, refractive index, viscosity, DSC, meam droplet size and SEM.
Results: The results from phase diagram show that microemulsion region was observed in high oil amounts.The mean particle size of micro emulsion samples was within 19.7-87.6 nm, the polydispersity values were lower than 0.5, indicating uniformity of droplet size distribution within microemulsions. The pH value, RI and viscosity were observed (5. 83-6.11), 1.4373-1.4578 and 277.1-404.5 centipoise respectively. DSC cooling thermogram of drug microemulsions and non-drug microemulsions showed free water peak at (-50C) and interface water at (-150C) indicating w/o microemulsion structures.
Conclusions: The results show that using microemulsionnanovehicles for formulation of low solubility such as diclofenac increase the skin permeability of diclofenac.

Keywords: Diclofenac; Microemulsion; Phase diagram