

The study of physicochemical properties of clindamycin microemulsion

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Background and Aims: Microemulsions are isotropic, thermodynamically stable and transparent colloidal systems of oil, water and surfactant. These adaptable delivery systems provide protection against oxidation and improve the solubilization of lipophilic and hydrophilic drugs. Hydroquinone is physically unstable to environmental conditions and is used for the treatment of Acne. The aim of this work was to prepare a microemulsion product that increases skin permeability of clindamycin in addition to improve photostability of this drug.

Methods: The phase diagram was constructed using water titration method by oil phase of oleic acid and transcutoIP (10:1), tween80 and span 20 as surfactant and Propylen Glycol (as cosurfactant) (2:1) and water. Then four samples of microemulsions were selected with full factorial design and 1% of clindamycin added to each one. These samples were examined for RI, pH, DSC, viscosity, droplet particle size, SEM and drug release. Also, drug photostability of microemulsion samples examined under UV light in comparison to methanolic samples.

Results: The results from phase diagram show that microemulsion region was observed in high surfactant and co-surfactant amounts. The mean particle size of micro emulsion samples was within 50-70 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 (4.4. -6.7), 1.6501 and 193-313 centipoise respectively. The highest cumulative release percent of microemulsion samples was 50% belong to microemulsion 1 (oil 50%, water 5%). Microemulsion samples were more stable in comparison to methanolic samples under UV light. DSC cooling thermogram of microemulsions showed free water peak at (-50C) and interface water at (-150C) indicating w/o microemulsion structures

Conclusions: The results show that using microemulsion nanovehicles for formulation of photosensitive drugs such as clindamycin can prolong shelf life, increase stability and improve the effectiveness of drug.

Keywords: Clindamycin; Microemulsion; Topical