ABESTRACT

Indomethacin is one of the potent classic nonsteroidal anti-inflammatory agents, practically insoluble in water, soluble 1 in 50 of alcohol, 1 in 30 of chloroform, 1 in 40 of ether.

Microemulsions are clear thermodynamically stable dispersions of two immiscible liquids with carefully adjusted emulsifier(s)

The aim of present investigation was to formulate stable microemulsion suitable for topical application containing suitable non-volatile carrier for Indomethacin with good physical and chemical stability, and of improved bioavailability.

In achievement of these goals, the work compiled in this thesis implicates the next chapters.

Chapter I
Formulation of different microemulsion bases using different surfactants, oils, and cosurfactants

In dealing with this topic, Pseudo-ternary phase diagrams were designed with a formula consisting of four components: -

An oily phase, a low HLB surfactant (cosurfactant), a high HLB surfactant, and an aqueous phase.

A. Using Brij97 as surfactant

The existence of microemulsion regions in the quaternary systems composed of Brij97 as surfactant, sorbitol or glycerol as cosurfactant paraffin oil or Jojoba oil as oil phase and water has been demonstrated.

The oil contents as well as the ratio of the surfactant to the cosurfactant control the formation of the microemulsion.

B. Using Tween 80 as surfactant

The existence of microemulsion regions in the quaternary systems composed of Tween 80 as surfactant, sorbitol or glycerol as cosurfactant paraffin oil or Jojoba oil as oil phase and water has been demonstrated.

No gelling occurs in this case, whatever the concentration of each component is. Only microemulsion formation could occur. It is also obvious that, the (Cosurf./Surf.): oil weight ratio affects the water content of the formula.

Chapter II
Formulation and evaluation of Indomethacin emulgels.

The aim of this chapter is to formulate an Indomethacin emulgels by selecting the best concentrations of surfactant, cosurfactant, oil, and water, which produce the best emulgels in the previous chapter and

evaluating them for physical characters, Release rate of the drug and stability.

A. Physical characters

The effects of the drug on the physical characters of the microemulsion are observed when fresh based on the Gel formation and Clarity to select the proper mixtures that proceed for the followed testing procedures.

A change in Clarity and gel formation occurs. the emulgels that remain stable and clear are used for further study.

B. Determination of the Release Rate of Indomethacin from different emulgel formulae

The aim of this section is to determine the release kinetics of Indomethacin from the selected Indomethacin emulgels.

The obtained data were listed in tables and statistically treated by the least squares method to identify the order of drug release whether being zero, first or diffusion release model.

C. Physical and chemical stability of the selected Indomethacin emulgels

The aim of this section is to study the physical and chemical stability of the selected Indomethacin emulgels.

The physical stability of the studied microemulsions shows no changes in any of the parameters studied from the samples maintained at room temperature, or under stress.

The degradation rate constants (K value) and t_{90} for the microemulsions tested at different temperature and at room temperature are obtained.

Chapter III
Pharmacodynamics of Indomethacin from different emulgel formulae

The bioavailability of Indomethacin in different microemulsions is tested by observing the effect of the formulae on reducing local edema induced in the rat paw by injection of the carrageenan as irritant.

Indomethacin significantly inhibits the carrageenan-induced paw edema by different percentage of the control value.

The effect of emulgels is between the effect of the commercial injection form (higher effect), and the effect of the commercial topical form (lower effect).