Investigation of Enhancing Effect of Glucam® P-20 on the In Vitro Skin Permeation of Diclofenac Sodium Microemulsions

Sarunyoo SONGKRO 1,4*, Niwan TANMANEE 2,4, Duangkhae MANEENUAN 1,4, Thitima CHUCHOME 3,4, Nai-Lun LO 1,4, & Prapaporn BOONME 1,4

1 Department of Pharmaceutical Technology, 2 Pharmaceutical Laboratory Service Center, 3 Department of Pharmaceutical Chemistry, Faculty of Pharmaceutical Sciences, Prince of Songkla University, Songkhla 90112, Thailand
4 Drug Delivery System Excellence Center, Prince of Songkla University, Hat Yai, Songkhla 90112, Thailand

SUMMARY. The aim of this work was to investigate the potential of Glucam® P-20 as a skin penetration enhancer for diclofenac sodium microemulsions across excised newborn pig skin. Glucam® P-20 (GP-20) or PPG-20-methyl glucose ether is generally used as a humectant, emollient and fragrance fixative. The w/o microemulsions composed of Tween 80, Eutanol G and water were formulated. The concentration of diclofenac sodium was 1 % w/w while the amounts of GP-20 were varied from 0-20 % w/w, ME-1 (0 %), ME-2 (5 %), ME-3 (10 %) and ME-4 (20 %). All microemulsions were transparent with Newtonian flow behaviour. The mean droplet sizes of the microemulsions were about 200 nm. The FTIR spectra of the microemulsions containing GP-20 were not markedly different from those of the microemulsion without GP-20, ME-1. The in vitro release and skin permeation studies of diclofenac sodium loaded microemulsions were investigated using modified Franz diffusion cell. For the in vitro release across synthetic membrane, the rank order of the release rate was ME-4 > ME-3 > ME-2 > ME-1. For the in vitro skin permeation experiments, GP-20 at 10 % and 20 % could markedly enhance the percutaneous absorption of the drug. The optimum concentration of GP-20 was 10 %. GP-20 is proposed as a potential skin penetration enhancer for percutaneous absorption of diclofenac sodium.

KEY WORDS: Diclofenac sodium, Microemulsions, Glucam® P-20, Skin penetration enhancer.

* Author to whom correspondence should be addressed. E-mail: sarunyoo.s@psu.ac.th