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Kinetic Considerations in the Design of Surfactant-Based Topical Formulations

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I. INTRODUCTION

The development of formulations using surfactants as vehicles for transdermal drug delivery is currently of great interest. Much of the attraction of this type of system lies in the acceptable rheological and wide-ranging physicochemical properties that can be obtained. The objects of system design are to achieve a suitable reservoir dosage and controlled release by percutaneous absorption. Contact between such vehicles and the skin inevitably entails modification of the skin's barrier function, either by hydration changes or structural changes in the molecular arrangements in the stratum corneum. This is a result of absorption of components either from a vehicle into the skin or vice versa. The thermodynamic equilibrium properties of the system, as always, will control the ultimate state of the system; however, the time scales of the various kinetic processes can be of more importance for consideration in practical applications because controlled or sustained release over a period is usually a major requirement.

Recently (1–10), attention has been focused on the kinetics of the transfer of components across oil–water interfaces in systems containing surfactant aggregation structures. The amount of available data is small, however, when compared with the corresponding literature relating to equilibrium properties. An understanding of the mechanisms found for mass transfer across interfaces in such systems is becoming clearer as a result of such studies. The purpose of this paper is to review the available information in the context of what it tells us about processes, such as solubilization, in-

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