

MODELING OF EMULSION PERCOLATION THROUGH STRATUM CORNEUM LAYER

Nowadays emulsions have become used in the numerous branches of industries and technologies, thus, there is a continuous interest of their behavior in the environment and influence on human. The purpose of this research work is to predict of emulsion penetration through human skin as a contract area. The process of emulsion percolation through dermal layers is an actual important issue, especially for medicine and pharmacology, cosmetology, labor protection and industrial hygiene etc.

Stratum corneum is defined as an outermost layer of a skin, and fulfils the function of a protection barrier. The current paper deals with the modeling of pathways and mechanisms of emulsions penetration through the stratum corneum.

In fact, there were efforts to describe a process of substances penetration using various mathematical models. The main types of exciting models are the following: 1) steady-state models; 2) quantitative structure–permeation relationship models (based mainly on evaluation of a permeability coefficient); 3) pharmacokinetic models; 4) binding kinetics model; 5) porous route models (penetration through appendages). The mathematical models are considered to be limited to precise description of penetration of the complex systems in skin outermost layer matrix.

In this communication, the process of emulsion percolation through the mentioned skin layer is described on a base of the structure-based model. The compiled model takes into consideration the “brick-and-mortar” structural form of stratum corneum, without including additional appendage pathways.

The important issue investigated in work are defined as the followings: heterogeneity of an emulsion percolation, which can be caused by droplets blocking and phase selectivity, consequently, penetration pathway change.

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МОДЕЛИРОВАНИЕ ПРОЦЕССА ПЕРКОЛЯЦИИ ЭМУЛЬСИЙ ЧЕРЕЗ НАРУЖНЫЙ СЛОЙ ЭПИДЕРМИСА

Рассматриваются исследования прогнозирования с помощью математических моделей проникновения эмульсий через кожу человека.