ABSTRACT

This thesis aims to the assessment of methods used in in vitro analysis of dermal permeation and absorption of caffeine. Guarantee of standard processes during an experiment is essential for the rightness of results evaluation and interpretation.

First part is focused on alternatives and different transport ways of substances through the skin barrier. As transdermal drug delivery offers an increasing number of advantages, the number of studies performing transdermal experiments with drug delivery grows up. On the other hand we are also able to observe or predict the risk of intoxication of individuals after exposure to different kinds of chemicals.

The standard methods assessment is of great importance to obtain reproducible results. In this thesis, caffeine was chosen as a model hydrophilic compound. Skin barrier was simulated by dermatomed pig skin of two different thicknesses from ear and abdomen. Eight experiments were carried out with different types of skin using Franz cells in two types of dosing – finite and infinite.

Experimental part of the thesis aims on actual determination of caffeine permeation. Measurements were taken in receptor fluid, in particular layers of the skin and on its surface. Spectrophotometry and HPLC analysis were used for the assessment. The ability of caffeine permeation through all skin layers was confirmed and obtained results are presented as an amount of absorbed and unabsorbed dose. Pharmacokinetic parameters of caffeine penetration were assessed while using mathematical methods. Obtained data confirmed their comparability with results from similar studies and also the correctness of chosen conditions and methods.