

Abstract

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Title of the thesis: 2-hydroxyethyl cellulose gels with novel polyamidoamine dendrimers for the skin application of Imiquimod

Imiquimod (IMQ) is a medicinal substance used in the therapy of skin diseases (carcinomas). IMQ's hydrophobicity does not allow its incorporation in hydrophilic gels, which are the most used gel formulations for topical application. Dendritic molecules, which are highly branched polymers, could potentially increase the solubility of IMQ in hydrophilic formulations for the preparation of more concentrated hydrophilic dosage forms.

The purpose of this work was to increase the concentration of IMQ in hydrophilic formulations using dendritic molecules. First, aqueous solutions containing IMQ were prepared, in the presence or absence of different generations and concentrations of dendritic molecules. The pH of the solutions was adjusted to 5,5, which corresponds to the pH of the skin. After that, 2-hydroxyethyl cellulose was used as gelling agent to prepare hydrophilic gels as preferable formulations for topical application. Selected solutions and gel formulations, were used for permeation experiments on human skin.

The results of this thesis prove that the presence of dendritic molecules can increase the solubility of IMQ in aqueous medium at pH 5,5. In comparison with the commercially available formulation Aldara, the gel formulations containing dendrimers are able to deliver 3 times less IMQ amount to the target tissue (*epidermis*) while containing 1000 times less active substance. On the other hand, the gel formulations containing dendrimers were found to deliver detectable amounts of IMQ to the acceptor phase after the permeation experiment. Additional experiments are needed to evaluate if lower concentration of dendritic molecules can be used in hydrophilic gels to deliver similar amounts of IMQ in *epidermis*. At the same time, these gels should not deliver the active substance to the acceptor phase, minimizing potential side effects.