

Abstract

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Title of Thesis: Effect of mesoporous carrier on the properties of hydrophilic matrix based on hydroxypropyl methylcellulose

Colon targeted drug delivery has an essential role in treating local colon diseases. Various specific drug delivery systems resistant to the acidic environment of the upper gastrointestinal tract are used in the controlled drug release. In addition, higher efficacy, especially of poorly soluble drugs, can also be achieved by using mucoadhesive matrix systems in combination with liquisolid systems. Within these systems, the drug is usually dissolved and, therefore, it does not need to dissolve during release from the dosage form.

The aim of the presented work was to study the effect of the mesoporous carrier Neusilin[®] US2 on the mucoadhesive properties and swelling rate of tablets based on hypromellose. Formulations containing the model drug theophylline, Neusilin[®] US2, hypromellose K15M (HPMC K15M) or their mixtures were subjected to determination of swelling and mucoadhesion strength in the environment of three biorelevant media simulating the fasted state of the stomach (FaSSGF), small intestine (FaSSIF) and colon (FaSSCoF). The obtained results showed that the incorporation of Neusilin[®] US2 into the polymer matrix slightly reduces the swelling index and minimises the effect of pH on the swelling rate. A higher mucoadhesive force was measured in the matrix tablets containing a greater proportion of HPMC K15M. Therefore, a sample with a higher amount of HPMC K15M (85,4 : 14,6) appears to be the most suitable formulation for further testing due to the pH-independent behaviour of this sample.