

## **ABSTRACT**

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**Title of Thesis:** Study of drug adsorption on mesoporous silicates

This thesis focuses on the study of the effect of mesoporous silicate carrier type and environmental pH on the readsorption process of flufenamic acid (FFA), a model poorly water-soluble drug, on mesoporous silicates (MS). The study was carried out using two types of MS, Neusilin® US2 (NUS2) and Aeroperl® 300 Pharma, in different amounts (5 mg and 50 mg), and in different pH environments (5.5, 6.0 and 6.8). Adsorption isotherms, specifically the Freundlich and Langmuir models, were used to characterize the adsorption behavior of FFA on the carriers. The experiments showed that at all pHs tested, the extent of FFA readsorption on the carriers was mainly dependent on the initiation concentration of the drug, while the amount of used carrier showed only insignificant effect. The highest FFA adsorption was observed at lower pH values (5.5), which is probably related to the lower solubility of FFA under these conditions and the higher affinity of the drug for the carriers. On the contrary, at pH 6.8, the adsorption was lower, probably due to the ionization of FFA, which reduces its interaction with the carrier surfaces. The obtained results confirm the importance of the effect of pH and MS properties on the adsorption of poorly soluble drugs, which may be valuable for optimizing drug development using drug delivery systems based on mesoporous silicates.