ABSTRACT

Charles University, Faculty of Pharmacy in Hradec Králové

Department of: Pharmaceutical Technology

Supervisor: PharmDr. Petra Svačinová, Ph.D.

Student: Klára Lamiová

Title of Thesis: Effect of surfactant concentration on drug release from spray-dried powder

In this study, mixtures containing meloxicam (MX), chitosan (CHIT), and various amounts of sodium lauryl sulfate (SLS) were evaluated. These samples were prepared by spray drying at a temperature of 170 °C and compared with corresponding physical mixtures and raw materials.

The appearance of the prepared particles was examined using optical and scanning electron microscopy. It was found that spray drying affected the morphology of meloxicam and sodium lauryl sulfate particles, whose originally irregular particles changed to spherical ones because they were dissolved in the solution and spherical formations were formed when atomized into the drying chamber. Chitosan was suspended in the mixture, so it underwent the drying process without visible changes. Microscopic images did not confirm a significant impact of surfactant concentration on particle appearance.

The thermal properties of the samples were evaluated using differential scanning calorimetry. The results showed that spray drying and the presence of SLS could significantly reduce the melting point of MX. This fact cannot be confirmed with certainty, as this peak was not reliably detected. No significant temperature shifts were observed for the other components. When evaluating the thermal properties of the dried mixtures, the effect of SLS concentration on these properties was not observed.

Finally, drug release was evaluated using the flow-through cell dissolution method (the dissolution medium was phosphate buffer of pH 6.8). The results were measured using a UV/VIS spectrophotometer at a wavelength of 363 nm. The obtained graphs confirmed that both the presence of SLS and the spray drying process had a significant impact on the amount of released MX and its dissolution rate. The best results were achieved at lower amount of surfactant, specifically 1.2 g and 2.4 g which corresponds to a concentration of 0.3 % to 0.6 %.