

ABSTRACT

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Title of Thesis: Preparation of spray-dried lactose from high concentrated aqueous solutions

In this work, the effect of higher concentration of lactose aqueous solution dried at different temperatures on the properties of spray-dried powder was evaluated. Lactose solutions with concentrations of 30 %, 40 % and 50 % were prepared for evaluation. Each solution was spray dried at three inlet temperatures: 180 °C, 200 °C and 220 °C. The geometrical characteristics of the obtained particles were evaluated by optical microscopy and thermal properties using differential scanning calorimetry (DSC).

Based on the results, it was found that, compared to the original material (D-lactose monohydrate), spray-dried samples contained spherical particles with the smooth surface, which slightly decreased in size. Most of the particles were in the range of 2.5 to 15 µm. On the contrary, particles smaller than 2.5 µm and larger than 20 µm occurred in very small quantities. During spray drying, slight changes in particle size were observed as a function of the inlet temperature.

DSC thermograms showed glass transition temperature, crystallization and dehydration peaks and melting points of α -lactose. Glass transition was not observed with 40% solution dried at 220 °C. Dehydration peaks occurred only in 30% solution dried at 180 °C and in 40% solution dried at 200 °C. The melting point of α -lactose was 203.1 to 218.2 °C for all samples and increased between 180 °C and 200 °C.