

Empirical model of spray drying of whole milk powder using nozzle atomizer spray dryer

ABSTRACT

Spray drying is a common drying technique in food industries, especially in dairy industry. The quality of spray dried product greatly depends on its moisture content. However, moisture content is difficult to measure and control. The selection of operating parameters is important to ensure the desired quality of final products (moisture content). The aim of this study is to develop an empirical model of spray drying of whole milk powder using a nozzle atomizer spray dryer, Lab-Plant SD 05 Laboratory Scale Spray Dryer. In developing the empirical model, a preliminary study on the effect of two operating parameters on the product quality was studied. The inlet air temperature was selected as the manipulated variable (input) to control the outlet air temperature (controlled variable) and also indirectly control powder moisture content. The empirical model obtained can be represented as the first order plus time delay (FOPTD) model. The obtained model can be considered valid for process control because $R^2 \times 0.6$.

Keyword: Whole milk; Spray drying; Empirical modeling; First order plus time delay