Spray drying is a technology that is widely applied in chemical, biotechnical, pharmaceutical and food industries. It is one of the most popular method to process liquid feed into a free flowing powder in one short and continuous operation. It consists of the spraying of liquid material into a mist to form small droplets inside the dryer chamber and rapid evaporation of water as a result of contact with a stream of hot drying air. Drying air plays an important role in shaping the process conditions, as the difference of partial pressures of water vapor between the surface of the material and the drying air is the driving force of the process. For that reason, the air humidity is an important parameter in spray drying performance. The application of dehumidified air for drying was firstly introduced in 1989 and later in 1997 as a drying method (Hayashi 1989, Bhandari et al 1997). As the result of lowering of drying air humidity, the driving force of the process is increased, which gives the possibility to lower the drying temperature. However, this area of research has not been widely investigated. Dehumidified air at only one level of humidity, leaving other parameters unchanged, was applied for spray drying of orange juice concentrate and tomato pulp (Goula and Adamopoulos 2005a, 2005b, 2010). The application of dehumidified air enabled to improve product properties and drying performance.

The available literature data concerning this area does not describe the influence of the drying air humidity at various levels on the spray-drying process and does not refer to the need to optimize other process parameters in the case of using air with reduced humidity.

The aim of this project is to broaden knowledge on the influence of drying air humidity on spray drying performance. Distilled water and maltodextrin solutions will be used as model materials and spray dried with the application of air of varying humidity and other drying parameters such as drying temperature, feed rate, feed solution concentration. This project will investigate the impact of drying conditions on the process performance and the properties of obtained maltodextrin powders. The obtained results will be used for the development of further research, including the participation in the OPUS project and establishing international cooperation with the Department of Food Sciences and Technology, Faculty of Agriculture, Forestry and Natural Environment of the Aristotle University in Thessaloniki.

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