UNIVERSITÄT HOHENHEIM

Institute of Food Science and Biotechnology | Department of Process Engineering and Food Powders (150c)

Master Thesis/Project Work/Bachelor Thesis: Experiments to create a digital twin of a spray dryer

Background: The study is part of the DigitalTwinSD project, which aims to create a digital twin of the pilot-plant spray dryer. A digital twin consists of the real asset – the spray dryer – and a virtual model that contains the same elements and reflects the same behaviour. Continuous data exchange between the real asset and its virtual counterpart is expected to yield multiple benefits, including the possibility of predicting process anomalies and accelerating scale-up. Before a virtual counterpart can be modelled, the measurement methods used to gather data for the model must be developed and validated.

Objective: The preliminary objective of the project is to establish a systematic approach to characterise spray-dryer behaviour. This includes multiple facets, ranging from Design of Experiments (DoE) and conducting pilot-plant trials to measuring material-specific drying kinetics in the laboratory. You will investigate one of these work packages in detail to derive valid conclusions on how to systematically create a digital twin.

Possible Tasks - the focus can be tailored to the student:

- Work package 1: Investigating the attainment of steady state in a spray dryer
- Work package 2: DoE to assess a spray dryer with low experimental demand
- Work package 3: Kinetics measurement and spray-dryer modelling

The ideal candidate should be

- curious and able to approach new topics systematically,
- interested in process engineering,
- open to some basic programming; the exact focus will be adapted to the student.

Contact: David Vollmar (david.vollmar@uni-hohenheim.de)