Chair of Bioseparation Engineering
TUM School of Engineering and Design
Technical University of Munich

BioSE

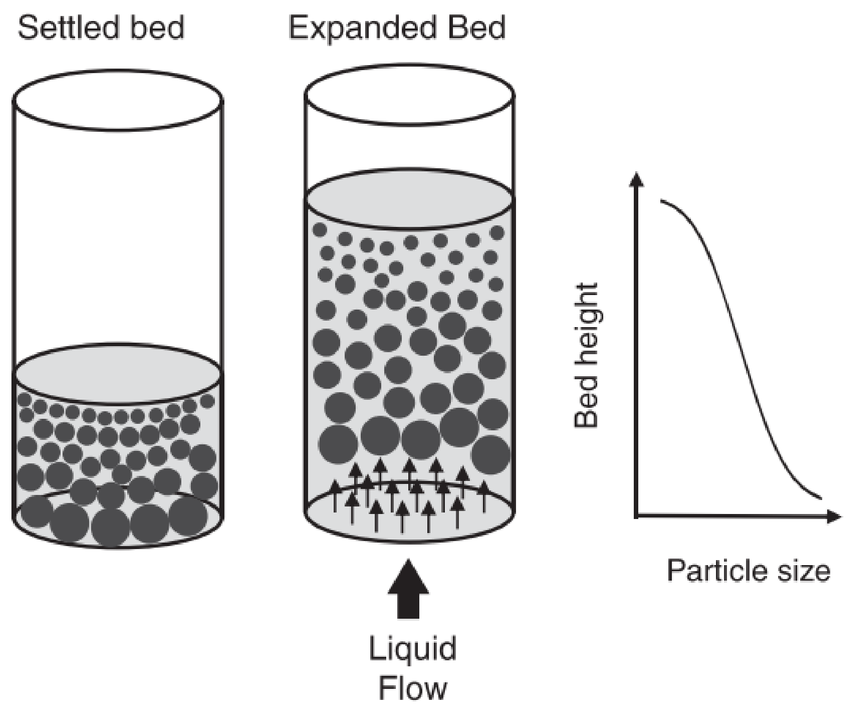
Internship

Modeling and simulation of an Expanded Bed Chromatography

Keywords: Simulation | Modelling | Expanded Bed chromatography | Hydrodynamic

Project Description

Expanded Bed Chromatography (EBC) is a technique used for purifying substances such as proteins. The separation matrix consists of particles of various sizes arranged within a column and fluidized from below. Based on their size, density, and the flow rate, the particles ascend to specific levels, forming a stratified expanded bed. Typically, numerous experiments are needed to optimize process parameters.



Koppejan et al. (2018), DOI: 10.1002/jctb.5595.

However, by implementing an appropriate model, the number of required experiments can be minimized through simulation. Additionally, the model can offer deeper insights into the physical dynamics of bed expansion.

Profile

- Structured and independent way of working
- Joy of learning

Ideal, but not required:

- Experiences in modeling and simulation
- Understanding in hydrodynamics
- Lab experience

- Starting date: From now
- Language: English, German
- Master's or Bachelor's thesis might be possible

Task

- Explanation of the physical processes during bed expansion
- Implementation of a suitable model for simulation
- Simulation of a bed expansion depending on column and particle properties and flow rate
- Optional: Simulation of the flow of molecules through an expanded bed
- Validation of simulation results with experimental data

Nadja Kohn| n.kohn@tum.de | Chair of Bioseparation Engineering | Room MW2406