Universität Basel

Departement
Pharmazeutische Wissenschaften

DEPARTMENT
OF PHARMACEUTICAL SCIENCES

Formulation Optimization of 3D-Printed Pediatric Tablets Using Semi-Solid Extrusion

3D printing using semi-solid extrusion (SSE) is an emerging technology with significant potential to transform personalized medicine. One of its most promising applications lies in decentralized pharmaceutical production, particularly within hospital and pharmacy settings. This is especially valuable for pediatric patients, where medication requires low and precisely tailored dosages.

In this context, an Innosuisse-funded collaborative project between the Institute of Pharma Technology at the University of Applied Sciences and Arts Northwestern Switzerland (FHNW Muttenz) and the University Hospital of Basel seeks to establish SSE 3D printing as a viable method for producing immediate-release and orally dispersible tablets for pediatric use.

The goal of this Master's thesis is to optimize existing formulations and investigate new formulation strategies for commonly used pediatric drugs. This includes extensive literature research on current formulation strategies for semi-solid extrusion, applicability of current formulation developed for hydrochlorothiazide on other pediatric drugs, and a systematic formulation screening of other excipients to assess printability. Selected printable formulations are characterized in terms of rheological properties and the final printed tablets are evaluated for key quality attributes, including mass uniformity, content uniformity, drug dissolution and disintegration time, to ensure their suitability for pediatric administration.

Project start: June 2025 or later
Project location: Institute of Pharma Technology, FHNW Muttenz