

Grain starch quality under controlled agricultural management

Supervisor: Prof. Dr. Christian Zörb / Dr. Xudong Zhang

Starch, a major component of cereal grains, finds widespread use in various industries, including food production, paper-making, pharmaceuticals, and more. Its diverse applications hinge on its molecular structure and functional properties.

Agricultural practices, such as nutrient fertilization and organic farming, can potentially influence starch biosynthesis and grain quality. However, these processes are sensitive to environmental factors like elevated CO₂, temperature, drought, and soil salinity. While much research has focused on optimizing agricultural practices to enhance crop yield, their impact on grain quality remains understudied and often overlooked.

Understanding these effects can provide a theoretical framework for developing value-added food products through optimized agricultural management, thereby contributing to the sustainability of agronomy and food production.

1. What I would be able to offer?

Bachelor or master thesis based on field trial-collected cereal grains like maize, wheat, or legume under different nutrient fertilization like N, P or under organic cultivation system

2. What you would be able to learn?

This research project explores the impact of agricultural management practices, including nutrient fertilization and organic cultivation, on the physicochemical and nutritional properties of cereal starch. The study involves a comprehensive research process, encompassing literature review, conceptualization, experimental execution, data collection, analysis, and thesis writing. Experimental procedures include starch isolation, amylose determination, assessment of starch hydration properties, and evaluation of starch enzymatic digestion. The results contribute to understanding the effects of agricultural practices on cereal grain quality, with implications for food sustainability and agricultural management strategies.

Contact information:

Dr. Xudong Zhang (Postdoc)

University of Hohenheim

Institute of Crop Science

Quality of Plant Products (340e)

Building 04.23, Room 110, Emil-Wolff-Str. 25, 70593 Stuttgart, Germany

xudong.zhang@uni-hohenheim.de