



CENTER OF EXCELLENCE

FOOD TECHNOLOGY

NUTRITION

**ACHIEVE MORE
THROUGH RESEARCH & DEVELOPMENT**

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**RESEARCH &
DEVELOPMENT**

ACHIEVE MORE WITH AUSTRIA'S STRONGEST RESEARCH UNIVERSITY

Successful businesses know from experience: Every euro that goes into research and development pays for itself many times over. This is because innovations give those businesses a decisive competitive edge, generating revenue and securing jobs in the long run.

As a centre of research, Upper Austria is in the fast lane, and the University of Applied Sciences Upper Austria (University of Applied Sciences Upper Austria) has become a driving force. Austria's most research-intensive university of applied sciences offers innovative businesses its four campuses and approximately 400 professors and academic staff. Currently, over 400 projects in 17 specialist areas of research are being implemented.

Areas of Applied Research:

- » IT (Hagenberg Campus)
- » Medical Engineering and Applied Social Sciences (Linz Campus)
- » Management (Steyr Campus)
- » Engineering (Wels Campus)

Perfect networking of the campuses makes it possible to achieve an optimal overall solution for each project.

The State of Upper Austria is undertaking joint initiatives in the areas of education, research and business through the strategic economic and research programme to ensure that Upper Austria retains a clear competitive edge.

Upper Austria boasts the most businesses and the strongest growth in the food and nutrition sector compared to other regions in Austria. In order to enhance the focus of research on food production, potential businesses will have to be encouraged to innovate in order to acquire core competencies in the field of food and nutrition research.


The Center of Excellence Food Technology and Nutrition was established in order to meet the requirements of the strategic programme 'Innovative Upper Austria 2020'. The Center's projects support the achievement of the programme's strategic objectives.

The State of Upper Austria has in the University of Applied Sciences Upper Austria a longstanding partner in the field of research and development that actively supports the achievement of its strategic objectives.




Mag. Thomas Stelzer
State Governor of Upper Austria




Markus Achleitner
Minister of Economy of Upper Austria



COOPERATION MADE EASY

With more than 400 researchers, the University of Applied Sciences Upper Austria is on hand as a flexible and reliable partner for addressing research and development issues with businesses and institutions from industry and society.

The possibilities for cooperation are numerous and varied:

- » Applied R&D projects with business partners
- » Academic research projects
- » International R&D projects
- » Symposia and workshops
- » Students' bachelor's and master's theses

Project time frames can range from a few months to up to five years.

The University of Applied Sciences Upper Austria offers its R&D support to businesses and institutions from industry and society.

This includes on the one hand businesses which lack personnel resources or have limited financial resources for their own research and development activities (e.g. small and medium-sized enterprises).

On the other hand, solutions for companies needing specialised support (e.g. in the form of special equipment) are also available. For the University of Applied Sciences Upper Austria's cooperation partners, a joint project is, above all, a financially straightforward and efficient undertaking.

Geared towards the needs of the client, innovative solutions will be developed that can be put directly into practice.



*Dr. Gerald Reisinger
President University of Applied Sciences Upper Austria*



*Prok. Prof. Priv.Do. Dipl.-Ing. Dr. Johann Kastner
Vice President FH OÖ Forschungs & Entwicklungs GmbH*



Thematic Areas:

- » Plant-derived bioactive compounds
- » Chemical Analysis
- » In-vitro and in-vivo Studies
- » Toxicological Evaluation
- » Product Development

ACHIEVE MORE THROUGH INNOVATIVE FOOD CONCEPTS

The Center of Excellence Food Technology and Nutrition (CoE FTN, <https://forschung.fh-ooe.at/en/coe-lte/>) at the University of Applied Sciences Upper Austria Wels Campus encompasses various areas of food and feed development and characterisation with an emphasis on the analysis of food and feeds as well as their plant-derived bioactive compounds (phytochemicals).

The CoE FTN focuses on the following areas of research:

- » **Analytical characterisation of food and feeds** as well as the necessary raw materials (mainly fruit, vegetables, cereals and oilseeds)
- » **Isolation and characterisation of plant-derived bioactive compounds**
- » **Isolation and characterisation of toxic substances** that occur during food production and the development of strategies to avoid the formation of these substances
- » **Development of suitable in-vitro and in-vivo test systems** (molecular biology, biochemistry, biophysical, cell biology) to study the influence of food and feeds as well as their substances at the cellular and molecular level
- » **Characterisation of cellular signalling pathways** which are relevant to nutritional physiology or have preventive functions (e.g. insulin signalling)
- » **Design and development** of new, innovative and functional food and feeds as well as food supplements
- » **Stabilisation of functional food ingredients and micro-organisms** and their applications in food and feeds
- » **Bioavailability and cytotoxicity studies** of food ingredients
- » **Mechanical characterisation** of food and its structure
- » **Recycling of by-products**
- » **Analysis of microbial contamination**
- » **Characterisation of food microstructures** using imaging techniques
- » **Clinical studies** on humans and animals in cooperation with hospitals and university clinics

ACHIEVING MORE: CURRENT RESEARCH PROJECTS

Josef Ressel Center for Phytogenic Drug Research Christian Doppler Research Association (CDG)

This JR Center will study plant-derived bio-active compounds for the prevention and therapeutic support of human diseases as well as improving animal health and performance.

Phytogenic substances are plant-derived bioactive compounds that can have a beneficial effect on human and animal health. Current estimates suggest that more than 28,000 different plant species have relevant medical effects, with only a fraction of these known in today's practice of medicine and nutrition. Moreover, detailed information about the potential molecular modes of action is often lacking. Nevertheless, natural chemical compounds have long been an important source of new drugs and represent a unique structural diversity.

There is a growing body of scientific evidence that phytogenic food ingredients or isolated phytogenic substances have a positive impact on human health when consumed as part of a regular diet. For example, a large number of studies have shown that a diet rich in polyphenols can prevent cardiovascular diseases. Furthermore, it was possible to identify cancer-inhibiting activities as well as various modes of action against diseases such as Alzheimer's, obesity and diabetes. Nevertheless, the actual effect of phytochemicals at the molecular and cellular level often remains unclear. Further studies to clarify possible functional effects and to identify potential bioactive substances or to estimate their toxic potential are therefore essential. In addition, phytogenic substances have also

become enormously important as bioactive feed additives in livestock breeding and performance in recent years due to the ban on antibiotics as a growth-promoting feed additive. In this context phytogenic substances are considered as a possible natural substitute. However, their effects and potential applications are far from fully explored.

Research at the JR Center will focus on evaluating the potential role of phytogenic substances in foods or dietary supplements for the prevention and treatment of major lifestyle diseases (e.g. obesity, diabetes) and, with regard to animals, on the study of phytogenic substances as natural feed additives to improve animal health and performance. Different in-vitro, in-vivo, in-ovo and in-silico test systems will be used. In addition, a comprehensive chemical-analytical qualification and quantification of phytogenic substances will be carried out.

This project encompasses key research questions to lay the scientific foundations for the use of phytogenic substances in the prevention and selective treatment of human diseases as well as improving animal health and performance.

Project volume: €1.45 million
Project manager: FH-Prof. Dr. Julian Weghuber
Partner: TU Wien
Participating firms: agromed Austria GmbH,
Delacon Biotechnik GmbH, PM International AG
Duration: 2019–2023

Acrylamide

Development of methods for the reduction of the acrylamide content in grain-based coffee replacement products

- » 'Innovative Upper Austria 2020' food cluster project
- » University of Applied Sciences Upper Austria project share: €20,000
- » Project management: FH-Prof. Dr. Otmar Höglinger, FH-Prof. Dr. Julian Weghuber
- » Participating firms: Arnreiter Mühle GmbH, backaldrin International The Kornspitz Company GmbH
- » Duration: 2018–2019

TC-BioScreen

Development of a multiwell-capable TIR reader for the quantitative determination of proteins and their interaction partners in the plasma membrane of living cells

- » TIMed Center Project, State of Upper Austria RTI
- » Project volume: €111,500
- » Project manager: FH-Prof. Dr. Julian Weghuber
- » Partner: Hochschule Aalen
- » Participating firm: Bayer AG
- » Duration: 2018–2020

Phytogenics

Molecular biological characterisation of protective mechanisms of selected phytogenic substances

- » University of Applied Sciences Upper Austria dissertation research grant
- » Project volume: €120,000
- » Project manager: FH-Prof. Dr. Julian Weghuber
- » Doctoral candidate: Georg Sandner, MSc
- » Duration: 2019–2021

LuxInnovation GlucoTOP

Development of functional food and nutritional supplements with antidiabetic effect

- » Project volume: €180,000
- » Project manager: FH-Prof. Dr. Julian Weghuber
- » Partner: PM International AG
- » Duration: 2016–2019

Detection of FODMAPs and Associated Microorganisms

- » University of Applied Sciences Upper Austria dissertation research grant
- » Project volume: €120,000
- » Project manager: FH-Prof. Dr. Julian Weghuber
- » Doctoral candidate: Johannes Pitsch, MSc
- » Duration: 2018–2021
- » Laufzeit 2018–2021

K1 Competence Center for Feed and Food Quality, Safety and Innovation

FFG K1 Center FFoQSI

- » The Austrian Competence Center for Feed and Food Quality, Safety and Innovation (FFoQSI) is a European lighthouse project in which for the first time research is being conducted along the entire feed and food production chain. The aim of FFoQSI is to make domestic feed and food production safer and more sustainable and to drive innovation. FFoQSI's research covers key issues along the entire value chains of plant and animal food, combining the strengths of different specialist disciplines along production chains. In addition to the University of Applied Sciences Upper Austria, scientists from the University of Natural Resources and Applied Life Sciences, Vienna (BOKU Vienna), University of Veterinary Medicine, Vienna (Vetmeduni Vienna), AIT (Austrian Institute of Technology GmbH), AGES (Austrian Agency for Health and Food Security) and RECENDT (Research Center for Non Destructive Testing) contribute their expertise. The University of Applied Sciences Upper Austria is a partner in a consortium with the Vetmeduni Vienna and BOKU Vienna. More than 36 collaboration partners are involved in the project and profit directly from the research findings. The research activities in Wels focus mainly on the characterisation and industrial applications of plant raw materials and ingredients in both food and feed. In this context, the physiological effect of selected substances is particularly important. The findings will lead to the development of innovative functional products. Additional areas of inquiry include the establishment of detection methods of toxic substances which occur during production processes, the reduction of microbial stresses and waste recycling.
- » Total project volume: €16.4 million
- » Operational management at the FFoQSI Wels location: FH-Prof. Dr. Julian Weghuber
- » Duration: 2017–2021

CURRENT DEGREE PROGRAMMES

Hagenberg Campus

M Biomedical Informatics
B Medical and Bioinformatics

Linz Campus

B Medical Engineering
M Medical Engineering

Wels Campus

B Food Technology and Nutrition
B M Bio- and Environmental Technology
B M Automation Engineering

B = Bachelor's degree programme, M = Master's degree programme

ACHIEVE MORE WITH OUR EXPERTS

Cutting-Edge Infrastructure on Every Campus

- » **Two wet chemical laboratories** with standard equipment for chemo-analytical, biochemical, molecular biological, microbiological and cell biological experiments; HPLC, FPLC, GC-MS, IC, Real-Time PCR
- » **Baking laboratory** with sensory room
- » **Experimental and teaching brewery**
- » **Microscopy laboratory** with 2 TIR fluorescence microscopes, well plate reader, UV irradiation system and Olympus stereo microscope
- » **Two cell culture labs** including large pool of different mammalian cell lines
- » **Fermentation lab**

YOUR POINTS OF CONTACT



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