



Food Processing Technology

LUT Kouvola

EXPERTISE IN FOOD PROCESSING TECHNOLOGY

Department of Separation Science

CORE TEAM AT LUT KOUVOLA

Assistant Prof. Samuel B. Perez Vega

- Food engineering
- Design, evaluation and implementation of sustainable process systems

Post-doc Marjo Pöysä

- Food sciences and analysis

Post-doc Abayneh Demesa

- Bioprocessing

Project Eng. Ville Hamara

- Foodtech laboratories

Development Manager, Matti Lampinen

- RDI actions, external collaboration

Junior researchers: Savindi Wanninayake
Unnahalage, Rahul Biswas, Anh Hoang, Okba
Guedri

COMPLEMENTARY EXPERTISE

Prof. Mika Mänttari

- Membrane technology

Prof. Tuomas Koiranen

- Ultrasound treatment

Prof. Tuomo Sainio

- Chromatographic separation

Assoc. Prof. Teemu Kinnarinen

- Solid-liquid separation

Assoc. Prof. Ikenna Anugwom

- Biorefineries

MASTER'S PROGRAMME IN FOOD PROCESSING TECHNOLOGY

- » The Master's Programme in Food Processing Technology is a two-year programme.
- » Blended learning at Kouvola Regional Unit
- » The programme leads to the degree of Master of Science in Technology, M.Sc. (Tech.), which is 120 ECTS credits.
- » Approx. 20-30 students intake annually. The programme started in autumn 2024.
- » For applicants having completed or about to complete their Bachelor's degree in Finland or anywhere worldwide.
- » The Master's Programme in Food Processing Technology focuses on processing technologies and unit processes used in food manufacturing.

Koulutus

Kouvola on elintarvikealan koulutuksen jättiläinen – nyt kaupungissa aloittivat uudet maisteriopiskelijat

Ensimmäiset opiskelijat perehtyvät muun muassa prosessi- ja tuotekehitykseen.



Lähde: Yle

MASTER'S PROGRAMME IN FOOD PROCESSING TECHNOLOGY

Core studies	Specialisation Studies to Food Process Engineering	Alternative Specialisation Studies
Obligatory, 8-10 ECTS	Obligatory, 80 ECTS	10-35 ECTS, select min 10 ECTS
Orientation to M.Sc. Studies (1)	Introduction to Food Processing Technologies (5)*	Current Issues in Enabling Technologies for Circular Economy (5)
Laboratory Safety Course (1)	Instrumental Food Analysis (5)*	Biological Waste Water Treatment (5)
Introduction to Food Sector (1)*	Industrial Solid-Liquid Separation (5)	Precipitation, Crystallization ... Methods in Water Treatment (5)
Research Methodology (5)	Membrane Technology in Biorefining and Food Technology (5)	Process intensification (5)
Work Experience in Master's Degree (2)	Adsorption Separations in Biorefining and Food Processing (5)	Development of New Sustainable Products and Solutions (5)
	Fluid dynamics in chemical engineering (5)	Academic writing (3)
	Bioprocessing and Microbiology in Food and Biomaterials (5)*	
	Modelling and Simulation of Food Processes (5)*	Elective studies, credits to complete degree (120 ECTS, 2 years)
	Project course in Food Technology (10)*	Include freely selected courses from any discipline at LUT
	Master's Thesis and Seminar (30)	

SYSTEMIC FOOD PROCESSING (SFP)

» Research areas

» Processing and Separation Technologies

» Raw Materials and Functionality

» Sustainability and Environmental Impact

» KEKE-project - LUT FoodTech

» Investments & RDI

» Solid/liquid separation equipment

» Chromatographic separation equipment

» RDI

» Ultrasound assisted processing



FROM RESEARCH TO BUSINESS – ULTRASOUND BASED TASTE RELISHES TO RESTAURANT KITCHEN

Ruoka

Lappeenrannassa keksittiin laite, jolla limoncello-liköörikin valmistuu kymmenessä minuutissa

Ultraääntä käyttävä uuttolaite nopeuttaa esimerkiksi yrttiöljyn ja liköörin valmistusta.

Lähde: Yle



Uuttolaite oli tiistaina piilossa medialta, sillä laitetta ei ole vielä patentoitu. Kuva: Kalle Purhonen / Yle

ADVANTAGES COMPARED TO OTHER SIMILAR METHODS

- YIELD**
 - Ultrasound improves the mass transfer efficiency of the extraction process.
 - Less raw material is needed to produce intense flavours.
 - Less extractant is needed.
 - Works with edible extractants.
- SIZE**
 - Smaller devices achieved by the more efficient extraction process.
 - Easier to place in the work environment.
 - Due to the short processing time, the device is readily available for the next batch.
 - No need to produce in stock.
- TEMPERATURE**
 - Process does not carry a large heat load, and the need for cooling is minimal.
 - Saves cooling energy.
 - The controlled temperature produces a high product quality.
- HYGIENE**
 - Easy to maintain food hygiene.
 - Saves labour resources.
 - One-stop process: no extra material handling required.
 - Easy to clean.

ULTRA-SOUND BASED TASTE RELISHES TO RESTAURANT KITCHEN

Restaurant kitchens, like any food service business, lack an efficient and easy-to-use way to utilize fresh ingredients and produce unique, healthy flavours.

In **ULMARA** project, we demonstrate a new and modern concept for creating customized flavours using ultrasound-assisted extraction technology from fresh and healthy ingredients, such as berries, fruits and herbs.

Tasty extracts can be prepared and used on-site in a restaurant, cafe, bar, bakery or other similar premises.

NextGenExtraction CONCEPT

1. Ultrasound Extraction Device
2. Maintenance and Service
3. Taste Development and Recipes
4. Branded Consumer Products and Devices

WHY ULMARA? COMMERCIAL ASPECT

- TASTE DEVELOPMENT**
 - A variation on existing recipes.
 - Introducing new flavours to new products.
 - Replacing artificial and factory-made flavours with fresh and tastier ones.
- NEW MARKET OPPORTUNITIES**
 - Local, controlled raw materials.
 - Fresh extracts are always available.
 - New, customized flavours.
 - Bright colours.
- BRAND STRENGTHENING**
 - New, exciting products.
 - Trendsetting.
 - Product innovation.
- COST ADVANTAGE**
 - Less waste, higher yield.
 - Flexible production.
 - Fewer resources are required.
 - Productivity growth, profitability.

LUT SEPARATION SCIENCE

500+
PERSON COMMUNITY

110+
SCIENCE
EXPERTS

11
PROFESSORS

370+
STUDENTS

35+ NATIONALITIES

State of the art
RESEARCH FACILITIES

3500_{m2}
LAB SPACE

350+
RESEARCH
INFRASTRUCTURE

FULL SCALE PILOTING POSSIBILITIES

10M€
RESEARCH BUDGET

57%
EXTERNAL
FUNDING

120+
PUBLICATIONS
ANNUALLY

