Independent Projects in Food Science, 30 hp (A1E or A2E – Magister or Master)

NB! A1E can be written in Swedish or English, A2E must be written in English.

If you are interested in any of the suggested projects or just want more information please contact the supervisor. For some projects see more details below.

In collaboration with Sweden's farm dairies - Dried abomasum; how does it work in cheese making?
Contact: Monika.Johansson@slu.se

Space food or what will we eat on Mars? Projects in collaboration with German Aerospace Center
Contact: Tor.Blomqvist@dlr.de; Monika.Johansson@slu.se

Evaluation of sensory analysis of cheese produced using innovation rennets. Project in collaboration with Sweden's farm dairies
Contact: Monika.Johansson@slu.se

Feeding strategies to reduce methane emission from dairy cows; effect on protein and fat profiles in milk
Contact: Monika.Johansson@slu.se

Comparison of the composition, protein profile and technological properties of milk from Swedish Mountain cows and Swedish Holstein cows.
Contact: Monika.Johansson@slu.se

How are levels of free fatty acids in milk affected by lactation number of the cow?
Contact: Monika.Johansson@slu.se

Pea starch: Molecular structure and functionality
Contact: santanu.basu@slu.se, Roger.Andersson@slu.se

Grain morphology profiling with the novel Cgrain instrument. Comparison between wheat landraces and modern cultivars at different cultivation conditions. (www.slu.se/brodprojekt)
Contact: Roger.Andersson@slu.se

Vill du hjälpa Åland att utveckla en hållbar livsmedelsstrategi? Eller vill du vara en del av Ålands mathantverk?
Kontakt: Harriet Strandvik, verksamhetschef, Mathantverkare på Åland.
harriet@mathantverkare.ax; monika.johansson@slu.se

Effects of protein concentration, pH, and salt on the structural properties of Plant-Based Protein Nanofibrils
Contact: Jing.lu@slu.se

The consumer's dilemma – food safety vs food waste
Contact: Karin Söderqvist, Karin.soderqvist@slu.se (Department of Biomedical Sciences and Veterinary Public Health, SLU) and Marie Lange, marie.lange@ikv.uu.se (Department of Food Studies, Nutrition and Dietetics, Uppsala University)

Various projects regarding *Non-conventional yeasts, and their potential application for food, feed, and other biotechnological applications to establish sustainable, circular processes*
Contact: Volkmar.Passoth@slu.se
See broad project areas for Food Biotechnology below.

Spent mushroom substrate (SMS) as biofertilizer and soil amendment (literature review)
Contact: Bettina.Muller@slu.se; and Hesam Mousavi/Svein Solberg (Inland Norway University of Applied Sciences)

PROJECT DESCRIPTIONS

Effects of protein concentration, pH, and salt on the structural properties of Plant-Based Protein Nanofibrils

Peas are suitable for cultivation in Sweden on both large and small scales and can produce palatable and nutritious foods. Peas have high levels of protein, starch, and soluble fiber but are under-utilized in the Swedish diet. The major protein family in peas consists of globulins, which are further classified into legumins (300-400 kDa), vicilin (150-170 kDa), and convicilin (~210 kDa).The ability to create targeted textural properties in protein is highly dependent on protein structure and its capacity to interact with other food ingredients. A promising solution is to reassemble proteins into stiffer structures such as amyloid-like protein nanofibrils (PNFs). PNFs are commonly formed by the self-assembly of highly ordered peptides, providing a framework for creating ordered functional structures from the atomic level up to the macroscale. The conversion of a protein to PNFs results in an aqueous dispersion of fibrils, and the high aspect ratio of PNFs promotes inter-fibrillar contacts, leading to the formation of a continuous network between the fibrils—a gel.
The project will investigate the effects of protein concentration, pH, and salt on the structural properties of plant-based protein nanofibrils. We will characterize the secondary structure by analyzing samples using ThT-assay, UV-CD, AFM, and SDS-PAGE, among other techniques.

The consumer's dilemma – food safety vs food waste

Background:

Reducing food waste is of great importance for a sustainable development and one target of 2030 Agenda (Nr: 12.3) is to reduce food waste by 50%. The private households are responsible for the largest part of the Swedish food waste and it has been reported that more than half of the food that has been discarded at consumption level is edible at the time of wasting. This may be a consequence of that the discussion about food safety has a much longer history than the discussion about food waste. However, some food products may actually become health hazards if consumed after its use by date, e.g. smoked salmon or ham. This mainly poses a risk for the elderly, pregnant women and the immunocompromised. But in today's discussions, the debate about reduced food waste (and also economic interests) often ends up higher on the agenda than the one about food safety. This result in a struggle between the perspectives as you do not want to throw away food and at the same time you want to eat safe food.

Project:

The purpose of the project is to study consumers knowledge, routines, and attitudes towards food handling in the private household with a focus on food safety. What conflict of interest could be found between food waste and food safety actions? Which factors could impact consumer wastage? How is the relation between food safety and the aim for less food waste discussed among food retailers? In this project, qualitative data will be combined with quantitative data as it is planned to include interviews followed by a consumer survey.

The group of Food Biotechnology has its main focus on *non-conventional yeasts, and their potential application for food, feed, and other biotechnological applications to establish sustainable, circular processes*. Our research also focuses on the fundamental side of science as yeasts are important model organisms to understand eukaryotic physiology and genetics. We develop methods for controlled cultivation of microbes, quantification of lipids and carotenoids in yeasts and cell fractionation, and for metabolic and genetic manipulation. To understand the physiology and to use them as cell factories we are also establishing methods in genome, transcriptome, and proteome analysis. We are also interested in exploring food applications of yeast oils/protein as well as in assessing consumer acceptance and market potential.

This offers room for a broad range of potential master thesis within both Food science, Sustainable Food Systems, and Biology, e.g., extraction and analysis of extracellular substances in oleaginous red yeasts; identifying novel compounds for industrial applications; consumer acceptance of yeast-based food, microbial lipid and carotenoid production from waste residues; genetic manipulation of oleaginous red yeasts, and more. If you are interested to do you master thesis related to these topics, please contact Volkmar Passoth (Volkmar.Passoth@slu.se).

Spent mushroom substrate (SMS) as biofertilizer and soil amendment

Task: To review and quantify the long-term agronomic benefits of using SMS as peat substitute in horticulture or as a soil amendment in agriculture.

Methodology: Systematic literature review, e.g. using Web of Science Core Collection with the advanced search function and with terms: Spent AND Mushroom AND (Substrate OR Compost) AND Soil AND Amendment.

Supervisor (external): Hesam Mousavi/Svein Solberg (Inland Norway University of Applied Sciences) and supervisor (internal): Bettina.Muller@slu.se