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.

Effect of germination on the cooking behavior of millet and legume flour
Contact: Santanu.Basu@slu.se; Sunera.Zulficar.Nurmomade@slu.se

Image based classification of faba beans from different varieties
Contact: Santanu.Basu@slu.se; Asa.Grimberg@slu.se

Impact factors controlling the desired raw milk, mainly for the production of cheese and milk powder
Contact: Maria.Karlsson@lrf.se, Tel. 010-1844418

The nutritional content of milk and vegetarian alternatives, respectively
Contact: Ann-Kristin.Sundin@lrf.se, Tel. 010-1844185

Nutritional density in relation to environmental impact - how do we best evaluate food from a health and environmental perspective?
Contact: Ann-Kristin.Sundin@lrf.se, Tel. 010-1844185

Dairy matrix - milk and dairy products beyond saturated fatty acids
Contact: Ann-Kristin.Sundin@lrf.se, Tel. 010-1844185

Impact of freezing storage of milk on milk coagulation properties and cheese yield
Contact: Monika.Johansson@slu.se; Ase.Lundh@slu.se

Effect of germination on the cooking behavior of millet and legume flour
Contact: Santanu.Basu@slu.se; sunera.zulficar.nurmomade@slu.se

Mung bean protein components: Extraction, characterization, and gelation/fibrillation
Contact: Saeid.Karkehabadi@slu.se; Maud.Langton@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

Connecting dough behavior to flour baking quality and composition (in Malmö)
Contact: Louise.Selga@lantmannen.com; Tel. 072-2371497

Pulsed electric field pretreatment of wheat bran to improve arabinoxylan extraction
Contact: Solja Pietiäinen; Solja.Pietiainen@lantmannen.com; Tel. 076-6970022

Comparison of lamb meat fatty acids from imported and Swedish lamb
Contact: Jana Pickova

Fatty acid composition in Arctic char fed with feed containing red yeast
Contact: Jana.Pickova@slu.se

Surviving ratio of milk microbiota during long-term storage at freezing temperatures
Contact: Monika.Johansson@slu.se; Ase.Lundh@slu.se

Comparison between protein profile of camel, goat and cows' milk using SDS-PAGE
Contact: Monika.Johansson@slu.se; Ase.Lundh@slu.se

PROJECT DESCRIPTIONS

Effect of germination on the cooking behavior of millet and legume flour

<u>Background</u>
Pearl millet and Cow Pea (legume) is mostly cultivated in Africa and Asia and are consumed as staple food by large population in these continents. There are major issues of starch and protein digestibility due to presence of multiple antinutritional compounds (ANCs) naturally present in the millets and legumes. A very common and cheap technique to remove the ANCs is germination.

<u>Project</u>
The project will aim to look into the effect of germination and composition of blended flour samples on the cooking behavior. Cooking behavior will be studied in terms of pasting, rheological properties and starch gelatinization phenomena.

Image based classification of faba beans from different varieties

<u>Background</u>
Faba bean is today a minor crop that has a huge potential to be grown as a legume based plant protein source in different parts of Sweden. However, basic knowledge on what factors determine seed quality of faba bean is lacking.

Project
This project aims to contribute to a better understanding of how different visual seed traits are associated to seed quality, by exploring new efficient imaging techniques. The color of faba bean seeds is at least partly determined by the seed coat tannin content (i.e. phenolic profile) which also changes with the storage time. Total phenolic profiling of the seed coat or the whole seeds is not an easy method to follow in an industrial set up. In this project, we are aiming to develop an image based analysis of the color and size of the faba bean seeds for easier seed quality determination.

Impact factors controlling the desired raw milk, mainly for the production of cheese and milk powder

How is the milk raw material affected by the various factors in the value chain? Especially genetic markers for milk quality. Problematization about the total number of bacteria is also relevant.

The nutritional content of milk and vegetarian alternatives, respectively

There is a survey from France which shows that half of all consumers surveyed perceive vegan drinks as nutritious as milk, and that 1/5 of consumers surveyed perceive vegan drinks as complete substitutes for dairy products for infants. A Danish study confirms this trend among Danish consumers. Therefore, it is important to know whether a significant proportion of Swedish consumers also have this perception. In such a case, targeted communication about the nutritional content of these different foods would need to be highlighted in order for people to be able to make the right decisions about food choices. We do not mean that all people have to drink milk or eat dairy products, and there are very good vegan alternativers that suit people of different ages. However, problems arise if consumers do not know the differences between the different foods, especially when the target group is young children. The purpose is to map the state of knowledge among Swedish consumers and, in the event that there are incorrect perceptions about the nutritional content in each product category, provide a basis for communication. In this way, people can make the right decision based on their own conditions and goals.

Effect of germination on the cooking behavior of millet and legume flour

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Project

The project will aim to look into the effect of germination and composition of blended flour samples on the cooking behavior. Cooking behavior will be studied in terms of pasting, rheological properties and starch gelatinization phenomena.

Mung bean protein components: Extraction, Characterization, and gelation/fibrillation

The mung bean is cultivated throughout the southern half of Asia and eastern Africa. It contains more than 20% protein and it is considered to be a major source of protein in many developing countries. Three types of storage proteins are present in mung beans, namely 7S, 8S and 11S. The major component is the 8S with approximately 80% of the total globular protein. The aim of this study is to extract and characterize the 8S component based on the pH/Salt -solubility profile. If time permits the effect of extraction method, pH and NaCl addition on rheological properties and microstructure of heat-induced mung bean-8S gels will also be evaluated.

Connecting dough behavior to flour baking quality and composition

We are looking for two master students interested in working in the Cerealia mill in Malmö. The project focuses on how wheat flour composition influences baking properties. In the project you will perform a variety of rheological analyses and connect these to the flour composition and baking performance. Data evaluation will be done using multivariate analysis.

Pulsed electric field pretreatment of wheat bran to improve arabinoxylan extraction

Background
Arabinoxylan (AX) is an abundant hemicellulose in wheat bran and an important functional component in baked products that could be used as a food ingredient to improve bread quality. AX is however embedded in a complex cell wall matrix and hard to extract efficiently from bran without compromising its properties in terms of molecular weight and feruloylation. Pretreatments are known to increase AX extractability and could be combined with suitable extraction method to improve AX yield form wheat bran. Pulsed electric field (PEF) is a process where high voltage electric pulses are applied to biological materials to increase membrane permeability. With sufficient electric field strength and exposure time, the electric field applied in PEF processing causes electrical breakdown of cell walls. PEF pre-treatment has previously been shown to have potential as assistance or alternative to conventional thermal processing that could be used as a novel bran pretreatment to increase AX solubility.

Project
The aim of this project is to evaluate and optimize PEF as a wheat bran pretreatment in terms of AX extraction yield and monosaccharide composition of extracts. The work will include PEF pretreatment of raw material, extraction of AX and chemical assessment of extracts including monosaccharide composition using high-pH anion exchange chromatography (HPAEC). This Master's thesis project will be done in collaboration with Lantmännen as a part of Solja Pietiäinen's industrial PhD project "Fractionation of wheat bran to create functional ingredients".