

Food - Feed - Fertilizer - Fuel - Future

The project goal of **cycle** is to introduce a holistic approach to improve resource utilization in the Norwegian food chain by developing knowledge and sustainable solutions for eco-friendly bio-processes and technology within a bio-economical perspective.



Dear reader,

Loss and waste is a large problem in food industry as well as private households, which is why the CYCLE project aims to obtain total utilization of raw material from fish, chicken and vegetables. The focus in CYCLE is eco-cycle thinking and sustainable technological solutions for an efficient and profitable food process industry. This include value-chain-integrating disciplines, such as food safety, sustainability, sensor and automation technology, logistics, bioprocessing technology, and socio-economics. The main goal of CYCLE is to improve resource utilization, both loss and waste, in the food chain of both agriculture and marine sector. The research project has established an industry arena with the partners from both food and fish industries and their retailers, and feed, energy, logistic and equipment industry

Best regards,

Marit Aursand

Marit.Aursand@sintef.no

Automated quality differentiation and sorting of co-streams and waste

Robot-based poultry processing and intelligent process control

An intelligent robot-based solution that focused on machine vision for localization of chicken filet in the carcass, gripper (equipped with an integrated knife) that grips the chicken filet, and robot control strategy to guide the robot-arm to perform releasing of the chicken fillets from the carcass is under development to enable optimal raw material utilization and increased production efficiency,

Experiments with enzymatic hydrolysis are going on to turn mechanically rest material on the carcass into added-value products and promising results are obtained. To optimize the whole process, the rest material is monitored by NIR and fluorescence spectroscopy to determine constituents such as fat, protein, bone, cartilage, collagen etc. The hypothesis is that the process settings for the hydrolysis can be optimized based on this material knowledge.

Contact: Ekrem.Misimi@sintef.no

Resource-efficient bioprocessing technologies for food industry



Photo Randi Seljaasen

Developing new processing technologies and applications gives added value to selected food-grade co-streams. Formulated vegetable co-stream-based smoothie recipes are developed and edible films from potato peels has successfully being prepared. In addition as well as the work to increase vitamin B₁₂ content of vegetable products by fermentation has started. Hydrolysis and fractionation techniques for poultry processing co-streams are developed.

Contact: raija.lantto@vtt.fi

Food safety and logistics



Photo iStock

New strategies for planning in food production

A case study of a major Norwegian food producer has been used to demonstrate how the predominant tradition of production to stock is consuming a large portion of a food product's shelf life before it reaches the consumer. Producing, ordering and distributing food products in large volumes leads to large inventories at all stages of the supply chain. To alleviate such problems, the research indicates that combining make-to-stock production with production based on actual consumer orders can better balance supply with demand. Such a hybrid strategy can increase the likelihood of the produced food being eaten since more of a product's shelf life is available to the consumers – and in total reduce the amount of food that is thrown away.

Contact: Jan.Strandhagen@sintef.no

Socio-economy – market and consumer

The potential of an interdisciplinary approach combining social science with design theory in creating solutions for reduced food waste will be investigated in a PhD study. Materials as well as the socio-cultural structures that influence behavior and how design intervention can contribute to reduced food waste practices of Norwegian households are the main research topics. The objectives of this fellowship include:

- Mapping waste handling practices and the material environment of these practices in Norwegian households.
- Investigating the relationship between product design and food practices and its impact on food waste.
- Examining socio-cultural, economic and material barriers and possibilities for design for sustainable behavior that will reduce food waste.
- Exploring how intervention by design for sustainable behavior can reduce food waste in households.

Contact: he@ifro.ku.dk

Bio-processing of waste for feed, fertilizer and energy



Photo Vera Kristinova

Measuring greenhouse gas emissions from a compost reactor

Emissions of greenhouse gases (GHG) during composting will be studied. Compost substrates will be manure from 16 horses mixed with food residues and residues from horticultural crops. Daily monitoring of input and output of materials and measurement of the composition of the airflow from the reactor will be carried out.

Biogas produced by anaerobic digestion should be upgraded to fuel instead of being combusted for heat and electricity. Using ashes from wood, produced e.g. in a power plant fed by wood chips, to clean the CO₂ in the biogas is an interesting option that will be studied.

Amino acids from chicken feathers, and liming soil by eggshells

Studies of feather decomposition to produce valuable protein feed are continued, combining optical assessment of decomposition with chemical analysis.

Contact: anne-kristin.loes@bioforsk.no

Events

Nordic collaboration on sustainable logistics 4-5 June 2014

<http://www.ntnu.edu/sustainablelogistics/slow-symposium>

The Best of the Rest 8-10 October 2014

A joint seminar between EU-APROPOS, CUCLE, EU-NOSHAN and EU-TRADEIT is arranged in Potsdam, Germany.

<http://www.euapropos.eu/news/54-the-best-of-the-rest-seminar-in-potsdam-in-october>

Coordinator

Marit Aursand
SINTEF Fisheries and Aquaculture
Brattørkaia 17C
NO-7010 Trondheim

Marit.Aursand@sintef.no

Contact

Ana Karina Carvajal
SINTEF Fisheries and Aquaculture
Brattørkaia 17C
NO-7010 Trondheim

AnaKarina.Carvajal@sintef.no

Contact

Tone B. Gjerstad
SINTEF Raufoss Manufacturing AS
S.P. Andersens v 5
NO-7031 Trondheim

Tone.B.Gjerstad@sintef.no