

# CYCLE Newsletter no 1

Food - Feed - Fertilizer - Fuel - Future

Dear reader,  
In today's food production, only half of the raw materials are used for food products. Loss and waste is a large problem, 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.

The project will run over four years with a budget of 50 million, where 40 million is financed by the Norwegian Research Council. We have researchers from Norway, Finland and Denmark who collaborate with industry partners from chicken, fish and vegetable industry. We will also work with wholesale and distribution, equipment suppliers and various bioprocess industry that produce energy. If we are to succeed with the project goals, we believe it is essential to carry out research in close contact with industries across the value chain.

The project started in March 2013 and we had a kick off in April for all participants in Trondheim. There was lectures by researchers and industry partners and the working groups also met and planned progress. Representatives from these



different research groups have been around the country this spring, visiting several of the corporate participants, and gained insight into how things are done now, and the challenges of the different industries.

An open combined workshop will be organized October 2014 where you are welcome. Please also join our mailing list via the project website:  
<http://www.cycleweb.no>

Best regards,  
Marit Aursand

CYCLE

## Main research areas within CYCLE

### Automated quality differentiation and sorting of co-streams and waste

One research area within the cycle project will focus on solutions for automated quality differentiation and early sorting of co-streams and waste within the production process. During the project a sensor system will be developed for quality differentiation and characterization of raw material and its residuals from agricultural and marine sector. Automated concepts for sorting between raw material on one hand, and co-streams and waste on the other will also be developed, leading to a higher bio-resource efficiency and increased sustainability within food production. The main focus will be on poultry, vegetables and pelagic and white fish.

**Research goal:**

*Develop VIS/NIR/(and/or) X-ray based sensor systems for optimal quality differentiation of raw materials, co-streams and waste; and develop automated concepts for an efficient and precise sorting of raw materials, co-streams and waste.*



Photo Eirin Bar

### Resource-efficient bioprocessing technologies for food industry

Eco-friendly bioprocessing techniques can enhance raw material stability, nutritional value, sensory properties and processability. By using classical unit operations and bioprocessing techniques the amount of edible food co-streams converted into foodstuff or food ingredients can be increased. There is a heavy focus on food safety in the project, both through processing to provide the consumer with safe products and to ensure long shelf life.

**Research goal:**

*Increase the resource-efficiency of food industry by developing new food application for edible co-streams based on bio-processes*



Photo Eirin Bar



## Bio-processing of waste for feed, fertilizer and energy

Global reserves of waste will increase in the future, and can be seen as a growing resource. In the CYCLE project, food waste that is not appropriate for food consumption will be used as feed, fertilizers and, at the very least, as energy. Currently there is no single optimal solution for the treatment of organic waste in Norway. Anaerobic digestion, composting and incineration are at present the most common approaches of waste treatment from food production. The utilization of organic waste for energy production has received increased attention in later years, both in anaerobic digestion and biodiesel production. Local solutions reduce the need for transport, and may cause increased awareness among the consumers and other end-users. Optimizing the scale of waste treatment, dependent on the inflow of waste materials is essential for a sustainable development of the food chain.

### Research goal:

*Convert waste not appropriate for utilization as human food to feed, feed ingredients or fertilizer, possibly in combination with energy production.*



Photo Eirin Bar

## Food safety and logistics

How to manage and control the flow of food products throughout the supply chain, how to manage and reduce waste and how to handle emergencies related to unhealthy or unsafe food while at the same time increase the use of food loss and waste are important issues to address in order to reach the goal of sustainable food production in the future. The main challenges dealt with in the CYCLE project are how to: Pack, handle and control food products in integrated supply chains, handling a range of different products with varying characteristics and requirements, in order to maximize speed and quality while minimizing resource consumption. This will lead to the development of logistics processes that enable demand-driven, safe and efficient supply chains, design of logistics processes to handle and reduce waste in the different value chain stages to improve sustainability, and transparency in information processes to handle emergencies to improve safety and more rapid withdrawal of unsafe foods, in addition to provide consumers with broader and more reliable product information about their food.

### Research goal:

*Study challenges of managing and controlling the complex logistics processes in the food chain from manufacturing until end of life.*



Photo Eirin Bar

## Socio-economy – market and consumer

Today, 50 % of Norwegian food waste is created at household level. In the CYCLE project, barriers for sustainable food practises in households will be identified in order to map the waste handling practices. Waste handling management in households, such as freezing/cooling for later use, separation practice and experiences within households, and composting food waste in households will also be studied. This will be used in order to aggregate social/macro-economic benefits and impacts of implementing new systems/project results and by deducing options for policy formulation through regulation, both at corporate sector level and household level.

### Research goal:

*Study economic and institutional factors influencing production of co-streams and waste in value chains for chicken, fish and vegetables, investigate the role of consumers in sustainable consumption and integrate natural and social sciences in demonstrating macroeconomic values and policy options with a view to sustainable solutions.*



Photo Eirin Bar

## Cycle News

Food waste is an important topic among consumers, the European Commission, Norwegian authorities etc., and the topic is frequently discussed in different media like television and newspaper. Initially the CYCLE project was thoroughly presented in the local newspaper Adresseavisen where one of the industry partners, Potetpakkeriet at Frosta, Norway, told of the importance the project topic.

### CYCLE in the media

It is important for the CYCLE project that the results are being spread through different channels to reach a variety of target groups throughout the project. TYD has been engaged to develop a graphic profile, information videos, partner presentations and the project home page.

The information video will be presented at the next project meeting.



CYCLE Kick off April 2013. Photo TYD Media

## Between researcher and industry

During the first week of June, 8 partner companies within fish, poultry and vegetables were visited by the research partners.

Our partner companies opened their factories and gave the researchers valuable knowledge and information of their challenges and possibilities.

Cooperation with the industry is very important in the CYCLE project and therefore several companies participate in the project industry cluster as a sparring partners. During the CYCLE Tour, we got first hand insight into the problems and challenges of the companies, which is of great value and ensures that our research is relevant in an industrial setting. Thank you for your openness and hospitality.

## Upcoming events

The next tour will be arranged at the end of October and include companies in the Trøndelag region.

The first official presentation of the project will be at Aqua Nor 2013 in Trondheim 13–16 August where this newsletter is published. Please feel free to distribute this newsletter or our web page address [www.cycleweb.no](http://www.cycleweb.no) to your contacts.

The CYCLE project has planned to organize two project meetings each year. In addition, two biannual open CYCLE day workshops will be arranged, the first one at the end of 2014. More information about the internal meetings and the CYCLE day workshops will be presented in these newsletters and more information will be found on the web pages.

The next project meeting will be in October 28<sup>th</sup> and 29<sup>th</sup>, in Trondheim.



CYCLE Tour June 2013. Photo TYD Media





### Research partners

-  **SINTEF** Energy
-  **SINTEF** Raufoss Manufacturing
-  **SINTEF** Technology and society
-  **SINTEF** Fisheries and aquaculture



### Industry partners

### Let us know your opinion!

The goal of this newsletter is to inform our readers of the progress of our project.

Since we very much appreciate your opinion, please send us your feedback, comments and questions!

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