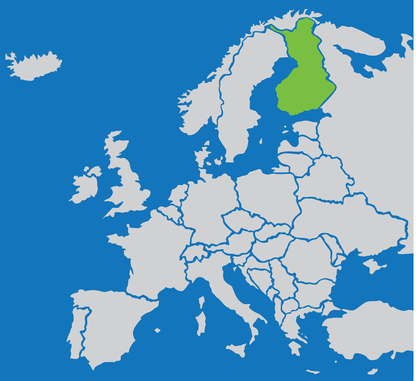
Feed self-sufficiency and animal health



AGRI Innovation summit 2019

UNIVERSITY OF OULU

Operational Group

SMART FEED - Smart measurements in cattle feeding and health

ÄLYREHU - Älykkäät mittaukset karjan ruokinnassa ja terveydessä

Practical problem

Feed analytics and monitoring cattle well-being requires too much time and/or sending samples to remote laboratories.

Calendar

Start: 01/01/2018
End: 01/01/2020

Budget

Total amount:
€319,818

Partners

ProAgria Kainuu Rural Advisory Services (advisor), 8 farms, veterinarian, Mtech Digital Solutions Ltd (company), Semes Ltd (company).

Objectives of the project

Proper feeding is important for cattle wellbeing and productivity of dairy farms. Silage is usually produced at the farms and its quality has a significant effect on the amount of bought-in feeds. Thus, improved silage quality and optimised silage to bought-in feed mixing ratio are essential. The project aims to develop methods, tools, analytics and data transfer to create a system for monitoring silage quality and energy and protein nutrition balance in dairy cows on-site at farms. The ultimate aim is to increase efficiency, productivity and competitiveness of the farms by reducing feeding costs. Rapid, semi-automated measurement systems also reduce the working time needed.

Main activities

The project will
a) test a handheld device for monitoring nutritional value of growing grass and determination of optimal harvesting time for fodder;
b) develop a tool for easy silage sample collection;
c) develop a quick on-farm method for determination of dry matter in silage/fodder;
d) develop electrochemical biosensor assays for analysis of nutritional markers in milk to facilitate monitoring of nutritional balance of individual cows;
e) develop data transfer of measurement results to a central database. The project cooperates with two Estonian and one Finnish EIP groups enabling transfer of expertise and increased possibilities for dissemination of project results.

Expected results

The expected project results
a) a better tool/measurement system to estimate the optimal harvesting time of fodder production;
b) a sampling tool for easy silage sample collection;
c) a quick on-farm method for determination of dry matter in silage and fodder in few minutes including automatic data transfer of measurement results to a central database;
d) at least one prototype of electrochemical biosensor for analysis of a nutritional marker in milk including automatic data transfer of measurement results to a central database;
e) a mobile application to record and transfer measurement data to a central database.

Results so far/first lessons

The project has tested the first prototype of the silage sampling tool, further development is required. Quick on-farm applicable measurement of silage dry matter has been tested in lab-scale, first on-farm pilots are about to begin. An easy transfer, storage and handling of measurement results will be also piloted. A handheld NIR device for monitoring growing grass was tested and its calibration was promisingly improved by a small number of Finnish samples. A separate calibration is needed for different grass species. Two research proposals involving our Estonian collaborators have been submitted. Working visits have been made in both directions. Biosensor development is ongoing.

Who will benefit

In particular – dairy farmers, but also beef-producing farms. They save time and improve the quality of feed given to cattle. Feeding and medical costs of cattle may decrease. More data can be collected from farms and used to forecast future events or take preventive actions (health of cattle, quality of silage, required amount of commercial feeds).

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