

## Characteristics of different welfare assessment tools and use of milk quality parameters for welfare detection of dairy cows

### Partners

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### Background

The welfare of production animals has risen as a growing concern for consumers, producers and legislators alike in the past decades (e.g. Eurobarometer 2016). To provide tools for improving the living conditions of farmed animals, many national governments and the European Community have initiated actions that aim at developing standardized tools to assess the welfare of farm animals and to convey that information to different stakeholders. For instance, in the European Welfare Quality® (WQ) project welfare assessment protocols were developed for pigs, poultry and cattle (Blokhuis et al. 2013). The WQ protocols apply the latest scientific knowledge on animal welfare, including the emphasis on animal-based measures (ABM). However, conducting the assessments is very laborious and time consuming (e.g. de Jong et al. 2014, van Eerdenburg et al. 2014).

Some effort has been put in the welfare scheme to combine parts or ideas of the WQ to existing health or welfare evaluation systems, and to utilize data that is otherwise routinely or automatically collected. Indirect or "iceberg" indicators of welfare, possibly ABMs that are easy to perform, could reduce the time used for welfare assessment and work as tools for early detection of problems (Heath et al. 2014). These kind of welfare indicators could include for instance milk yield (Coignard et al. 2014) and properties such as somatic cell count, fat and protein content, fertility and mortality figures of the herd (Sandgren et al. 2009), and qualitative behavioral assessment (Andreasen et al. 2013). For instance, Coignard et al. (2014) found that while milk yield is not directly associated with overall welfare as assessed with WQ in French dairy herds, some welfare components such as occurrence of aggressive behavior and negative emotional state were connected to lower milk yields.

In the LETKA-project (Health and welfare of dairy cows in Finland and their relationship with farm profitability, UEF and Luke), it was recently discovered that the welfare assessment included in the Finnish healthcare scheme for cattle (Naseva) does not give compatible results on the welfare of dairy cattle when compared with Welfare Quality. The further development and modification of the Naseva system is currently in planning, and experience and insights from other national welfare assessment projects are very valuable in this work.

The Italian National Animal Welfare Reference Center (CReNBA) has developed a welfare assessment system for dairy cattle that, similarly to the Finnish system, is conducted by veterinarians (Bertocchi and Fusi, 2014). The evaluation takes a maximum of half a day to conduct and considers the different animal groups (lactating and dry cows, young stock) at the farm. Currently a study is being conducted at CReNBA that looks for milk quality parameters that would correlate with the welfare of dairy cows. A similar database, including welfare results with WQ and milk yield and quality along with fertility measures from dairy herds will be analyzed in the Finnish LETKA-project.

Results from these studies could in the future help to develop automatic monitoring systems of ABMs at farm level. These devices, integrated for example in automated milking systems, could be used to give warnings and recommendation concerning the welfare of the herd and help the farmer to make informed decisions in the farm management, such as changing the feed composition or litter management.

### **Aims of STSM**

The current search for animal welfare indicators and new technological solutions for the welfare assessment and improvement process has led to a wealth of research, but also many different animal welfare evaluation systems being used in Europe and globally. There is thus a need for more understanding and dialogue between the different systems as well as stakeholder and developer groups to improve harmony and to find the most efficient methods for welfare assessment.

The main aims of the scientific mission are to:

- Exchange knowledge and experiences on different welfare evaluation methods
- Compare welfare evaluations of dairy cattle in Finland and Italy
- Look for milk quality parameters and other animal based measures that have a connection with animal welfare
- Learn how to use and analyze the milk parameter data
- Invoke collaboration between research groups with the same scope of interest

### **Proposed methodology**

Activities in the STSM visit will include:

- Participation on farm visits for collecting welfare (CReNBA protocol) and milk data (SCC, milk fat and protein, urea, total bacterial count etc.)
- Welfare Quality assessments on Italian farms and comparison of welfare results obtained using WQ and CReNBA protocol on the same farms
- Comparison of the welfare results collected with WQ in Finland and Italy
- Statistical analysis of the obtained welfare and milk quality data

### **Expected results**

The work done during the STSM is expected to increase knowledge in promising new animal based measures (milk quality parameters). It will also increase the applicant's (an early stage researcher) professional competence and connections. The comparison of Finnish and Italian welfare data will give insights into what are the main welfare concerns in these different production environments (and possibly some solutions to them). Also, the applicant will learn about the CReNBA welfare assessment method, and these lessons can be used when developing the Finnish Naseva system for welfare evaluation. The results of the collaboration will be published in an appropriate DairyCare-conference.

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