

## **In-line milk analysis and identification of health and reproduction events**

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Sensors to monitor health and reproduction events have been developed in recent years in order to save labour time and secure a high degree of detection of events that need the attention of the farmer. The systems enable the farmer to overlook and manage larger farms. Early diagnose of diseases also improves animal welfare as discomfort associated with disease is minimized due to early intervention. So far, measurements in milk have been available to farmers either on-line (electrical conductivity, colour, Somatic Cell Count) or off-line (California Mastitis Test, bacterial culture, Somatic Cell Count, Progesterone and lately the PAG pregnancy test). A number of systems based on cow activity have been developed to monitor heat, and some of these systems also include monitoring of chewing activity. Many systems, however, deliver huge amounts of unprocessed data, which leaves the user with laborious data filtering. One major obstacle to most sensing systems is that they are stand-alone systems, and therefore the farmer has to combine the output from these systems with other available data in order to make a management decision.

Recently an online system for the management of mastitis, ketosis, reproduction and protein feeding has been developed in Denmark, the Herd Navigator™. The system will automatically sample milk during milking from selected cows, analyze for four milk constituents. The analytical data are analyzed in biological models together with other cow specific data and presented to the farmer on the farm computer as advice with a Standard Operations Procedure attached. The Herd Navigator™ can be considered a “Whole System Approach”, as it selects cows in need of measurements, a sensor system, biological algorithms, data condensation and issue of timely warnings to the farmer of specific states of the cow, together with suggested intervention procedures, set up by the farmer in the Herd Management System.

The advantage of analysis of time series of specific milk constituents over unspecific data is obvious. A system using specific constituents can issue specific diagnoses, and in particular the continuous measurements of milk progesterone have the advantage of also detecting silent heats, ovarian cystic conditions, abortions and pregnancy.

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