



**D4Dairy**

**Digitalisation, Data integration,  
Detection and Decision support in  
Dairying**

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## MILK-MIR SPECTRAL DATA- SOURCE FOR NEW TRAITS IN BREEDING AND HERD MANAGEMENT

THE KNOWLEDGE OF THE USEFULNESS OF SPECTRAL DATA IN THE CONTEXT OF MASTITIS, KETOSIS AND FERTILITY HAS BEEN GREATLY EXPANDED. CONTINUED DEVELOPMENT OF MIR MODELS IS PROMISING AND NECESSARY FOR BENEFICIAL USE IN IMPROVING BREEDING AND HERD MANAGEMENT.

The aim of the D4Dairy-MIR project was to explore the potential of MIR data for predicting health problems in dairy herds, especially mastitis and ketosis, and to extend existing knowledge. The international composition of the project partners guaranteed on the one hand access to a wealth of experience from previous projects such as OptiMIR and on the other hand the use of data sources beyond the Austrian milk control. Practical experience in the scientific handling of MIR spectral data from routine milk testing and their linkage with milk performance, reproduction and veterinary diagnoses, which had previously been lacking at Zuchtdata and BOKU, could be built up within the framework of the project.

Thus, statistical MIR prediction models for mastitis were developed and evaluated at BOKU using veterinary diagnoses and MLP spectral data from LKV Austria. It could be shown that MIR spectral data complement the accuracy of previously cell count-based risk models and improve them. An attempt at the LKV Baden-Württemberg (BW) to extend the MastiMIR model developed there with a common dataset from BW and Austria showed that local models are more accurate here.

To improve the accuracy of ketosis risk prediction, the KetoMIR-2 model was developed as a continuation of the KetoMIR model at LKV BW, based on spectral data

## SUCCESS STORY

and veterinary diagnoses from LKV BW and LKV Austria. In a one-year MLP field test at LKV Austria with additional rapid ketosis blood tests as well as in a field test at LKV BW, an improvement by KetoMIR-2 could not be demonstrated, but the accuracy and usability of the established KetoMIR estimates was confirmed.

Another work package was the extension of the MIR models for the content of BHB (beta-hydroxybutyrate), acetone and citrate in milk as indicators for negative energy balance and ketosis. These international consortium models were extended and robustness improved in the D4Dairy project at the CRAW research institute in Belgium by integrating new international reference data, including Fleckvieh and Braunvieh MLP samples from LKV Austria.

Another research topic was the detection of pregnancy and fertility problems via MIR milk spectral data. For this purpose, MIR models were developed at BOKU, based on reproduction and milk MIR data

from LKV Austria. The experiment showed that pregnancy in milk is generally detectable via MIR spectra although the accuracy is not yet sufficient for use in reproduction management.

### Effects and impacts

The results of the work in the MIR project confirm the usability of existing models. In addition, new estimation models and usability studies in herd management and breeding could be developed. Due to the international networking of the project partners BOKU, Zuchtdata, CRAW, University Liege/Gembloux, LKV Austria, LKV Baden-Württemberg and the European LKV umbrella organization European Milk Recording (EMR) synergy effects could be used. This concerns both the exchange and development of expertise and the sharing of data and is a prerequisite for the continuous development of MIR models and digital applications in herd management and breeding.

### Project coordination (Story)

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## Project partners



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