ICAR IDF initiative on sensor data for functional traits: reference standards and guidelines to quantify rumination for health and animal welfare recording

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The increasing adoption of sensor technologies and precision farming tools in the dairy cattle sector is revolutionizing the continuous, real-time monitoring of animal health, welfare, and productivity. These digital advancements provide high-frequency, objective, and large-scale data that is essential for proactive herd management. Despite technological proliferation, a significant scientific gap remains in the validation of these commercial sensors. Specifically, a lack of standardized and rigorous protocols often leaves the accuracy and reliability of the generated data undetermined. The overall aim of the joint ICAR and IDF initiative is to develop guidelines to support the adoption of novel technologies and use of sensor data for improving animal health and welfare.

The joint initiative establishes a common agreement on definitions and terminology for health conditions and behaviors measured with sensor systems. In accordance and in collaboration with other working groups, the project develops standards to facilitate the exchange of data and information across different farms and sensor technologies. Making guidelines based on best practices for data collection, handling, and analysis for different use, e.g. genetics, health and welfare monitoring. Generating recommendations and protocols for testing the performance of sensor systems. Sensor-based rumination data was selected as the primary use case due to its high adoption rate and critical value as a health indicator. Despite its popularity, the field currently lacks standardized definitions and independent validation, often leaving the true impact on animal welfare and production unverified. Preliminary results and recommendations on use of rumination data for health and welfare assessment, sensor key performance indicators, and preferred reference standards will be presented.

Irrespective of the use of sensor data, validation and standardization are key to ensure that sensor data from diverse sources remain reliable and comparable, building the trust necessary for data-driven health and welfare decisions. Close collaboration between ICAR and IDF with relevant stakeholders and manufacturers leads to the development of unified guidelines, which will promote global adoption of the use of sensor data in herd management, animal health, and welfare assessment.