

Mid-infrared spectroscopy adapted to sheep milk for flock management, performance recording and milk processing

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Milk-based indicators offer strong potential to support flock management, performance recording and milk processing in the dairy sheep sector. Mid-infrared spectroscopy (MIR) provides a rapid and low-cost approach to derive such indicators but requires species-specific development to ensure reliable routine use in sheep production systems.

Species-specific MIR prediction equations were developed and evaluated through successive and complementary research projects, based on a long-term co-construction approach with relevant stakeholders, such as the National Dairy Sheep Committee (CNBL) and the French Dairy Sheep Interprofessional Organisation (FBL). MIR spectra are routinely collected within the official dairy sheep performance recording scheme and stored in the national dairy sheep information system (SIEOL), providing a large and standardised data flow for model development, validation and application.

Applying bovine MIR equations to sheep milk resulted in a significant loss of prediction accuracy due to species variability. Conversely, equations specifically developed for sheep milk, particularly for milk urea content, achieved accuracy levels comparable to those obtained in cattle, for both individual and bulk tank milk (Albert et al., 2024). Encouraging prediction accuracies were also reported for milk fatty acids and caseins (Gelé et al., 2014 ; Lagriffoul et al., 2019 ; Corbière et al., 2024). Each year, more than 300,000 MIR spectra from over 730 dairy sheep farms are collected, representing a major asset for the large-scale application of species-specific equations. These results demonstrate the strong potential of MIR-based indicators for operational flock management and performance recording in dairy sheep, while further work is needed to strengthen their use for nutritional advice, but also to explore other fine components or complex traits predictions, including promising methane emission proxies.