Considerations for the Establishment of Practical Accuracy Limits for On-Farm Milk Analysers for Official Milk Recording

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On-farm milk analysers are increasingly used in dairy production systems, yet their integration into official herd improvement and recording schemes remains limited. A key constraint is that existing accuracy limits and testing frameworks are not fully aligned with the primary objective of herd improvement programmes. Farmers make a variety of decisions from milk data: some related to long term performance over a lactation or longer, and some related to recent performance or even today's performance. In contrast, herd improvement schemes are oriented around overall (lifetime) cow performance rather than short-term production fluctuations. The current and proposed ICAR accuracy limits for on-farm milk analysers for use in official milk recording were derived from laboratory reference methods coupled with the goal of detecting significant day-to-day production changes. This approach does not reflect the requirements of herd improvement programmes. In conventional milk recording systems based on laboratory testing of milk samples, overall accuracy is mainly affected by biological day-to-day variation, sampling frequency and on farm handling and sampling factors, rather than laboratory analytical precision. On farm milk analysers produce many repeated measurements for each cow, which makes them much less sensitive to these sources of error. Because of this, setting accuracy requirements for on-farm milk analysers based on the accuracy of laboratory instruments is inappropriate. To set practical and meaningful accuracy limits for on farm milk analysers, evaluation frameworks need to focus on outcomes that matter for herd improvement. Defining accuracy limits in terms of system-level measurement of cow-average or cow-total performance would align the evaluation process with the goal of herd improvement and remove the unhelpful requirement for highly precise individual test accuracy while preserving confidence in official recording data from on-farm milk analysers.