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Assessing the usefulness of fat content and milk yield data gained during ICAR farm tests of milk recording and sampling devices to estimate carry-over in milking systems

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Carry-over between milkings can affect sampling results that are used for herd management, breeding or diagnostic purposes in dairy cows. Giving an estimate of a milking system's carry-over therefore would be a useful additional part of the ICAR certification of a recording and sampling device.

Current methods of estimating or calculating carry-over between subsequent milkings require additional expenses for e.g. tracer chemicals or constituents of milk that can be used as a tracer and their analysis, respectively. Another factor required for these methods is time, which also translates into additional expenses. However, during an ICAR farm test of a recording and sampling device all relevant data required for an estimation of carry-over can potentially be recorded. This aim of this article is to evaluate the usefulness of these data (milk yields, fat contents, milking sequences) for estimating a given milking system's carry-over.

Data gained during ICAR farm tests are used in different statistical models (regression analysis, linear mixed model analysis with repeated measures) to estimate the carry-over of the combination of milk recording device and sampling device under test. This includes at least four different manufacturers and different milking systems (three automatic milking systems, one conventional milking system). Estimated carry-over values are compared with values from literature and reference methods. Data from experimental farms are used as a base to create "virtual" herds of dairy cows. These herds are used to simulate various different setups of an ICAR farm test: conventional milking systems and automatic milking systems with short and long sequences of subsequent milkings per day and milking time, as well as different levels of carry-over. Carry-over is then estimated in simulations using the above-mentioned statistical methods. The simulations indicate the level of carry-over that could be detected in ICAR farm tests as well as the inherent test power for the different setups.

The results of the simulations are compared to the ICAR farm tests with a similar setup, and as a conclusion possible options for future farm tests are derived.

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