

24-hour yield calculations in the Finnish milk recording

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This paper describes the current status with 24-hour yield calculations in the Finnish milk recording system, as well as the historical reasons behind the choices made. The results of each method are also shortly analysed. The methods are found to be working reasonably well, but not perfectly.

Summary

Keywords: milk recording, robotic milking, 24-hour yield calculation

In the Finnish milk recording, owner sampling has been common practice since the 1980's, and appr 95% of all herds now record by that method, with their own private recording equipment. At the same time, 90% of all samples are reportedly taken from one milking only. Farmers are also responsible for some 90% of milk recording data capture. In September 2019, 40.0% of all recordings during the previous rolling 12-month period came from automatic milking. This article presents the 24-hour yield calculation methods currently in use.

Introduction

Up until 2003, the only available sampling method in Finland was proportional sampling. 24-hour yields were simply calculated by adding up milk weights and using the analysed values as they come.

Historical overview

This approach, however, started to be problematic due to three main reasons. Firstly, in a farmer-recording system it became evident that many samples were in fact not exactly proportional between the evening and morning milkings. Secondly, the results showed that a number of farmers were taking samples from one milking only. And the third reason was the advent of automatic milking which made it impossible to continue the old way.

For these reasons, it was decided to allow one-milking sampling starting April 2003.

In traditional milking systems, milk weights are measured at two consecutive milkings (or three, if the cows are milked thrice per day). Some 10% of all herds claim to take proportional samples, and no correction is applied to their laboratory analyses. For fat content in one-milking samples from traditionally milked herds, the Delorenzo and Wiggans (1986) correction is applied with the received factors.

Currently used methods

In automatic milking systems, the milk weights are collected during a 96-hour period and these results are used for calculating a 24-hour yield for each cow (Lazenby *et al.* 2002). In this calculation, the preceding intervals are taken into account to adjust to uneven individual cow measurement periods.

The fat and protein yields, however, are estimated on the basis of a one-milking sample, using data of only two preceding milkings (Peeters and Galesloot 2002). This method was also tried for milk weights but some herds with irregular cow traffic had a lot of problems with that, so the approach was changed in 2016. Also, the original Peeters & Galesloot method was found to produce slightly underestimated fat contents when compared to dairy deliveries, so in 2017, the method was updated by the corrections suggested by Roelofs *et al.* (2006), adding factors like stage of lactation, parity, and hour of the day to the equation.

Evaluation of current methods

To evaluate how the methods are working, a very simple comparison was made with average

24-hour yields produced by each method. The results for the whole Finnish dairy cow population are shown in table 1. In general, the differences between the methods are small.

However, we notice here that the calculation does not entirely cover the difference between fat contents in morning and evening milk. The correction factors used are already 33 years old, and are based on data from a significantly lower yield level. Typical Finnish feeding also produces high milk fat contents which is maybe not entirely in keeping with the data used for making these formulae.

Automatically milked cows also tend to obtain a lower 24-hour fat content than cows from conventional milking systems. This was presumed to be due to higher milk yield, but due to the fact that the automatic milking herds have a significantly higher proportion of Holsteins, the results were recalculated for Holstein breed only (Table 2). Here the difference between morning samples and samples from automatic milking was slightly smaller.

Table 1. Corrected and recorded 24-hour averages by method, all cows.

Sampling scheme	Nr of samples	Average result			
		Milk, kg	Butterfat, %	Protein, %	Cell count
One-milking sample (Z), milking time 4-10 AM	255,461	29.8	4.30	3.58	157
Z sample, milking time 2-8 PM	309,974	30.2	4.51	3.61	187
Proportional (P) sample	112,620	29.6	4.41	3.61	167
Z sample, automatic milking	370,908	33.4	4.23	3.56	214

Table 2. Corrected and recorded 24-hour averages by method, Holstein cows only.

Sampling scheme	Nr of samples	Average result			
		Milk, kg	Butterfat, %	Protein, %	Cell count
One-milking sample (Z), milking time 4-10 AM	116,009	31.3	4.17	3.52	161
Z sample, milking time 2-8 PM	142,204	31.9	4.36	3.56	184
Proportional (P) sample	45,191	31.4	4.25	3.55	167
Z sample, automatic milking	231,346	34.8	4.14	3.52	216

The current 24-hour calculation methods are performing on a satisfactory level. However, it seems that there could be some advantage in recalculating the historical fat correction factors to make the obtained estimates more accurate.

Conclusions

Delorenzo, M.A., and G.R.Wiggans. 1986. Factors for estimating daily yield of milk, fat, and protein from a single milking for herds milked twice a day. *J Dairy Sci* 69; 2386.

List of references

Lazenby, D., E. Bohlsen, K. J. Hand, D. F. Kelton, F. Miglior and K.D. Lissemore. 2002. Methods to estimate 24-hour yields for milk, fat and protein in robotic milking herds. Presented at the 33th biennial Session of ICAR, Interlaken, Switzerland, May 26-31, 2002.

Peeters, R. and P.J.B Galesloot, 2002. Estimating Daily Fat Yield from a Single Milking on Test Day for Herds with a Robotic Milking System. *J Dairy Sci.* 2002 Mar; 85(3):682-8.

Roelofs, R.M.G, G. de Jong and A.P.W. de Roos, A.P.W. 2006. Renewed estimation method for 24-hour fat percentage in AM/PM milk recording scheme Proceedings of the 35th ICAR Session, 2006, Kuopio, Finland