Use of Daily Milk Weight Averages to Predict Lactation and 24 hour Yields

Daily Milking Systems

Interfaced electronic meters

- record daily milk yield
- compute multiple day averages (*non-traditional estimators*)
- record total lactation milk yield
- conventional or robotic systems

Canadian Context

- Phenotyic lactation yields
  - multiple trait prediction method (MTP)
- Genetic production traits
  - Canadian test day model (CTDM)
- Both methods use 24 hour test-day yield observations (6 – 12)

PART I: Lactation Milk Yield

PART II: Daily Fat & Protein Yields

PART I: Lactation Milk Yield

Data Collection

- 16 Canadian Holstein herds
- Daily milk weights (each milking), collected from May 2004 to Feb 2006
- 1,164 complete lactations
  - 5 through 305 days in milk (DIM)
- Milk weights were 94% complete
  - missing and abnormal weights were adjusted using localized regression techniques

Method

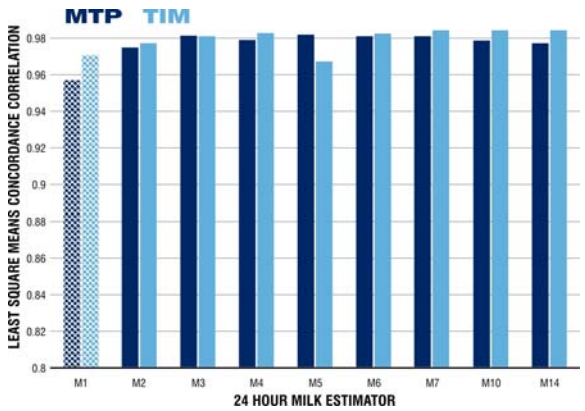
For each full lactation

- 7 or 8 random test-days (TD) selected
- 36 to 42 day intervals
- 24 hour milk yield (M1), and 8 *non-traditional estimators* were computed (M2, M3, M4, M5, M6, M7, M10, M14)
- *Non-traditional estimators* based on lag averages
- Lactation yield predicted using TD inputs of 9 estimators in both MTP and test-day interval method (TIM)

Method

- observed daily milk weights were used to calculate reference lactation yields
- all agreements between observed and estimated lactation yields were classified by:
  - herd
  - lactation (L1, L2, L3+)
  - estimator (M1 through M14)
  - lactation calculation method

Results



Conclusions

When calculating lactation milk yields using MTP or TIM, there is minimal (or no effect), using multiple day milk yield averages in lieu of traditional 24 hour milk yield.

PART II:
Daily Fat & Protein Yields

Data Collection

- 11, 2X Holstein herds
- Milk samples collected from all milkings for five consecutive days
- 1,083 cows were sampled
- 10,000 samples analysed for fat, protein, SCC, MUN

Method

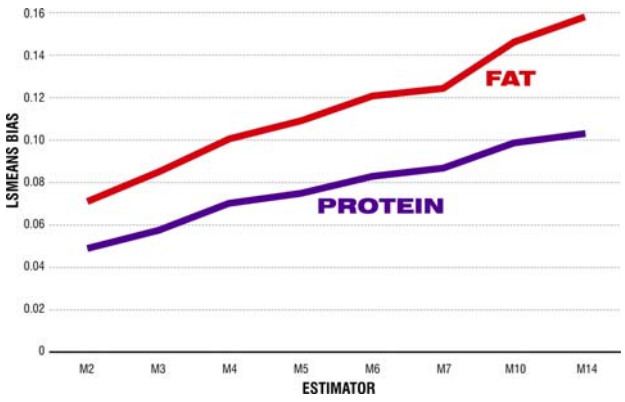
For each sampling day

- calculated traditional 24 hour daily fat and protein (milk yield X%)
- daily fat and protein yield also calculated using M2 through M14 milk estimators *(disconnected estimators)*
- traditional 24 hour daily fat and protein yield used as reference

Method

- all agreements between 24 hour and disconnected milk estimator daily fat and protein yields were classified by:
  - herd
  - lactation (L1, L2, L3+)
  - milk estimators for daily fat (M1-M14)
  - DIM classes (5-60; 61-120; >120)

Bias Results



Concordance Correlation Results

Conclusions

- Use of multiple day milk yield averages to estimate 24 hour fat and protein yield results in significant loss of accuracy
- As disconnection increases, the bias increases and the concordance correlation decreases

Summary

- When calculating lactation milk yields using MTP or TIM, there is minimal (or no effect), using multiple day milk yield averages in lieu of traditional 24 hour milk yield
- Use of multiple day milk yield averages to calculate 24 hour fat and protein yield results in significant loss of accuracy

Issues to Investigate

- Measure effect of using disconnected milk estimator fat and protein yields to calculate lactation yields in MTP and TIM
- Measure day to day variability in daily milk yield during lactation
- Measure day to day variability in daily fat yield, daily protein yield, somatic cell count and milk urea nitrogen across 5 consecutive days
- Validate current AM/PM adjustment factors for 2X and 3X herds
- Measure accuracy of using CENTERED average milk estimators to calculate test-day fat and protein yields

Credits

AUTHORS

D. Lazenby, K.J. Hand, F. Miglior,
D.F. Kelton, M.A. Quist-Moyer

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Discussion

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