Perspectives for proactive dairy herd management based on on-farm milk analysis- and potential implications for future milk recording

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Purpose of this presentation

- To present some results from the Biosens models, on DCRC data and from the two commercial test farms
- To discuss the need for ICAR specifications to on-farm measurements

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- Established in 2001
- 50:50 partnership between DeLaval and FOSS
- Development, market preparation and production
- Sales via owners:
- DeLaval to the farmers
- FOSS via existing customers
- Situated in Hillerød

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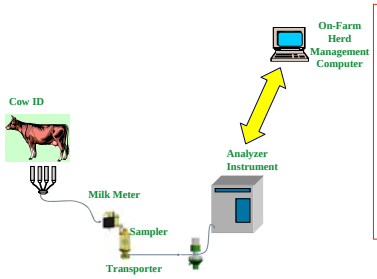
Lattec's solution, an overview…



Local Solution: integrated in the DeLaval Herd Management System

Central Solution: developed together with Danish Cattle Federation, using available information from the central cattle data base

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Standard Operating Procedures are created!

- Biosens, a research consortium between DIAS, DCRC and Lattec
- Biosens builds models, Lattec implements, - and we test the models together, creating SOP's.

We focus at:

- Mastitis
- Heat, reproductive disorders and pregnancy
- Ketosis
- Imbalances in feeding

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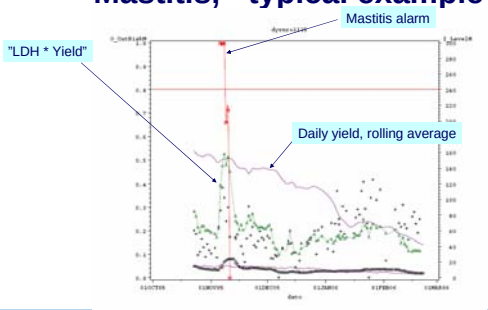
Mastitis, - typical example



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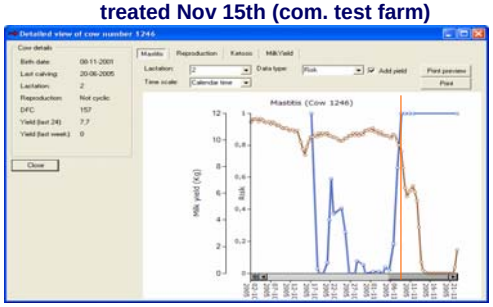
Mastitis: Alert Nov 9th, detected Nov 12th, treated Nov 15th (com. test farm)



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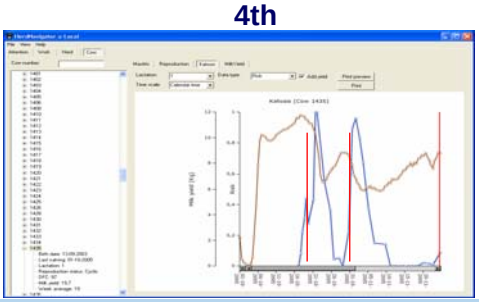
Ketosis, Lattec alert Oct 19th and Nov 1st, owner detection Oct 24th and Nov 4th



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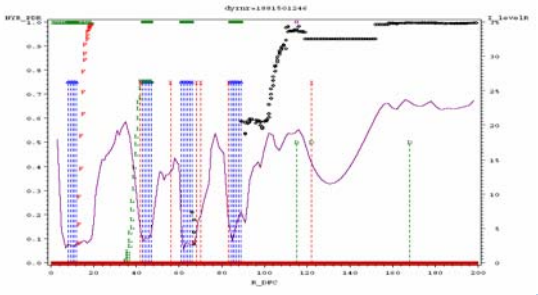
Reproduction



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Energy model, - including fat and protein?

- Lattec's purpose for measuring fat and protein
  - To detect upcoming metabolic disorders
  - To improve feeding and reproduction management
- ICAR's purposes for measuring fat and protein
  - For improving feeding and reproduction management
  - For breeding purposes

So we do have mutual interests!

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Mutual target!

- Holistic view. Not only talk repeatability and bias
- Go for an overall improvement of the whole system. Not only parts of it.

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Contributors to inaccuracy in measured results

- Correct sample ID
- Sample quality at measurement
- Measurement frequency
- Repeatability and accuracy (bias) of the measurement.
- Day-to-day variation in fat/protein content of the milk sample

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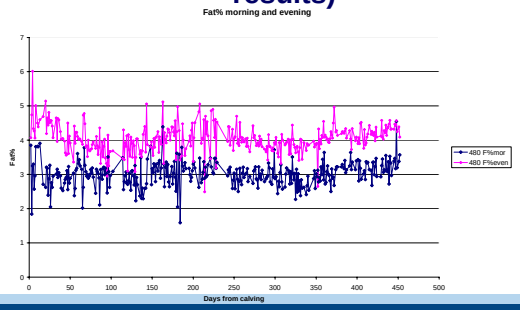
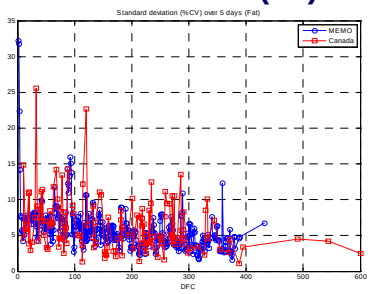
Day to day variation in fat content (DK results)



Day-to-day variation, -now two data sets:

- **DK-dataset:**
  - **1 herd, 11 cows randomly selected, monitored all lactation**
- **CA-dataset:**
  - **14 herds, 10 cows from each, each cow is monitored for 5 days.**

Standard deviation (fat) over 5 days



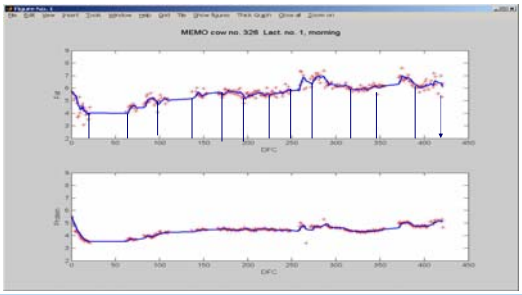
Average CV (DK): 5.25

Average CV (CND): 6.40

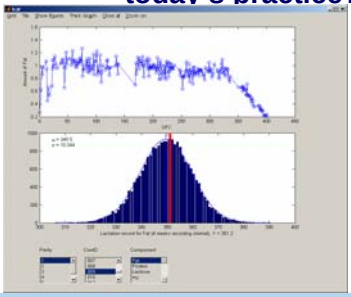
Average CV Parlor1: 6.43

Average CV Parlor 2: 6.54

DHIA today



How do these results compare to today's practice?

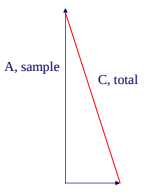


One approach….

CV% = (SD x 100%)/av fat %, - Av Fat% = 4.5%

CV (MSC) = 0.5 %, or SD(instrument) = 0.023 = B

SD(total) = 0.34 = C (7.3 % CV, 0-60 days)



$A^2 + B^2 = C^2$ or,

SD^2sample + SD^2instrument = SD^2total

Today:

SD^2sample + $(0.023)^2$instrument = $(0.34)^2$total, or

SD^2sample = 0.339

On-farm, if CV% is **1.5%:**

$(x)^2$sample + $\mathbf{(0.07)^2}$**instrument** = $(0.34)^2$total, or

SD^2sample = **0.33**

Conclusion:

- Total variation around 7-10 % at the beginning of lactation seems to be the case.
- A number of error sources are abolished or minimized with on-farm analyses, a few increases.
- We should use all information available to improve the total setup, - in stead of focusing only on parts of the system
- Work to establish technical specifications for on-farm analyzers is needed

Acknowledgements:

- Dr Dave Kelton, Dr Karen Hand, University of Guelph, Canada
- Dr Carsten Ridder, Lattec, Denmark
- Dr Peter Løvendahl et al., Danish Institute of Animal Science

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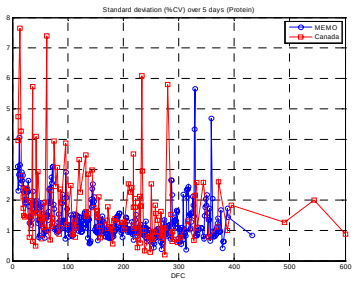
Standard deviation (prot) over 5 days



Average CV (DK): 1,56

Average CV (CND: 1.80

Average CV Parlor 1: 2,16

Average CV Parlor 2: 1,79

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Focus is on start of lactation!

cow	SD(5) 60 days	CV%(5) 60 days	av fat%
244-4	0.37	6.10	5.68
485-1	0.27	5.33	3.79
392-1	0.27	6.95	3.94
281-5	0.33	6.50	4.75
480-1	0.25	6.05	3.43
469-1	0.41	9.88	4.02
8202-5	0.41	7.50	5.23
499-1	0.28	6.13	4.54
240-3	0.50	8.16	5.36
287-5	0.29	5.11	4.44
809-1	0.27	5.58	5.35
390-Prot	0.14	4.92	3.49
	0.34		4.50

For all lactation:

Average CV (DK): 5.25, (or SD = 0.24)

Average CV (CND): 6.40, (or SD = 0.29)

Average CV Parlor1: 6.43
Average CV Parlor 2: 6.54

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