We make sustainable food production possible
Sensor validation from a manufacturers point of view
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Four pillars of sustainability

- Animal welfare
- Environment
- Farm profitability
- Social responsibility
Happy and healthy cows are productive cows.
Do more, with less

• Greater efficiency and profitability in production
• Reduced environmental footprint on farms
• Increased animal welfare
• Improved animal longevity
Sensors can measure a lot...  
...but what makes most sense to measure?

- Methane
- Breathing
- Chewing / ruminating
- Feed and water intake
- Heart rate
- Activity
- Position
- Weight
- Body condition
- Temperature
- Rumen – pH, temperature and motility
- Lying / Standing
- Manure quality and quantity
- Udder health
- Milk composition
- Lameness
- Social responsibility
- Environment
- Farm profitability
- Animal welfare
Low activity
High activity

Body condition score

COW DATA

Feed consumption
Visits to feed station

Gate passages

Body weight

LDH
SCC
BHB
Progesterone
Urea

Electrical conductivity
Colour / blood

Milking interval
Flow
Milk yield

DeLaval
The need of sensor validation – example heat detection
Put the customer in focus
The need of sensor validation – example heat detection
Put the customer in focus

- Precision
- Verification
- True positives
- Repeatability
- Customer value
- Farm studies
- False alarms
- Reproducibility
- Negative predictive value
- Validation
- Standard deviation
- Research
- Payback time
- Sensitivity
- Specificity
- Accuracy
- Marketing statement
The need of sensor validation – example heat detection
Put the customer in focus
The need of sensor validation
Put the customer in focus
The need of sensor validation
Put the customer in focus
The need of sensor validation
Put the customer in focus

- Conscious decision
- Proven quality
- Based on evidence
- Best suited for her specific needs and conditions
The need of sensor validation – example BCS
From a manufacturers point of view
The need of sensor validation – example BCS
Farm management

- **Relative value** is most important
  - See trends over time
  - Dropping too fast
  - Gaining too much
  - Individual farm specific

- **Absolute value** not so important

Just calved – enough energy balance?
OK to inseminate?
Getting fat?
Ready for dry-off and calving?
The need of sensor validation – example BCS

Genetic evaluation

- **Absolute value** is used
  - Measured at specific DIM
  - Model must give absolute value for many different breeds, ages, stage in lactation etc

- Relative values, trends and actions not important
The need of sensor validation – example SCC
From a manufacturers point of view

- EC  SCC  Flow  Yield
- Lact no  DIM  Treatments
- Blood  xxxxx  yyyyy

Farm Management
Detection of mastitis

Farm Management
Milk quality

Genetic evaluation
Bench marking

Sensitivity and Specificity of detecting mastitis
Accuracy of SCC measurement
Accuracy of SCC measurement
The need of sensor validation – example BCS
From a manufacturers point of view

When the sensor is more accurate, repeatable and reproducible then the available standard
The need of sensor validation
From a manufacturers point of view

• Validation and quality stamp from independent organization

• We are measured against other manufacturers on the same terms

• We are guided in our product development, verification and validation to ensure quality sensors both for farm management, genetic evaluation and research
Thank you for your attention!
We make sustainable food production possible