FOSS

”Adding value to the central milk testing business – the ongoing FOSS commitment”

ICAR Manufacturers Showcase Riga, Latvia, 2 June 2010

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Dedicated Analytical Solutions

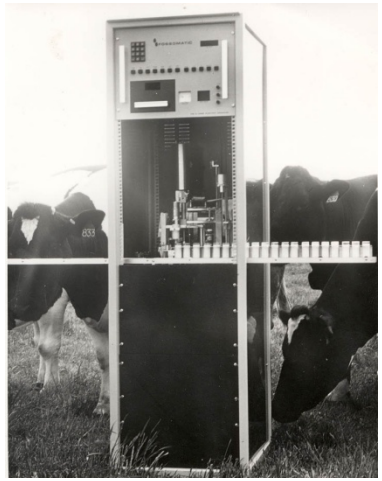
Agenda

- Proud Track Record
  - FOSS' commitment for +50 years
- Present CMT situation
  - Current challenges
  - How does FOSS meet the challenges
- FOSS´ contribution
  - Quality: Free Fatty Acids
  - Health: Fatty Acids profile
  - Cattle diseases: Acetone/ BHB for ketosis
  - Adulteration: Abnormal Spectrum Screening
  - Costs savings:
    - Improved effectiveness
    - Quality
    - After Sales Support
- Future

Proud Track Record – A common history

FOSS' ongoing investment in new customer dedicated solutions:

- Since 1956 FOSS has explored new ways to improve milk analysis through innovative analytical solutions
- The CMT structure developed in symbiosis with FOSS since the early 60's
- FOSS' Commitment to innovation: Invest >10% of turnover in R&D
- FOSS employs 200 engineers and scientists
- Has always had ongoing development with customers and internationally recognized science centers
- Substantial investments and full commitment to protect and further develop our role as global market leader



In the 1970's FOSS took the first jump into milk quality. Today SCC is synonym with milk productivity & milk quality

Proud Track Record

FOSS invented:

- IR, for compositional analysis
- Developed IR into FTIR
- Automated somatic cell counting
- Rapid &automated IBC

Recognized product brands:

- MilkoScan, milk composition
- Fossomatic, somatic cell counting
- BactoScan, individual bacteria counting

FOSS first on applications/ calibrations for:

- Urea (patented)
- FPD (patented)
- Fat B (patented)
- Standardization (patented)
- Dynamic precision (patented)
- Casein
- Free Fatty Acids (FFA)
- Fatty Acids profile (FA)
- Acetone/BHB - for ketosis (patented)
- Abnormal spectrum screening

All developed in close co-operation with our customers!

Proud Track Record

FOSS: Global market leader

- FOSS has CMT solutions in operation in more than 80 countries
- More than 2200 MilkoScans have been sold world wide (many generations)
- More than 2500 Fossomatics have been sold world wide (many generations)
- More than 1000 BactoScans have been sold world wide (3 generations)
- FOSS CMT solutions have obtained many approvals and are in compliance with a number of directives (IDF, EU, ISO)
  - National approvals to mention:
  - DE, FR, IT, ES, BE, US (FDA/ IMS)




Strong global partnerships

All improvements on new business opportunities are made through close co-operation with customers and recognised science centers among others:

- DE: Bufo, Kiel / Max Rubner Institute (MRI): Validation of BactoScan for approval in DE; Development and tests; Papers etc.
- NL: Campina / Qlip: Development of health improving parameters (FA/Omega 3)
- UK: NMR / Milk Link / Volac: Further development of fatty acids profile
- FR: CNIEL: Extended project and analysis on different fatty acids
- IT: University of Padova: Using FTIR for milk coagulation properties
- BE: Ghent University: Metabolic diseases
- Global: Dairy Herd Business Forum: FOSS hosted. Established in order to develop the business together with the customers and look for new business opportunities
- IDF/ ISO/ ICAR: Strong involvement in guidelines, standards, papers etc.

Qlip

NMR information partnerships

FrieslandCampina

MRI Max Rubner-Institut

Severe challenges for the CMT sector

Dairy farming

- Very low milk prices, often less than production costs
- Environmental constraints
- Lack of trained labour
- Intense consolidation: fewer and much larger farms
- Less cows / higher productivity

Dairy herd improvement

- Increased difficulties to prove the value added
- Less subsidies

Dairy processing

- Under pressure from retailers
- Low prices on milk and milk products
- Consolidation

How does FOSS contribute

FOSS' commitment to improve business opportunities for our customers and their customers

Milk Payment - value chain
(CMT – Dairy – Consumer):

- Health improving parameters *(e.g. fatty acids profile)*
- Milk quality (e.g. FFA, FPD)
- Safety & quality *(e.g. abnormal spectrum screening)*

Herd Improvement - value chain
(CMT – DHIA – Farmer/Cow):

- Productivity (fat, protein, yield)
- Mastitis (somatic cells, microorganisms)
- Feeding (Urea, fat, protein)
- Cattle diseases *(Acetone/BHB/Ketosis)*
- Breeding (all parameters, yield)

FOSS can contribute to improved quality

Why measure Free Fatty Acid (FFA)?

- FFA has a rancid and soapy taste and smell (in butter for instance)
- High levels of FFA influences the shelf life (i.e. milk powder)
- FFA is not included in the coagulum (reduced cheese yield)

The content of FFA is affected by:

- The mechanic treatment of the milk
- The general hygiene/bacterial status of the milk
- Physiological status of the cow (stage of lactation, diseases, composition of fodder etc)

- 0.5 mmol/ 100 gram +/- 0.3 fat is regarded as the normal level

- Used today in NL, NO, FR, BE and several other countries are testing FFA

Benefits to the dairy industry by measuring FFA

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Statements from labs using the FFA calibration for MilkoScan FT6000/ FT+

- 50% of off flavor milk samples were due to high FFA values!
- We always find a reason at the farm if high FFA values have been measured!
- In general this contributes to improved milk quality as it gives an early warning due to frequent measurements!

Cost savings by using MilkoScan for FFA detection

- Assuming 4.000 suppliers tested monthly at a cost of 1 Euro = Euro 48.000
- Screening with MilkoScan FT+ find 10% positive samples = Euro 4.800
- Potential savings: = Euro 43.200

This means a pay back time of a few months!!

FOSS can contribute to healthier dairy products

Why is Fatty Acid Profiling so interesting?

- Potential improvement
  - of nutritional value of milk
  - of health and reproduction for the dairy cows
  - cut in emission of methane to the atmosphere (INRA paper)

- This can be done in two ways:
  - Short term by change in feeding
  - Long term by breeding in order to favor a specific fatty acid profile in milk.

The Fatty Acid profile can be used for payment:

- A Dutch dairy today has 500 dairy farmers feeding the cows with more linseed to achieve milk with more unsaturated fatty acids.
- The milk contains 20% more unsaturated and 10% less saturated Fatty Acids and twice the amount of Omega 3

Present FOSS calibrations to profile fat

At present FOSS are selling
4 calibrations in one package

Un saturated fatty acids
Saturated fatty acids
Poly unsaturated fatty acids
Mono unsaturated fatty acids

Beside calibrations for
3 single fatty acids:
C18:0
C18:1
C16:0.

More research is needed and many investigations are ongoing to achieve the right and robust calibrations

FOSS can contribute to monitor cattle deceases

Ketosis is a metabolic disease and is usually a herd problem:

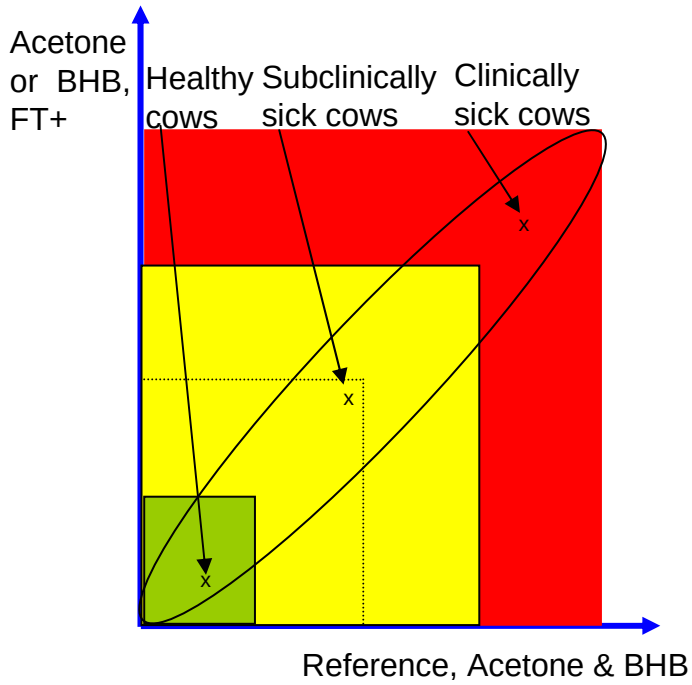
- Ketosis is a strong and often hidden factor for reduced productivity
- From the Herd Navigator project we know the losses due to subclinical cases is bigger than we anticipated

Benefits of using Acetone/BHB:

- The farmer:
  - Gets a monthly screening of his early lactation cows for ketosis, which will display potential feeding and management problems related to long term or sudden energy insufficiency
- The lab:
  - A new DHI parameter with new business opportunities
  - Cost and time reduction for labs already measuring acetone

Ketosis, a new screening tool for Milkoscan users

- We know that acetone and beta hydroxy butyrate in milk inform about ketosis in the herd
- Strong requests from the DHI Business Forum for development of this parameter.
- A test running in a number of labs over a long period of time, - on-off- has showed reasonable results
- BUT we are at the limit of what is feasible with FTIR!
  - The calibration is semi quantitative
  - Instrument performance must be good
  - Advisory service on how to use results must be in place



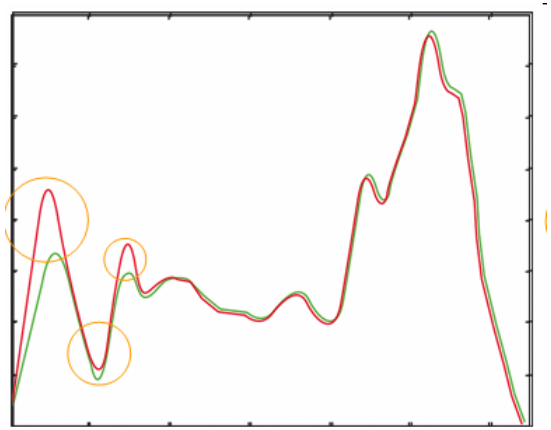
FOSS can contribute to screen for adulteration

Abnormal Spectrum Sceening is:

- A new screening tool for routine analysis in raw milk testing
- FTIR spectra from natural raw milk samples is a unique finger print
- Develop your own screening for abnormal properties of your milk samples

Examples of what can be screened for:

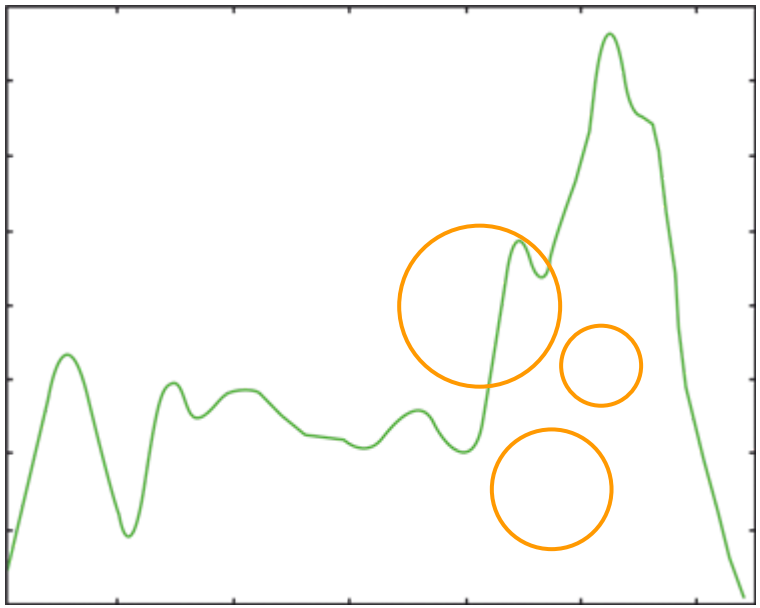
- Cleaning agents
- Different types of milk (cow, sheep, buffalo ….)
- Protein adulterants
- Fat adulterants
- Others? This application allows you to create an unlimited number of screening models

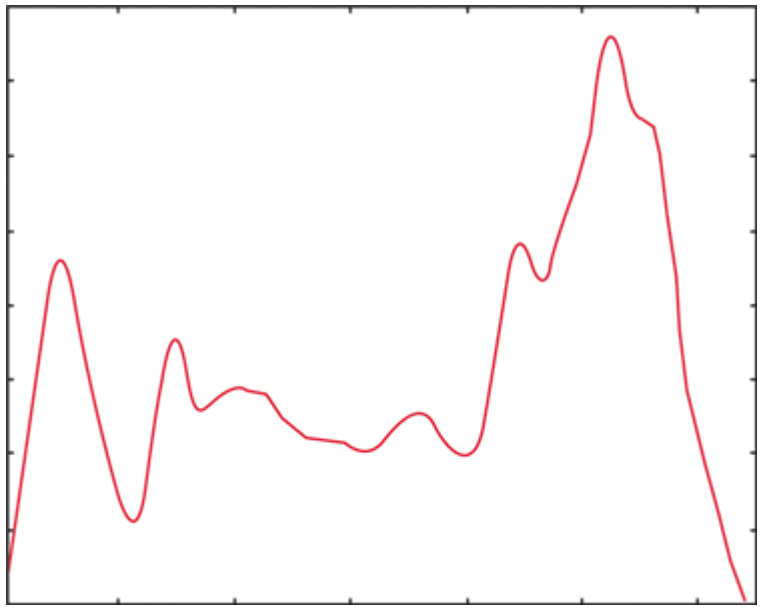


Abnormal Spectrum Screening

- FTIR spectra from natural raw milk samples is a unique finger print of normal milk

Raw milk sample





Adulteration and normal milk

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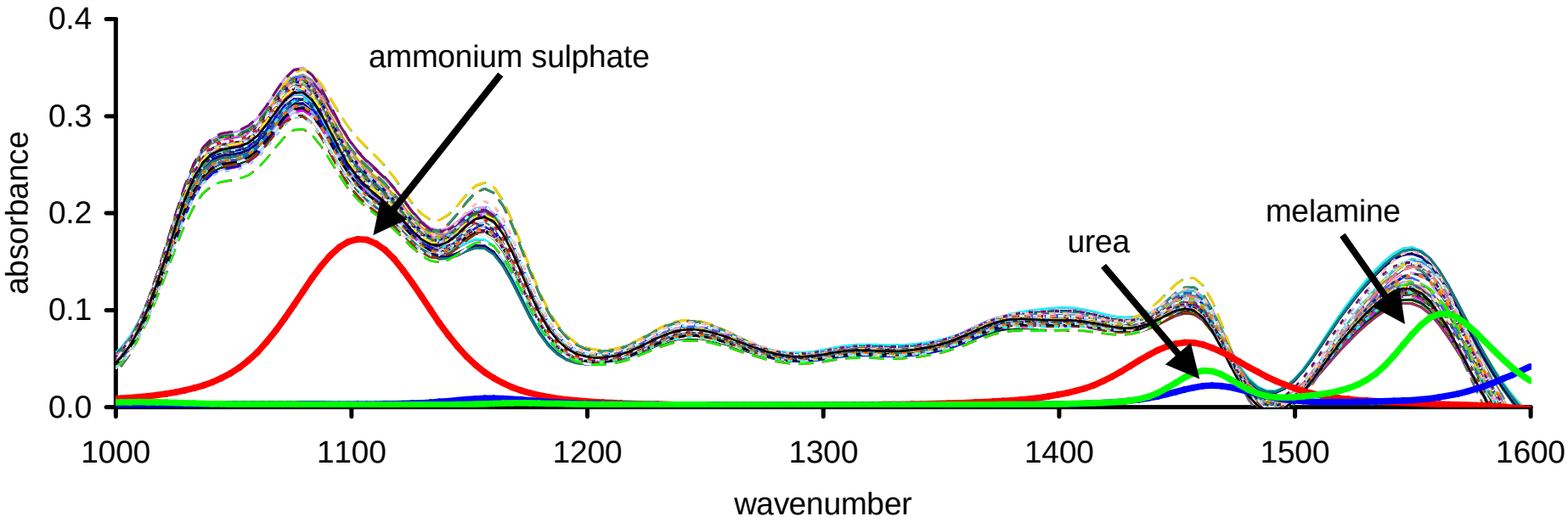
Adulterants have different spectral fingerprints



How does FOSS contribute

FOSS' commitment to ensure cost savings through improved effectiveness:

- Global, robust calibrations (minimal maintenance work)
- High analytical capacity – now up to 600 s/h
- One common SW platform
- High up-time (few daily procedures)
- Labour savings through automation
- Possibilities to analyse for parameters which would not be cost-effective or technologically feasible to perform elsewhere

How does FOSS contribute

FOSS' commitment to ensure growth and cost savings through improved quality:

- Standardisation of instruments (high, equal performance)
- Quality check and control samples
- Quality assurance of instruments
- Proficiency testing
- High accuracy (on all parameters)
- High performance (of all parameters)
- Approved measuring principles

Future - FOSS' contribution

FOSS' future commitment to the milk & dairy industry and in particularly to the central milk testing business area:

- FOSS a total supplier of dedicated analytical solutions
- FOSS Networking for central milk testing laboratories
- FOSS strong focus on even better delivery & product quality
- FOSS to strengthen after sales support and service
- FOSS within dairy on-farm solutions and milk testing




Future - Networking

FOSS Networking for central milk testing laboratories:

- Mosaic is networking software designed to precisely and easily configure, manage and monitor FOSS CMT solutions via the Internet

Networking and advantages for New Customers:

- Instant installation and setup
- FOSS specialists by your side at all time
- Proactive support and guidance
- Reduced need for training

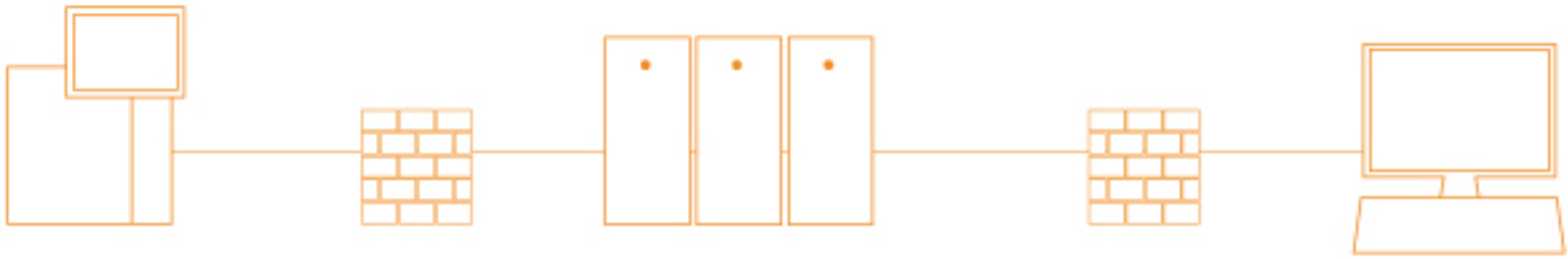
Networking and advantages for Existing Customers:

- Proactive and efficient support
- Reduce time required to maintain and support instrument
- Reduce downtime and improve instrument performance
- Stay updated

- Expected release for CMT Q4, 2010

Future - Networking

Mosaic/Networking set-up & tasks



Operator

Mosaic Server

Network Manager

Tasks:

- Routine analysis
- Performance check

- Automated central backup and storage

- Online training of Operator
- Set up and configure instruments
- Daily instruments surveillance
- Calibration monitoring
- S/I adjustments
- Calibration updates
- Troubleshooting, support and guidance
- Send Periodical Status Reports

Herd Navigator™

Pro-active Herd Management

Another visionary development from FOSS

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Herd Navigator monitors

Focus area	Parameter analysed in milk	Early / on time detection
Reproduction	Progesterone	Heat Silent heat Pregnancy Abortion Cysts Anoestrus
Udder health	LDH – lactate dehydrogenase	Mastitis Subclinical mastitis
Feeding and energy balance	Urea BHB – beta hydroxybutyrate	Feed ration – protein Ketosis Subclinical ketosis Secondary metabolic disorders

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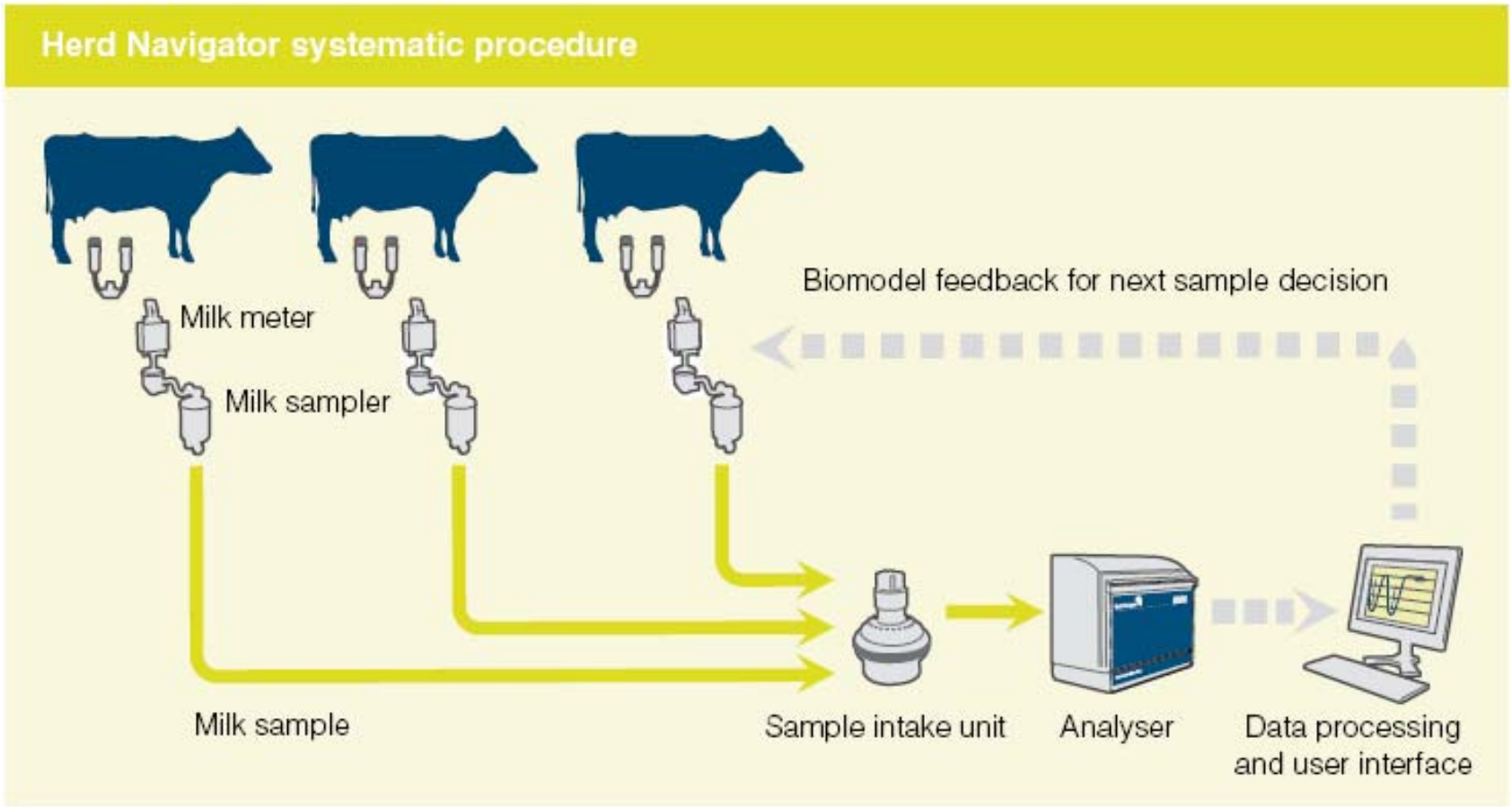
Herd Navigator flowdiagram



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Thank You!

Dedicated Analytical Solutions