CRV, leading in health and efficiency

Fatty acids

Actionable output developed from milk fatty acids to assess rumen health, negative energy balance, and production loss in dairy cows

Ines Adriaens | June 4 | 8:30 – 10:30
CRV BV

TS4 – Heat stress, health and welfare: genetics and management

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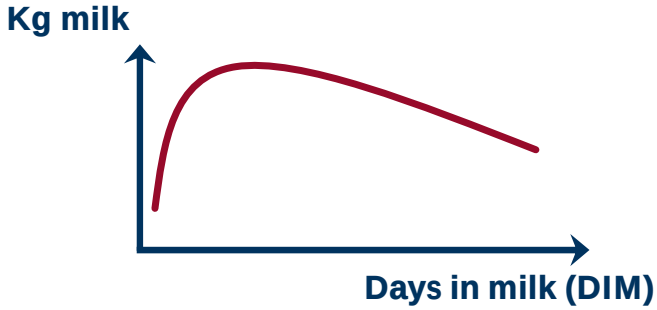
Qlip for farmers agrifirm de heus

Difference in diets

Transition period



Dry > lactation

Immune depression

MONITORING

ACTION

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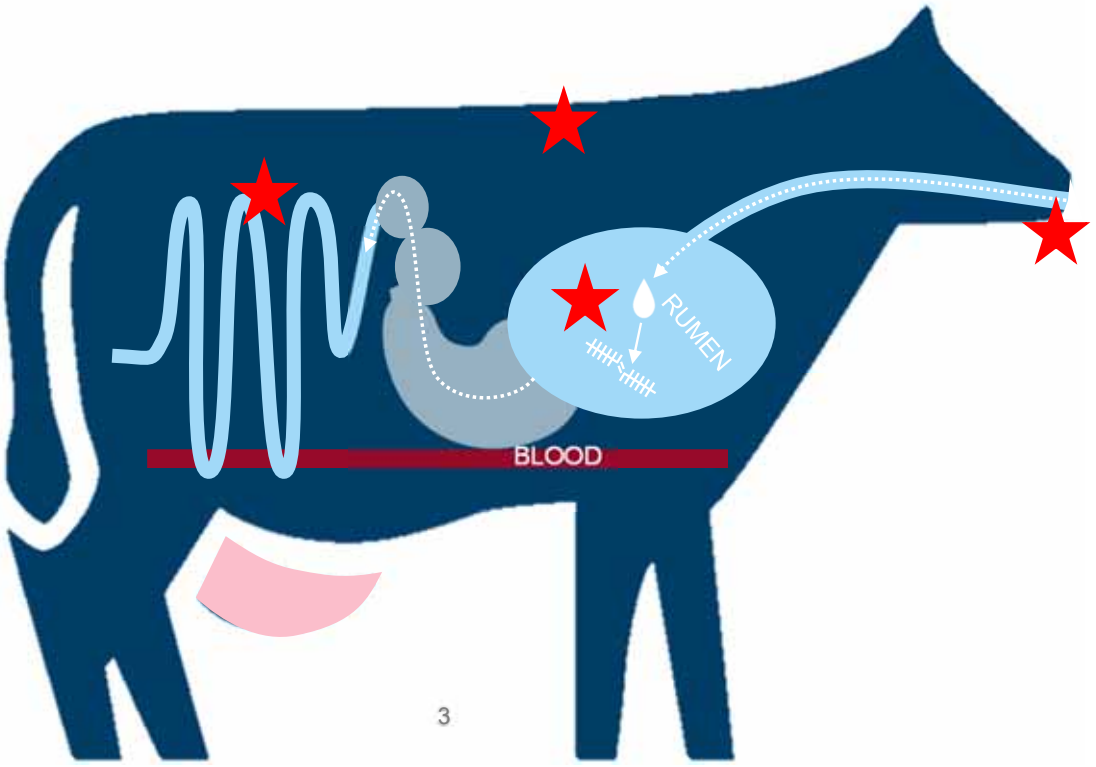
Why fatty acids?



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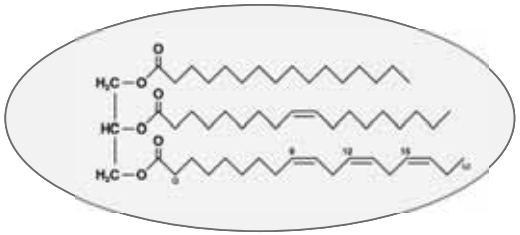
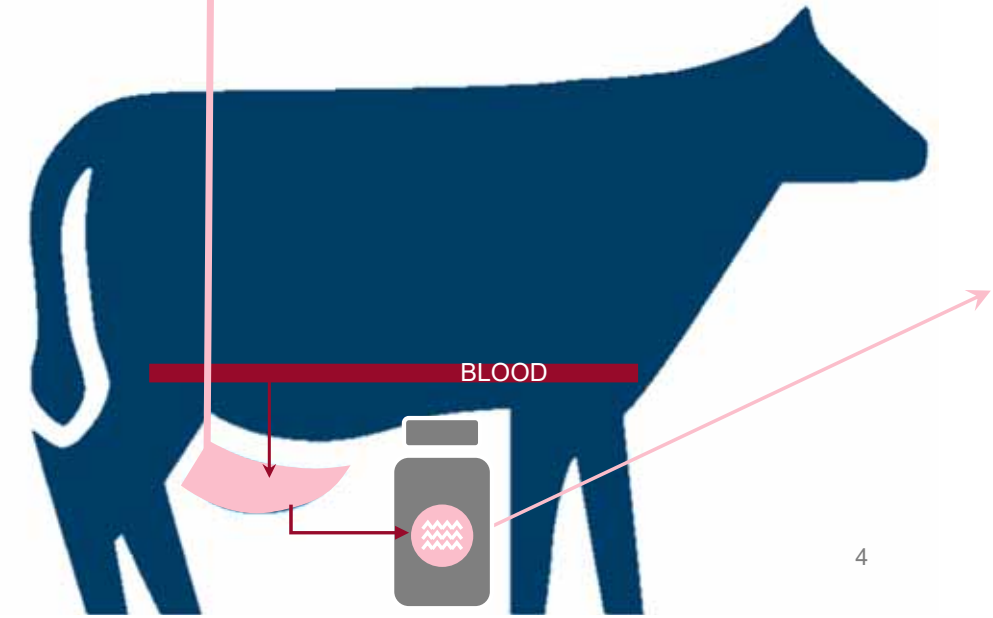


Synthesis of milk fat (triglycerides), with fatty acid composition depending on origin (body fat, feed, microbial synthesis)

Representative milk sample taken in context of DHI

Milk fatty acid composition analysed via MIR spectroscopy & chemometric predictions (QLIP BV)



- **FEED** | FA in ration, forage/fiber (pasture) and concentrates/energy
- **RUMEN FUNCTION** | Microbial activity
- **ENERGY BALANCE** | Mobilisation of body fat
- **GENETICS** | Differences in breed, genetic predisposition
- **LACTATION STAGE, AGE** | Fat content, udder maturity
- **HEALTH** | Feed intake, inflammation
- **SEASONAL/REGIONAL EFFECTS** | Mainly through feed

Concentration milk fatty acids

Actionable insight for farmers and advisors

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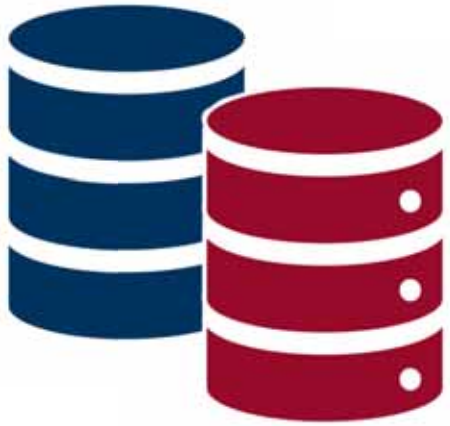
Herd milk recording data

- 53 farms
- 14 261 lactations



Daily milk yield (DMY) data

- 28 farms
- 6 637 lactations

181 794 fatty acid profiles expressed as %fat

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- IDs (farm, cow, date)
- Milk, fat, protein yield
- SCC, urea, acetone, BHBA

25 individual fatty acids + 9 groups:

- *saturated*
- *unsaturated*
- *mono-unsaturated*
- *poly-unsaturated*
- *omega-3*
- *de novo*
- *mixed*
- *preformed*
- *C18:1*

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RISK on HIGH NEGATIVE ENERGY BALANCE (NEB)

Fat mobilization: energy source => milk production

Excessive/extended NEB: fatty liver, ketosis, immune depression, reproduction issues, …

Biomarker: C18:1cis9 (oleic acid)
Fat stored in body: triacylglycerol
NEB => NEFA => citric acid cycle

RISK: 0 – 100%

Includes: season, parity, lactation stage, breed

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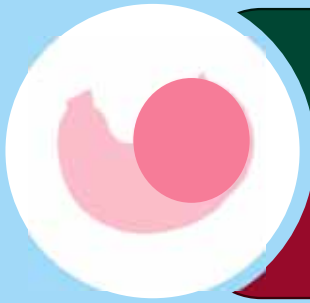
RISK on POOR RUMEN FUNCTIONING



Healthy rumen = high concentration precursors

Compromised microbial activity + rumen epithelial damage (pH) = lower synthesis/uptake capacity, higher NEB

Biomarker: “de novo” C4:C14 < acetate butyrate

Rumen function has direct link with “de novo” MFA

RISK: 0 – 100%

Includes: season, parity, lactation stage, breed

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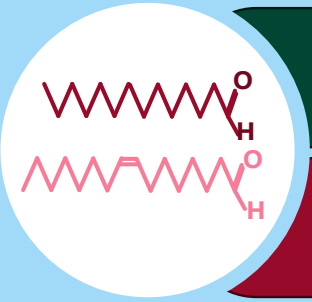
RISK on MILK LOSS in first 150 DIM



Balanced profile = good functioning metabolism

Unbalanced profile = higher risk of health problems and milk losses = relevant for farmers

Biomarkers: MFA profile (rumen health, diet, and fat mobilization), fat and protein yield, herd average yields

“full image” of fat synthesis and metabolism
=> combined/weighed image of several biomarkers

RISK: 0 – 100%

Calculated based on first MR of each lactation

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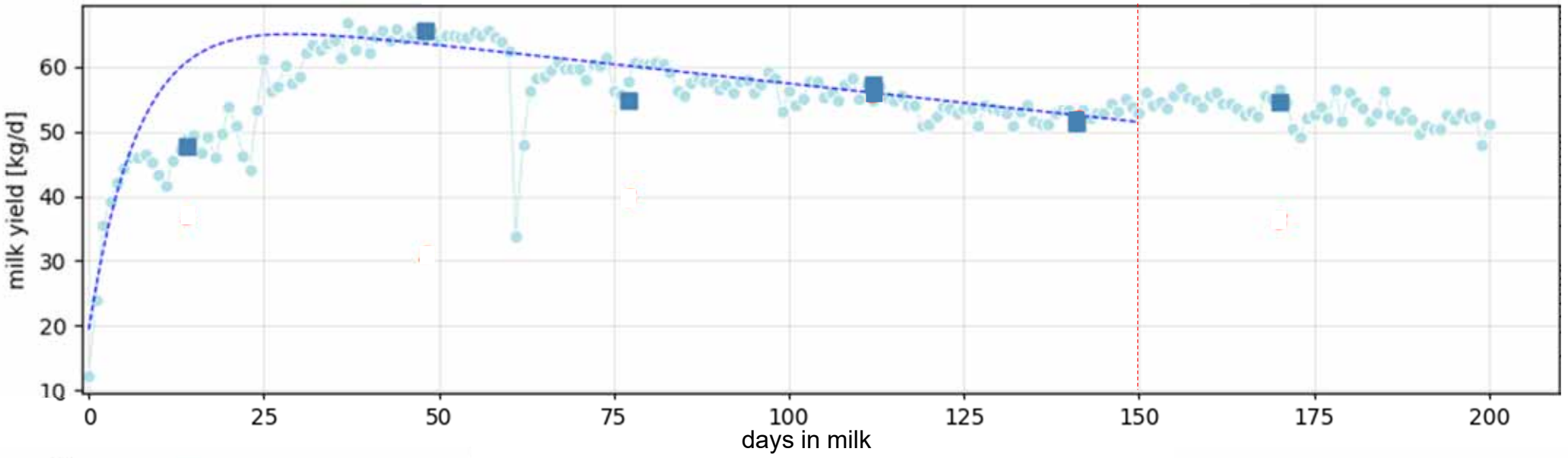
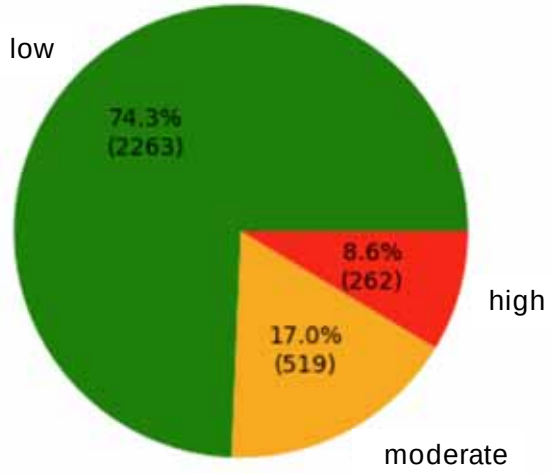
Milk losses



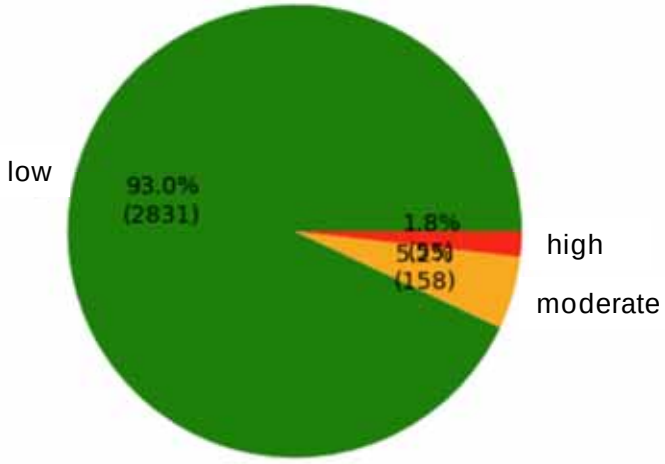
Adapted from Adriaens et al. (2021)

Validation study: Oct 2025 to Feb 2026
27 farms, 8887 MFA profiles

Risk negative energy balance (days in milk 0 - 100)



Risk rumen malfunctioning (days in milk 0 - 100)



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Validation study: Oct 2025 to Feb 2026
Daily milk yield from 17 farms, calculated on milk losses in first 150d for 707 cows with a test day record in DIM 0-42

RISK NEB	RISK RF	count	median (kg/d)	% diff	€*/cow
low	**low**	378	reference	reference	
low	**moderate**	0			
low	**high**	0			

- **Combination of high risk for rumen function and high risk on NEB give highest losses**
- Highest production losses in parity 2+
- Example: high-high = 33.6€/cow extra loss in first 150d

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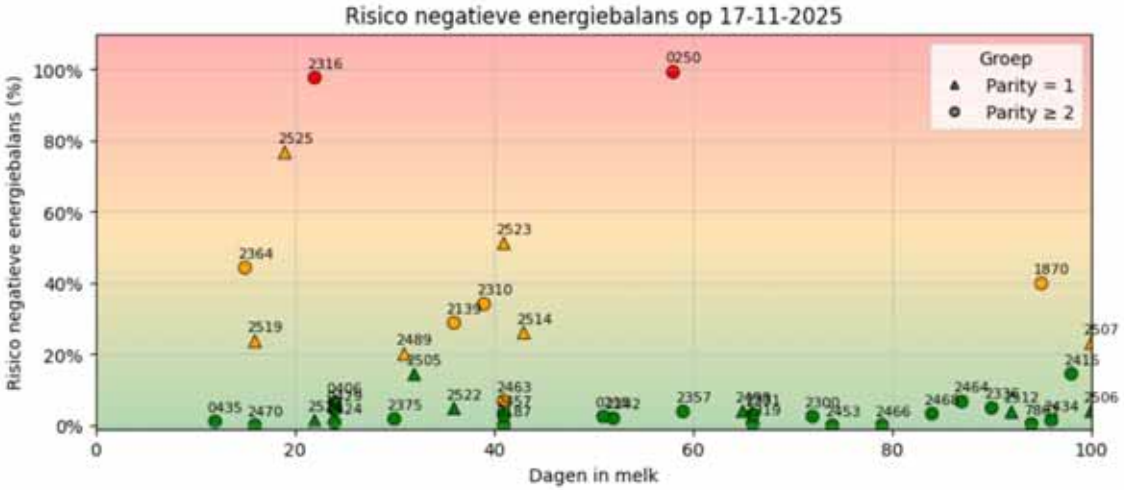
*RFC feb ‘26 41.5€/100kg

Actionable output

Group level



Individual cow level

Bella, parity 4, 58 days in milk

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Take home messages

- **MFA** provide **biology-relevant insight** in **metabolic health** through **negative energy balance** and **rumen functioning**

- **MFA biomarkers** can be translated into **risks** including **covariates** such as parity, lactation stage, and breed to make them **actionable** for farmers

- **Combined high risk** on NEB and rumen malfunction give **highest milk losses** in early lactation

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Thank you!

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