Management of Reticuloruminal pH in Modern Dairy Herds

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Farm Management: Control, Optimization and Monitoring

Operations and decisions involved in farm management rely on available information about the farm and the dairy cows.

Increase profitability… with healthy animals!
Development of Farm Management

- Managing bigger herds
  - cows and employees
- Efficiency enhancement needed
  - cost efficient
  - sustainable farming
- New technologies (on farm and analysis)
- New understanding of farming from customers
  - Healthy animals
  - Animal welfare
Increasing the on farm data pool

Challenge: Read and interpret the new data (interconnections and the parameters itself)
What happens in the rumen?

? pH Level

? SARA

? pH fluctuation

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Continuous reticuloruminal pH measurement

- Long-term measurement of reticuloruminal pH and temperature
- 144 measurements per day
- 150 days pH data, 4 years temperature
- Wireless data transmission and analysis
What does a pH curve tell us?
Reflects the Feeding Management: Feeding Times, Feed Push and the Diet

Herd Health: High pH- Fluctuations, Off-Feed Syndrome, Acidotic Conditions
pH in transition and high yielding dairy cows

- Several humoral, metabolic and physiological changes (Bell, 1995; Overton and Waldron, 2004)
- **5 key areas** to prevent and monitor production diseases of transition cows (Mulligan et al. 2006):
  - 1) body condition score management,
  - 2) hypocalcaemia,
  - 3) negative energy balance,
  - 4) trace element status,
  - 5) rumen health

- Relevance of rumen status due to high correlation between composition of rumen microbiota and milk yield and composition (Jami et al. 2014)
- Rumen microbiota is highly responsive to changes in the diet and feeding management (Pitta et al. 2014, Gasteiner et al. 2009)
PH INFLUENCED BY ANIMAL HEALTH
Control, optimize and monitor the pH: 1st lactating transition cow
1st lactating transition cow - Part I
Reticuloruminal pH in close-up and during calving

![Graph showing pH and temperature changes during close-up and calving](image-url)
1st lactating transition cow - Part II
Reticuloruminal pH of a diseased fresh cow

![Graph showing pH and temperature fluctuations with notes on calving, fever, SARA, and high fluctuations]

**NEW DIET: HIGH YIELDING TMR**

**Diagnosis:** retained placenta

**SARA**

**fever**

**calving**

**high fluctuations**
1st lactating transition cow - Part III
Recovery Period

No milk increase, cow not healthy

Group change: back to close-up with TMR with less carbohydrates

Recovery: more milk unless lower NEL, increase of water intake

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Different curves- same ration and feeding management

Diseased Cow

Recovered Cow

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PH INFLUENCED BY FEEDING MANAGEMENT
Control, optimize and monitor the pH:
Cow 1 – Irregularities in feeding times
Control, optimize and monitor the pH: Cow 2 – Irregularities in feeding times
Control, optimize and monitor the pH: Cow 3 – Irregularities in feeding times
Control, optimize and monitor the pH:
Cow 1 – No irregularities in feeding times

stable feeding management
Control, optimize and monitor the pH:
Cow 2 – No irregularities in feeding times

stable feeding management
Control, optimize and monitor the pH:
Cow 3 – No irregularities in feeding times
Conclusions

- **Management of pH** means managing health and feeding
  - Feeding pattern, Diets
  - Prevention of SARA

- **Optimal feed management** is a key factor in the economic efficiency and profitability of the modern dairy farm. Optimized rumen function is a key driver for animal health and performance.

- **Two types** of pH measurement: Permanent and problem/event detection based

- Measurement of pH in numerous commercial dairy herds provides new data. We need to learn how to interpret the data in detail.

*We are just at the beginning to understand our dairy cows!*
Thank you!