Dairy farm evaluation of rumen pH bolus data: identifying the benefits

Professor Toby Mottram  
Douglas Bomford Trust Chair in Farm Mechanisation  
Royal Agricultural University  
Cirencester  
Toby.mottram@rau.ac.uk
The problem: why measure rumen pH

- Cow biome is a complex interaction of 20k organisms
- Forage quality is highly variable
- Nutritional theory is hard to apply on farms
- Milk output is conserved in the short term
SARA: the problem

Rumen pH is determined by
FERMENTABILITY
X
INTAKE

As genetics has created cows with large appetites and intakes we have a problem of low pHs causing illness and reduced milk quality.

SARA defined as “extended” periods of “low” pH

What is “extended” and “low”. If you cannot measure it you cannot control it.
Rumen pH Bolus

- Inserted by mouth
- Retained in Reticulo-rumen
- Raw data (pH & T) downloaded to handset
- Handset Uploads to internet
- Bolus lasts 150 days before sensor fails
- Used >3 per group
This study

- Thirty Farms
- Range of farm types
- >120 cows with boluses
- Started May 2013
- Continues ...
  - Farmers addicted to data!
Case 1: Correcting low pH

350 cow housed herd on TMR
12,000 litre average yields
Was this SARA?
  
  No Cud-balls
  Some Loose dung with observed grains
Case 1: Strong daily cycle

pH low and wide range, not much night time eating
Case 1: after a feed change

After reducing digestible energy, pH is higher with narrower range, cows eat more at night, no change in milk yield, farm saved £6000 within 3 weeks
Case 2: Effect of grazing

- Grass is the perfect food for cows?

The low period is when cows grazed a new high sugar grass pasture.
Case 3: TMR and farm routine
Case 4: Robotic Milking

A plot of the pH over 11 days; Farm D 1990 11062013
Case 5: Cake and Grass

- Traditional predominant system in the South West UK
- Cows at grass from April to October
- Cows fed in parlour with concentrate
Case 5: Cake and Grass

A plot of the pH over 9 days; Farm G 891 14062013

Strong twice daily fluctuations in pH
Case 6: Rumen Buffer

- Rumen Buffer is routinely used to “raise” pH
- Experimental Farms are good for controlled studies
  - But
  - Farm practice is very different
  - Results are used to sell a product
  - No diagnosis possible before wireless rumen bolus
Case 6: Rumen Buffer

A plot of the pH over 9 days; Farm M 0532 04102013(1)

<table>
<thead>
<tr>
<th>Additive</th>
<th>Price £</th>
<th>p/cow/day</th>
<th>Cost (£) 250 cows</th>
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</thead>
<tbody>
<tr>
<td>Bicarb</td>
<td>350</td>
<td>9</td>
<td>22.5</td>
</tr>
<tr>
<td>Acidbuf</td>
<td>550</td>
<td>5.5</td>
<td>13.75</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>16.5</td>
<td>36.25</td>
</tr>
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</table>

£1103/month
£13,231/year
Conclusions

- Rumen pH was monitored in the reticulum routinely
- Each farm system has a different pattern of pH
- pH should be measured before rumen buffer used
- Incidence of SARA were rare (self selected group)
- Grass can cause low pHs
- Rumen pH analysis should focus on
  - Mean values
  - Range of values (less is better?)
  - Slope of drop
  - Number of drops per day
  - Length of non-feeding periods
Thank You For Listening

- Toby.mottram@rau.ac.uk
- Mole Valley Farmers
- Jeremy Hamilton, Three Counties Feeds
- Colleagues at RAU

EAAP 2016
European Federation of Animal Science Annual Meeting – Livestock Systems and Science
Belfast
28 August–1 Sept 2016
www.eaap2016.org