Does the increase of feeding frequency with automatic system impact the behaviour of dairy cows?

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“Feeding robot in 2012”

- Commercial pressure: 12 manufacturers
- High level of investment: ≈ 25 à 35 €/1000 l, (without silos)
- Decreased working times but concern about return
- Zootechnical performance
  - Possible adaptation of diets
  - Less refusal and cleaning of feeding bunk
  - Increased meal frequency?
    - 18 European herds: mean = 7,1 (3 -13) (Nydegger et Grothmann, 2009)
    - 10 French herds: mean = 6,9 (3 -10) (Institut de l’Elevage, 2013)

… Consequences on ingestion, dairy production and behavior of animals?
Objective

To measure the impact of meal frequency on zootechnical performance and behaviour of cow

Preliminary trials after first installation in experimental facilities
Experimental facilities at « La Jaillère »

- **Experimental farm : La Jaillière, ARVALIS**
  - Cubicle and rotative milking system
  - Feed bunk with headlock barrier

- **Feeding system (Rovibec, Canada)**
  - Management of forage
  - Management of concentrate
  - Mixing
  - Distribution

- **Some pictures ...**
**Forages**

- **Silages**
  - Horizontal silos with walls
  - Transfer of the silages towards 3 reserves (1 day)

- **Round ball**
Concentrates

- Individual compartments for concentrate and supplementation
- Automatic transfer to the mixing system
Total Mixed Ration

32 diets possible
Feeding robot

Conveyor suspended with rail and cart (500 kg maxi = 5 min.)
Material and methods

- From January to March 2013
- 3 groups of 17 cows (9 primi.) after lactation peak
- 3 feeding strategies
  - 1D : 1 meal/day (7:30) + 2 human interventions
  - 3D : 3 meals/day (7:00, 12:45, 18:20)
  - 8D : 8 meals/day (every 2 hours between 4:00 and 18:00)
- TMR : Maize silage and grass silage with 38 % concentrate (+ min. and vit.) , DM = 44%, ad libitum

Measures
- Zootechnical performances
- Behaviour 1D and 8D :
  - Time-budget by scan sampling (15mn) during daylight period (10:00 to 16:00)
  - Agonistic behaviour by ad libitum observations after distribution at 8:00 and 16:15
Feed intake

No effect of the number of meals (Refusal between 7 and 9 %)
### Zootechnical traits

<table>
<thead>
<tr>
<th>Treatments</th>
<th>1D</th>
<th>3D</th>
<th>8D</th>
<th>ETR</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk production (kg/d)</td>
<td>24.4</td>
<td>23.6</td>
<td>24.1</td>
<td>2.4</td>
<td>NS (1)</td>
</tr>
<tr>
<td>Fat content (g/kg)</td>
<td>42.7</td>
<td>43.0</td>
<td>41.6</td>
<td>4.0</td>
<td>NS</td>
</tr>
<tr>
<td>Protein content (g/kg)</td>
<td>31.2</td>
<td>31.4</td>
<td>31.1</td>
<td>2.0</td>
<td>NS</td>
</tr>
<tr>
<td>Milk 4 % of fat (kg/d)</td>
<td>25.4</td>
<td>24.7</td>
<td>24.7</td>
<td>2.9</td>
<td>NS</td>
</tr>
<tr>
<td>Fat (g/j)</td>
<td>1042</td>
<td>1015</td>
<td>1003</td>
<td>140</td>
<td>NS</td>
</tr>
<tr>
<td>Protein (g/j)</td>
<td>761</td>
<td>741</td>
<td>750</td>
<td>74</td>
<td>NS</td>
</tr>
<tr>
<td>Variation of weight (g/d)</td>
<td>+ 54</td>
<td>+ 222</td>
<td>+ 268</td>
<td>428</td>
<td>NS</td>
</tr>
</tbody>
</table>

- **Low feeding efficiency (50 % primiparous and after lactation peak)**
- **No major effect, in accordance with bibliography**
Few agonistic behaviour
Similar time-budget
Cows at the feed bunk

Cows ruminating

Synchronised activities of « 8D » group with meal distribution
Practical consequences: size of feeding area
Limits and perspectives

- Reduced duration of observation
  - One group of cows per treatment
  - Diurnal observation
  - Etc

- No competition in our conditions

- Taken into account these limits, in our conditions
  - No major diurnal time-budget effect
  - No major effect on zootechnical performance

- ... but to be checked on a larger scale in commercial farm
Thank you for your attention and « Bon appétit »