Effects of rearrangement of the cows in production groups on milk cortisol concentrations

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Third Dairy Care Conference - Zadar, Croatia, October 5th and 6th 2015
Is Cortisol a Useful Biomarker for Stress?

• Controversial results in scientific papers
• Can Cortisol be considered a “Golden Standard”? 
• Several questions to answer:
  • Which matrix
  • How many samples/How frequent
  • From ALL animals / From a percentage of the whole herd
  • …?

• Many other questions (WG1 Meeting in Bern...)

Third Dairy Care Conference - Zadar, Croatia, October 5th and 6th 2015
Why Cortisol in Milk?

Transfer of Cortisol (HC) Across the Blood/Milk Barrier

What do we measure?
- Cortisol in milk: 97% in water fraction
  - Fat should be removed
- Possibly indicative of “free” cortisol

When do we take a sample?
- Repeatedly
- Milk parlour
- Potentially automatizable

Third Dairy Care Conference - Zadar, Croatia, October 5th and 6th 2015
Aims of the Study

**First trial:** to evaluate physiological variations in milk cortisol and its diurnal in dairy cows.

**Second trial:** to investigate the effects of rearrangement of the cows in production groups on milk cortisol concentrations.
Both trials performed in the same commercial dairy farm in Northern Italy

Animals at first or second paritumrition

Same feeding and management conditions
First trial

Animals:
10 Norwegian Red (NR) cows and 10 Holstein Friesian (HF) cows remained in the same group all the experimental period.

Sampling protocol:
• individual milk sample collected at the morning (6:00 am) and at the afternoon (6:00 pm) milking for 3 consecutive days.
**Milk cortisol in the first study**

- **Breed:** ns
- **Day of sampling:** ns
- **Time of sampling (AM vs. PM):** ns

![Graph showing milk cortisol levels with error bars for different days and times.](image_url)
Second Trial

Animals (N=40)

5 NR and 13 HF cows: from “post partum” group to “high production” group

10 NR and 7 HF cows: from “high production” group to “low production” group

Sampling protocol:
individual milk samples: evening milking (6:00 pm)
<table>
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<th>Breed</th>
<th>Mean, ln(pg/ml)</th>
<th>SE</th>
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<tr>
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<td>6,31</td>
<td>0,10</td>
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<table>
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</table>
Milk cortisol in the second study

Parity: ns
Lactation group: ns

group change

P< 0.05
Conclusions

**Trial 1:**
Milk cortisol concentrations:
- do not significantly vary during consecutive days
- more variable in the afternoon than in the morning milking

**Trial 2:**
Milk cortisol concentrations:
- are significantly higher after the relocation of cows (D3, D4, D5)
- the two breeds responded differently to the challenge
- can milk cortisol be used in dairy cows to assess short term stimulation of the HPA axis?