Detection of Pregnancy-Associated Glycoproteins in Routine Milk Recording Samples
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Overview

• Pregnancy-Associated Glycoproteins (PAGs): Ideal markers of pregnancy in cattle (ruminants)
• IDEXX Milk Pregnancy Test detects PAGs in routine DHI samples.
• Trial to investigate carry-over of PAGs in different milking systems
• Paired hand-stripped and routine DHI samples collected from each cow same day
• Only milk from cows ≥ 28 days post breeding included
Conclusions

• Slight carry-over in DHI samples possible
• Should be addressed when implementing pregnancy testing
• Carry-over can cause false positive results
• IDEXX Milk Pregnancy Test is an effective and economic tool for pregnancy testing using DHI samples from 28 days post breeding
  - Facilitates workflow on the farm
  - Cows do not need to be fixed for pregnancy diagnosis
IDEXX in the Dairy Industry

• Since ≥ 30 years laboratories, processors, veterinarians and producers use IDEXX diagnostic tests and technologies.

• IDEXX has proven solutions to help the industry achieve this goal.

• IDEXX SNAP® tests keep antibiotics out of the supply chain

• IDEXX diagnostic tests help manage disease

• IDEXX pregnancy tests maximize production
Landeskontrollverband Weser-Ems e.V.

- 383‘000 cows on milk recording
- 4‘470 farms
- 325 controllers
- 20 employees in 5 locations
- Milk performance
- Milking analysis and milking technique control
- Herdmanagement software
- Part of LKV Niedersachsen with 765‘000 cows on milk recording and 8‘800 farms
DHI laboratory Weser-Ems

• 2014 total 5.26 mio samples analyzed (4.11 mio DHI samples)
• 60 employees
• DHI testing
• Pathogen detection
• Quality Management Milk
• Sample collection for governmental testing
• Pregnancy testing
Goal of Study

• Investigate potential of carry-over in different milking systems with different DHI sample collection systems.
• Carry-over: overflow (or remaining milk volume) from previous cow can influence test result of sample from next cow.
Study Farms

- 5 farms (3: TruTest, 1: GEA Metatron, 1: AMV Lely A3)
- Average herd size 116 cows (58 to 182)
- Average number of cows in milk 104 (51 to 161).
- Reproduction: all AI, one farm with additional bull breeding
- Year round calving
- Milking independent from performance or stage of lactation
- Animal IDs clear and traceable
## Overview and Technical Detail

<table>
<thead>
<tr>
<th>Farm</th>
<th>Parlor</th>
<th>Milk Meter</th>
<th>Cows (total - milking)</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Fishbone (2x8)</td>
<td>TruTest HI</td>
<td>119 - 106</td>
<td>9’616 kg</td>
</tr>
<tr>
<td>B</td>
<td>Tandem (10)</td>
<td>TruTest HI</td>
<td>142 - 126</td>
<td>8’626 kg</td>
</tr>
<tr>
<td>C</td>
<td>Rotary (24)</td>
<td>GEA Megatron</td>
<td>182 - 161</td>
<td>10’317 kg</td>
</tr>
<tr>
<td>D</td>
<td>Tandem (7)</td>
<td>TruTest HI</td>
<td>81 - 75</td>
<td>9’825 kg</td>
</tr>
<tr>
<td>E</td>
<td>Robot</td>
<td>Lely Shuttle</td>
<td>58 - 51</td>
<td>10’452 kg</td>
</tr>
</tbody>
</table>
Study Design - Samples

- Sample collection (during same milking event) between August 6 and September 12, 2014
- Milking position of every cow recorded
- Each cow pre-milked by farmer, then collection of hand-stripped samples from at least one quarter.
- Collection of DHI sample at the end of milking and milk volume recorded
Study Design - Testing

- Milk sample collection and documentation by LKV Weser-Ems e.V.
- All samples tested with IDEXX Milk Pregnancy Test within one day after collection
- Ultrasound check done by vet on relevant cows with recheck result or discordant paired sample result
- Relevant cows: \( \geq 28 \) days post breeding, no heat and \( \geq 60 \) days post calving
Results

• Overall comparison of OD values of paired pre-milk and DHI samples showed high correlation ($R^2 = 0.9582$)

• Farms A-D: 4.7% of the cows (12 out of 257) samples showed carry-over (Pre-milk and DHI sample result mismatch)

• Farm E (robot): 7.3% of the cows (4 out of 55) showed carry-over
Pre-Milk and DHI Sample Comparison

\[ R^2 = 0.9582 \]
## Carry-Over Relevant Cows (≥ 28 Days Pregnant)

<table>
<thead>
<tr>
<th>Farm</th>
<th>Total Tested</th>
<th>Matching</th>
<th>Carry-Over</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>66</td>
<td>65</td>
<td>1 (1.5%)</td>
</tr>
<tr>
<td>B</td>
<td>72</td>
<td>68</td>
<td>4 (5.6%)</td>
</tr>
<tr>
<td>C</td>
<td>80</td>
<td>79</td>
<td>1 (1.3%)</td>
</tr>
<tr>
<td>D</td>
<td>39</td>
<td>33</td>
<td>6 (15.4%)</td>
</tr>
<tr>
<td>A-D</td>
<td>257</td>
<td>245</td>
<td>12 (4.7%)</td>
</tr>
<tr>
<td>E</td>
<td>55</td>
<td>51</td>
<td>4 (7.3%)</td>
</tr>
</tbody>
</table>
## Carry-Over Data Relevant Cows (6 of 12) (≥ 28 Days Pregnant)

<table>
<thead>
<tr>
<th>Cow ID</th>
<th>Days post Breeding</th>
<th>Result previous Cow*</th>
<th>DHI* / Pre-Milk*</th>
<th>Ultrasound Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ella</td>
<td>107</td>
<td>3.790</td>
<td>0.377 / 0.009</td>
<td>Open</td>
</tr>
<tr>
<td>Klara</td>
<td>50</td>
<td>1.860</td>
<td>1.810 / -0.007</td>
<td>Open</td>
</tr>
<tr>
<td>Almara</td>
<td>34</td>
<td>0.069</td>
<td>0.310 / 0.048</td>
<td>Open</td>
</tr>
<tr>
<td>Cissi</td>
<td>201</td>
<td>0.779</td>
<td>0.127 / 0.028</td>
<td>Open</td>
</tr>
<tr>
<td>Biotika</td>
<td>83</td>
<td>0.566</td>
<td>0.116 / 0.009</td>
<td>Open</td>
</tr>
<tr>
<td>Konni</td>
<td>37</td>
<td>-0.016</td>
<td>0.121 / -0.025</td>
<td>Open</td>
</tr>
</tbody>
</table>

* OD values (S-N), if ≥ 0.250: Pregnant, if ≥ 0.100 and < 0.250: Re-check, if < 0.100: Open
Conclusions

• 4.7% of the cows (12 out of 257) from conventional milking systems samples showed carry-over (Pre-milk and DHI sample result mismatch)

• 7.3% of the cows (4 out of 55) from a milking robot system samples showed carry-over

• Carry-over can cause false positive results. False negative results have not been found.

• Slight carry-over in DHI samples cannot be excluded and should be addressed when implementing pregnancy testing