It’s the “little things” that add up!

Bob James
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Calving environment

If you were a cow where would you want to calve?

Colostrum management
Not colostrum again!
Colostrum Management

- Quality, quantity, quick and clean
- >85% of 1st milking colostrum over 50 g/liter
- Using Brix Refractometer
  - Not temperature sensitive
  - More durable than colostrometer
  - Readings > 22 indicate good quality colostrum
  - RID values > 50mg IgG/mL

Clean colostrum

It’s a race between bacteria in the environment or the initial feeding and the antibodies in colostrum.

One reason why it’s important

Early consumption of colostrum before exposure to ??

Colostrum provides...
One reason why it’s important!

Early exposure to E. coli with colostrum in milk

Total Bacteria Counts in Minnesota Colostrum

Median TPC = 615 million cfu/ml (73 to 104 billion)
93% of samples > 100,000 cfu/ml TPC

“We are feeding ‘fat-laden’ manure” Rob Trembley, 2006

Pasteurization of colostrum

- **Batch** pasteurize: 60 °C x 60 min
  - No viscosity changes
  - No change in colostrum IgG (mg/ml)
  - Significantly reduce or eliminate M. paratuberculosis, Salmonella, Mycoplasma bovis, E. coli, Listeria

(McMartin et al. JDSci. 2006. 89:2110
Godden et al., JDSci. 2006. 89:3478)
Serum IgG levels were significantly higher in calves fed heat-treated colostrum

Godden et al., 2006

Recent UMN Field Study

M. Donahue, S. Godden

- 1,000 calves / 6 herds
  - ½ fed raw and ½ fed heat-treated colostrum
  - Colostrum total plate count and serum IgG - negative
  - Colostrum IgG concentration - **positive**
  - Heat treatment - **positive** - independent of Total plate count
  - Colostrum Total Coliform Count and risk of scours - **positive**

Disconnect between critical control points:

- Location
  - Calving area
  - Fresh cow milking
  - Calf housing
- People - who is responsible?
  - Fresh cow milking?
  - Colostrum handling?
  - Calf feeding
Disconnect cont’d

- Quality
  - Colostrum handling -
    - Feed immediately or cool as soon as possible
    - Rapid cooling - frozen Coke bottles in bucket.
    - 6 hours at room temp = 6,000,000 cfu/ml
  - Clean containers
    - Luke warm water rinse
    - Hot soapy water
    - Sanitizer
    - SPC / sq. in. < 1,000

Two recent herd visits

- Dairy 1
  - >25,000,000 /ml, SPC, >15,000 coliform /ml, E. coli - TNTC
  - 8 calves < 7 days - serum protein - 3.9 – 4.6 g/dl
- Dairy 2
  - >25,000,000/ml, >15,000 coliform, E. coli TNTC -
  - 9 calves < 7 days - serum protein 3.9 – 5.2 g/dl

Newborn calf protocols

- Facilities for calving to obtain calves as soon as possible
- Clean calving environment
- Colostrum handling protocols – feed or cool ASAP
- Feed calves by bottle as soon as possible as much as they will drink! 2 – 3 quarts
- Esophageal feeder as last resort
Waste milk – benefits and risks!

Bob James

Quality of incoming milk

<table>
<thead>
<tr>
<th>Location</th>
<th>PrePasteurization - Aerobic plate count</th>
<th>Fat %</th>
<th>Protein %</th>
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<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>East</td>
<td>300,000</td>
<td>1 x 10^8</td>
<td>1.5%</td>
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<tr>
<td>West</td>
<td>26,000</td>
<td>5.9 x 10^6</td>
<td>1.2%</td>
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<tr>
<td>WI</td>
<td>6,000</td>
<td>7.2 x 10^7</td>
<td>2.8%</td>
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Intensive study on one dairy - June – August 2010

Mean SPC: 332,171 ± 733,487 cfu/ mL
Factors influencing microbial growth in waste milk

- Exposure of milk to flies, manure, dirt
- Cleanliness of storage tanks and length of time milk is held prior to pasteurization.
- Temperature of milk during storage
- Cleanliness of pasteurization equipment
- Cleanliness of bottles, tanks, buckets receiving pasteurized milk.
- Microbial content of milk from the cow

Post pasteurization quality control
Sample obtained prior to an every 20 minutes

Pasteurizer cleaning

- Rinse – warm water
- Caustic detergent
- Sanitize with acid cleaner

- Never allow HTST unit to run dry. Commercial machines have automatic flow sensors to prevent “cooking” of milk between plates.
- Cleaning “batch” pasteurizers?
Cleaning of feeding devices

Cleaning of hoses and nozzles
Equipment which lends itself to effective cleaning

Cleaning of feeding devices

Manual cleaning of tanks can be a challenge!
Gasoline nozzles are not Recommended!

Farm a

Daily Variation in Waste Milk Supply

<table>
<thead>
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<th>Time</th>
<th>lbs.</th>
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<tr>
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<td>7/28/2005</td>
<td>100</td>
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<tr>
<td>8/11/2005</td>
<td>200</td>
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</table>
Options to meet shortfall in waste milk supply

Compromise between nutrition of calf and expense
1. Additional saleable milk from bulk tank
2. Supplement waste milk by adding solids from milk replacer, whey protein and/or fat supplements
3. Switch calves to milk replacer.

Pasteurizer Conclusions

• Pre Past storage is key
  – Cooled, agitated
• Post Past handling important
  – Automatic tank washers
• Timing is important
  – Milking, storage, pasteurization, feeding
• More waste milk per calf on west coast
• Hot water supply/protocols for employees

Little things in feeding calves
Variation in Milk Replacer Feeding

- Where does variation arise?
- How big is a cup?
- How full is the cup?
- How much water is added?
- What temperature is the water?
- What is water quality?
- How to reduce variation?

Reducing variation?

- Replace cups with scales?
- 12.5% solution = 1.25 lb. powder/8.75 lb. water = 10 lb. final volume.
- Water temperature - finger or thermometer?

Water Management

Clean and plenty of it!
The “little” things are “big” things!

- Dry cow appetite and basic nutrient needs met.
- Calving environment
- Facilities and protocols for colostrum management
- Consistency in liquid feeding program
  - DM% and volume
- Water and calf starter intake to promote early weaning.