Monitoring Milk Quality on the Dairy Farm

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Intelligence for a Quality Milk Harvest
Rule 1 –
“Always do what is best for the cow”

Rule 2 –
“Refer to Rule 1”
Recording Keeping & Data Analysis

Effective Data Analysis begins with...

Accurate Data Capturing

The Challenge on a dairy farm...

Getting the Raw Data from the Cow to the Computer

Paper, laptop, tablet, smart phone, automated collection
You cannot Monitor what you do not Measure...

You cannot Measure what **Does Not** have an SOP
Recording Keeping & Data Analysis

Step 1

Identify EVERY “Repeatable Event”

Establish Standard Operating Procedure (SOP)

SOP’s must be Written….detailed & specific SOP
Recording Keeping & Data Analysis

Step 2

Identify the **Data to Collect** for each SOP

Who and how will **Capture the Data** @ the SOP site

Establish steps to **Get the Data** into a computer
Recording Keeping & Data Analysis

Step 3

Establish **Goals** to evaluate performance

Goals = “Key Performance Indicators” (KPI’s)
Data Quality

Measure the **Correct Process** in the Correct Way

Raw data **Accuracy**

Correct computer program to produce **Useful KPI’s**
Recording Keeping & Data Analysis

Data Relevance

Ancient history

Rolling Herd Average - Herd production the past 12 months

Recent history –

Monthly Milk Testing - Herd production the last 30 days

Current events –

Tanker Load Weights – kg/cow production shipped the past 24 hours

Future events –

Prediction - kg/cow production tomorrow
Milk Quality Recording Keeping

Herd Level

Bulk Tank Somatic Cell Count (BTSCC)

Largest data set for general milk quality

Constant variation is normal

Changes very slowly
Milk Quality Recording Keeping

Herd Level

Bulk Tank Cultures (Specific pathogens)

Essential to monitor contagious pathogens

Monitor drift in milking prep procedures/cow cleanliness

Quantitative Bulk Tank Results (cfu’s/ml)

Strep ag = 0  Strep spp. < 750
Mycoplasma = 0  Staph spp. < 250
Prototheca = 0  Coliforms < 100
Staph aureus < 50 (low as possible)
Milk Quality Recording Keeping

Herd Level

Bulk Tank Standard Plate Count (SPC)

- Total number of bacteria in bulk tank milk ($<5,000$)
- Does not identify species of bacteria

Elevated by:

- Improper cleaning of milking system
- Slow / failed cooling of milk
- Dirty cows / poor sanitation in cow environment
- Certain species of mastitis bacteria
Milk Quality Recording Keeping

**Herd Level**

Bulk Tank Preliminary Incubation Count (PI)

Measures psychrotropic (cold loving) bacteria

Psychrotropic

Incubate raw milk @ 12.8 °C for 18 hours

Elevated by:

- Improper cleaning, sanitizing, cooling, long storage
- Milking wet cows
- Old, cracked rubber milking parts
- Contaminated water supply
Milk Quality Recording Keeping

Herd Level

Bulk Tank Lab Pasteurized Count (LPC)

(LPC) Identifies thermoduric (heat loving) bacteria

(<100) Identifies spore-forming, spoilage bacteria

Elevated by:

Almost always dirty milking equipment

Old, cracked rubber milking parts

Leaking milk pump seals
Milk Quality Recording Keeping

Herd Level

Bulk Tank Coliform Count (Coli Count)

Identifies bacteria from manure (<50)

Elevated by:

High counts = dirty milking equipment

Moderate counts = poor milking prep, dirty cows, mastitis
Milk Quality Recording Keeping

Herd Level

New Clinical Mastitis Rate

Grade 1, 2 or 3 clinical mastitis

Goal = ≤ 2% / month
**Milk Quality Recording Keeping**

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**Herd Level**

**New Infection Rate**
Must have monthly, individual SCC data

- % of herd < 200,000 = 85%
- % of Lactation 1 < 200,000 = 90%

**Chronic Infection Rate**

- % of herd < 10%

**Cured Infection Rate**

Goal >= NIR
Milk Quality Recording Keeping

Herd Level

Conductivity Trend

Herd upward trend = Problematic

Compare with other herd trends to confirm significance
Milk Quality Recording Keeping

Herd Level

Parlor Summary Data (Parlor Performance Goals)

DC 305 Parlor Summary Commands:

Parlor \ W  or  Parlor \ P
### Milk Quality Recording Keeping

#### Herd Level

<table>
<thead>
<tr>
<th>Cows / Stall / Hour</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x = 4.0 – 4.25 cows / stall / hour</td>
<td>60 stall rotary = &gt; 6.5 cows / stall / hour</td>
</tr>
<tr>
<td>3x = 4.5 – 4.7 cows / stall / hour</td>
<td>2x = 68 kg / milk / stall / hour</td>
</tr>
<tr>
<td>3x = 52.3 kg / milk / stall / hour</td>
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</tr>
</tbody>
</table>

#### Parlor Summary Data (Parlor Performance Goals) Goals

- Milk / Stall / Hour
  - 2x = 68 kg / milk / stall / hour
  - 3x = 52.3 kg / milk / stall / hour
Milk Quality Recording Keeping

Cow Level

Clinical Mastitis Culture Results (by quarter)

Confirms the **Exact Pathogen(s)** attacking the herd

Confirms **Contagious** bacteria in the herd

Suggests if an **Environmental Bacteria acts Contagious**
Milk Quality Recording Keeping

Cow Level

Somatic Cell Count (by individual cow)

> 200,000 suggests mastitis

Powerful data to monitor mastitis on the Cow & Herd Level
Milk Quality Recording Keeping

**Cow Level**
New Infection Rate / Chronic Infection Rate

Must have monthly, individual SCC data

<table>
<thead>
<tr>
<th>Lactation group</th>
<th>NIR Goal</th>
<th>Chronic Rate Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lact 1</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Lact 2</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td>Lact 3+</td>
<td>8%</td>
<td>10%</td>
</tr>
</tbody>
</table>
Cow Level

Cure Rate

Specific pathogen by specific treatment protocol

Best tracked in DC 305 (or similar software)

Culture negative cure = Gold Standard

Drop in quarter SCC can take weeks after negative culture
Cow Level

DC 305 Commands
Type “Guide” on command line… “Guide”
Click Mastitis tab
Provides a series of Questions about Milk Quality

Click on a question and get a specific DC report

Type “Econ” on command line… “Econ”
Click Bulk Tank in drop box
don drop box “Bulk tank”
Lists cow SCC from highest
Milk Quality Recording Keeping

Cow Level
DC 305 Commands

Type “Egraph” on command line… “Egraph”

Click *Mastitis* in Event drop box

Every “Event” being tracked in DC

Variety of refinements can be changed in drop boxes

Date of Event
Days in Milk (DIM) of Event

Turn lactation groups On & Off
Milk Quality Recording Keeping

Cow Level

Parlor Summary Data (Cow Performance Goals)

Milk in 1st 2 minutes

2x = 8.4 kg (minimum)

3x = 6.6 kg (minimum)

Duration

First 11.4 kg = ≤ 4 minutes

Each additional 4.5 kg = 30 seconds
Cow Level

Parlor Summary Data (Cow Performance Goals)

**Average Flow Rate**
- $2x = 3.9$ kg/minute
- $3x = 3.0$ kg/minute

**Peak Flow Rate**
- $2x = 4.77$ kg
- $3x = 4.1$ kg
Questions

“A Global Organization for Mastitis Control & Milk Quality”

www.nmconline.org