Proper Milking Practices: Avoiding Mastitis

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Objectives

• Define Mastitis

• Identify methods for detecting mastitis in goats

• Understand the effects of Mastitis in the milk

• Identify factors that affect milk quality and production

• Identify proper milking parlor practices

• Identify preventive practice for reducing the risk of mastitis in dairy goats
Milk Goat Inventory – United States: January 1, 2015 and 2016

- 2015: 365,000 Head
- 2016: 375,000 Head

Increase: 103%
Milk Goat Inventory – United States: January 1, 2015 and 2016

Florida rank # 15
2016 as percent of 2015

148%
Dairy goat milk products are considered specialty foods. Demand and product sales have grown steadily as consumers have become more aware of the potential health benefits of goat milk:

- Higher protein content
- Lower allergens
- Lower cholesterol concentrations
Mastitis Definition:

(Mastos = Breast; Itis = Inflammation of; Greek)

Inflammation of the mammary gland, usually caused by pathogenic bacteria

Decreases milk production (yield), milk quality (composition) and profitability
All producers should aim for

- Productivity:
  - Produce the maximum quantity of high quality milk from their cows at lowest cost

Mastitis increases costs:
  - Reducing milk quality
  - Reducing milk quantity
Economic losses due to mastitis

Gestation: 5 month
Days in Milk production: 300 Days
Average production : 5 pound (0.5814 Gallons, 2.20L)
Conversion Gallon to pounds 1 gallon (3.8L) = 8.6 pounds (3.9kg)
300 days of lactation/year *0.5414 production/day = 162.42 gallons

<table>
<thead>
<tr>
<th>Milk price estimate/gallons</th>
<th>Production per Gallons/ Year</th>
<th>Estimate Value of goat raw milk in Markets</th>
<th>Estimate Value of 100 Goat in the year</th>
<th>US DGO Estimate of Mastitis 20%</th>
<th>Estimate loss base in Inventory 375,000 Heads</th>
</tr>
</thead>
<tbody>
<tr>
<td>$4.00</td>
<td>162.42</td>
<td>$649.68</td>
<td>$64,968</td>
<td>$12,993.60</td>
<td>$48,726,000</td>
</tr>
<tr>
<td>$6.00</td>
<td>162.42</td>
<td>$974.52</td>
<td>$97,452</td>
<td>$19,490.40</td>
<td>$73,089,000</td>
</tr>
<tr>
<td>$8.00</td>
<td>162.42</td>
<td>$1,299.36</td>
<td>$129,936</td>
<td>$25,987.20</td>
<td>$97,452,000</td>
</tr>
</tbody>
</table>
Forms of mastitis

1. Subclinical
   - Milk and udder appear normal but bacteria can be cultured from milk +/or milk has an elevated leukocyte (WBC) or somatic cell count.

2. Clinical:
   - Milk shows abnormalities such as clots, flakes, blood, or is watery
   - Udder is swollen, red, black, indurated, or painful to touch
   - Pain, fever, depression, weakness
   - Death
Abnormal milk

http://nmconline.org/images/mastitisclots.jpg

https://i.ytimg.com/vi/GI2rwkbkCpQ/maxresdefault.jpg

http://leucocitos.org/files/img/leucocitos.jpg
Bacterial Infection (microorganisms in milk)

- *Enterococcus faecium*
- Bacillus spp.
  - Gram-negative Bacillus
  - Gram-positive Bacillus
- *Staphylococcus* spp.
  - Staphylococcus aureus
  - Staphylococcus caprae
- *Streptococcus* spp.
- *Corynebacterium* spp.
- *Mycoplasma* spp.
How is milk quality measured?

- Bacterial count
- Somatic cell count
- Chemical residues
Human illness
- Milk-borne diseases (Salmonella, TB)

Bad taste
- Rancidity, saltiness

Reduces quality
- Lowered protein, butterfat, lactose

Reduces shelf-life
- Enzymatic breakdown of milk
Exceeding Preliminary incubation limits

• Preliminary incubation
  ◦ I should remain below 25,000 to 50,000 cfu/ml
  ◦ Maximum level *Grade A* 100,000 cfu/ml
  ◦ Grade B 300,000 cfu/ml

• Generally a problem with:
  ◦ Dirty milking equipment
  ◦ Lack of sanitizing the milk equipment
  ◦ Improper disinfection of teats before milking
When udder tissue is infected, significant numbers of white blood cells accumulate in the milk.

Grade A Standards

- 1,000,000 cells/ml
- Legal Limit 1,500,000 (Protein, Fat, SCC)

Most accurate method - California Mastitis Test (CMT)
### Somatic Cell Count

<table>
<thead>
<tr>
<th>SCC/ml</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1,000</td>
<td>Healthy gland</td>
</tr>
<tr>
<td>500,000 – 2,000</td>
<td>Infection by weak pathogens</td>
</tr>
<tr>
<td>Over 1,500,000</td>
<td>Signals infection</td>
</tr>
</tbody>
</table>
Interpretation of California Mastitis Test scores on goat milk.

<table>
<thead>
<tr>
<th>CMT Score</th>
<th>Reaction</th>
<th>Mean no. neutrophils per ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No reaction</td>
<td>68,000</td>
</tr>
<tr>
<td>Trace</td>
<td>Slight slime, tends to disappear with continued swirling</td>
<td>268,000</td>
</tr>
<tr>
<td>1</td>
<td>Distinct slime but without gel</td>
<td>800,000</td>
</tr>
<tr>
<td>2</td>
<td>Immediate gel formation; moves as a mass during swirling</td>
<td>2,560,000</td>
</tr>
<tr>
<td>3</td>
<td>Gel develops a convex surface and adheres to the bottom of the cup</td>
<td>&gt; 10,000,000</td>
</tr>
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</table>

Proper Milking practice procedure

1. Provide a Low Stress Environment
2. Wash Teat and/or pre-dip with disinfectant solution (30 second)
3. Dry Teats completely with individual Towel
4. Attach milking Unit 120 Second of pre-dip and adjust unit
5. Remove Unit and dip immediately
6. Examine three to four streams of milk from each teat before milking
   Or do CMT

Wash Teat and/or pre-dip with disinfectant solution (30 second)
Goal: milk clean, dry, sanitized teats

Checklist (11)

- Provide a low stress environment for dairy animals
- Check foremilk and udder for mastitis
- Wash teats with an udder wash solution or pre-dip teats in an effective disinfectant product
- Dry teats completely with an individual towel/animal
- Attach milking unit within 120 seconds after initiation of stimulation
- Adjust units as necessary for proper alignment
- Shut off vacuum before removing unit
- Dip teats immediately after unit removal with an effective disinfectant product
- Importance of hygiene
  - Mammary gland
  - Milking equipment
- Grouping and segregation
- Record individual production, treatments

National Mastitis Council revised 2013
Proper management practices include:

• Keep records
• Evaluation environmental stressors: pen cleanliness, overstocking, parasites, proper nutrition, etc...
• Monitor SCC (never go over 1.5 million)
• Culling problem animals
• Segregate animal with mastitis and milking after health animals will reduce the risk of contamination of herd.
Mastitis is the principal factor that affect the milk in Goats. Its presence could result in subclinical and clinical symptoms.

Generally, the lack of good management practice in the milking parlors is the principal factor of mastitis.

Environmental conditions can spread mastitis in your herd or flock.

In the United States the incidence of mastitis is 20% and represents a estimate of more than $50 million loss/year.
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