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## MANAGING MASTITIS THROUGH BULK MILK

Monitoring herd infection status needs to be a key element of every mastitis control program. Bulk tank somatic cell counts are your most basic measure of udder health and milk quality. An additional bulk procedure, microbiological culturing, can also be useful in monitoring udder health. Microbiological culturing will identify the predominant bacterial groups affecting a herd. Quality Milk Production Services and Dairy One have teamed up to enable you to monitor mastitis pathogens in your herd conveniently and economically.

Bulk tank cultures (BTC) are most useful for the identification of contagious mastitis pathogens, such as *Streptococcus agalactiae*, *Staphylococcus aureus*, and *Mycoplasma* spp., and monitoring their presence over time. Since BTC will identify all the bacteria in a bulk tank, they are also useful in evaluating milking methods and sanitation procedures.

These cultures are not foolproof tests. Although it is rare for a bulk tank culture to be positive for a contagious pathogen when no cows are infected in a herd (<6%), a single negative BTC does not guarantee the absence of contagious mastitis. One BTC will find *Streptococcus agalactiae* ~90% of the time but will only detect *Staphylococcus aureus* 75% of the time. Detection rate for *Mycoplasma* is even lower at 50%. Increasing the number of cultures done will improve these odds and as three or more samples are taken, the detection rate approaches 100%.

For herds attempting to control contagious mastitis, the bulk tank should be cultured monthly. When screening a herd prior to purchase, three bulk tank samples in a one-week period are recommended.

Modified bacteria counts can also be done on bulk milk samples and will identify all bacteria species present in bulk milk and give the producer the number of colony forming units of each species. When a herd experiences high bacteria counts, this service will help identify the organism responsible for the high counts. Bulk milk bacteria counts rose rapidly in January, 2000 for the herd in the Figure 1. Modified bacteria counts were able to identify *Streptococcus* sp. as the causative organism.

Dairy One technicians serving New York dairies are trained to take bulk milk samples and can provide this service during your monthly test. Milk samples are transported to a QMPS laboratory where they are tested for both contagious and environmental bacteria. *Mycoplasma* cultures are also done on each bulk tank sample. Results will be reported back to you within a week. Modified bacteria counts are available for an additional fee.

### Standard Mastitis Program\*

- Use optimal milking technique (forestripping, clean towels)
- Make sure the milking machine and system are functioning properly.
- Use post-milking teat disinfection (this is not a cure. Teat dip simply prevents new infection.
- Use a blanket dry cow treatment
- Use proper antibiotics in lactation
- Cull chronically infected animals

FIGURE 1

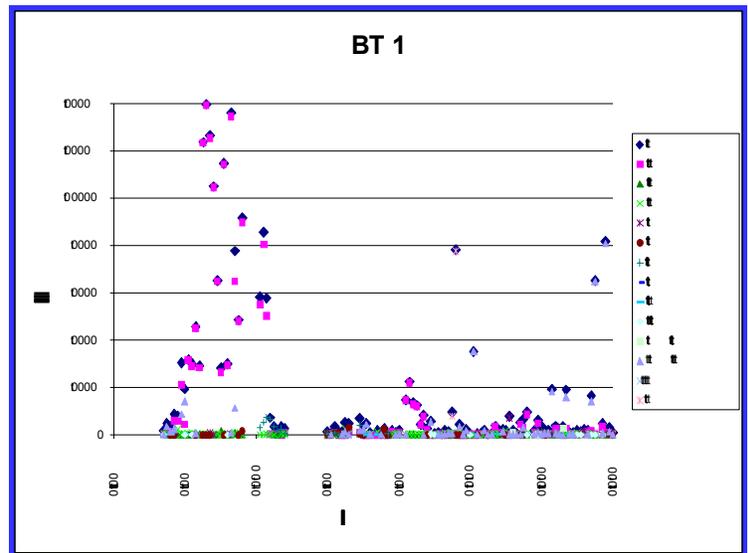


FIGURE 1. This graph shows bulk milk bacteria counts (in colony forming units per ml of milk) over time. In the time period between January 1, 2000 and February 20, 2000 the bulk milk bacteria counts approached 140,000 cfu. The majority of the colony forming units were *Streptococcus* sp.

## SAMPLING CLINICAL MASTITIS CASES

Why would you sample Clinical Cases ?

Samples from cows with clinical mastitis should be (periodically) cultured to identify the infecting bacteria and to determine antimicrobial sensitivities of the bacteria that cause clinical mastitis in your herd. The treatment guidelines should be adapted to the typical culture results obtained from clinical mastitis cases in your dairy. Intra-mammary antibiotics should be used more aggressively in herds with predominantly environmental streptococcus problems as compared to those herds with predominantly coliform infections.

If it is not feasible or practical to sample and culture all clinical cases, you might consider sampling all clinical cases and then freezing these samples. Only when an unusual pattern of mastitis or an unusual number of mastitis cases is observed these samples can be submitted for culture. In the case of small numbers or normal patterns, the samples could be discarded after a given amount of time (i.e. 2 months).

How do you sample clinical cases?

Milk samples should be aseptically collected and frozen from all cows with clinical mastitis prior to the initiation of therapy.

Residue Avoidance and Quality Assurance

Milk and meat should be withheld from human consumption for appropriate times following drug usage. Withholding times should correspond to the manufacturer's label when used according to the label, and when only one drug is used. The veterinarian must provide withholding recommendations when drugs are used in an extra-label manner, and when two or more approved drugs are used concurrently.

Records of drug usage should be kept to help to minimize the chance of adulterated milk or meat being sold for human consumption. Drugs should be stored and labeled according to procedures described by the Pasturized Milk Order (PMO). A review of the 10 critical control points that aid in residue prevention, a listing of FDA approved drugs and screening tests for them, along with a sample record system is available in the Milk and Dairy Beef Residue Prevention Protocol\*.

#### Treatment Assessment

As with any intervention that is made on a dairy, it is nice to know if it works. Methods to assess the efficacy of clinical mastitis treatment could include the follow-up with cell count data but certainly also follow up with sampling and culture results on these samples. To accurately assess bacteriological cure a sample should be taken approximately 7 and 14 days after the completion of therapy.

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## CULTURING FRESH COWS

### Why Sample Fresh Cows?

The dry period is a time of high mastitis risk for dairy cows. During the first two weeks after dry off, prior to complete involution, the mammary gland becomes a target for bacterial infection. Bacteria that invade through the teat canal are no longer being mechanically flushed from the udder two or three times daily by milking. Additionally, dry cows are often housed in areas that do not receive the maintenance that housing for the lactating herds receives. Antimicrobial dry cow therapies are designed to protect cows through this critical period but mastitis bacteria can become less susceptible to these drugs, or dry periods can be longer than the period of protection the drug offers. As the udder re-develops prior to freshening, leaking may become a problem. If milk is getting out, bacteria are likely finding their way in.

Infections in fresh cows are often subclinical. That is, without the outward signs: redness, swelling, or abnormal milk. Somatic cell counts will be elevated, impacting the quality of bulk milk. Treatment of bacterial infections early in lactation may result in higher cure rates compared to treatment later in lactation.

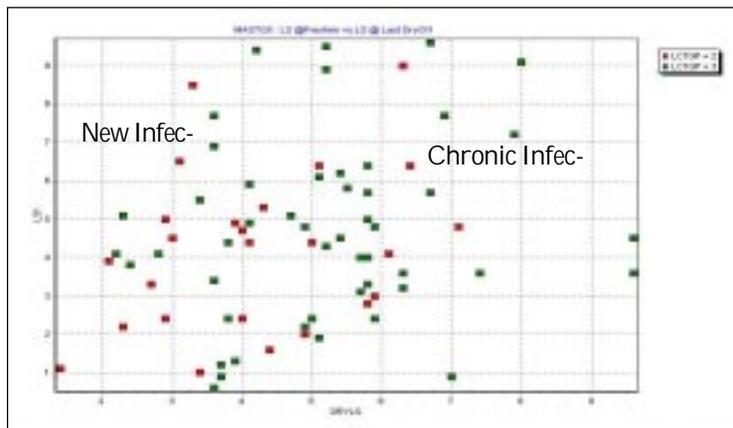
### Which Cows Should Be Sampled?

One option is to sample all fresh cows at the third or fourth milking. Although this procedure yields valuable results, it is often time consuming and expensive.

One alternative option is to perform a California Mastitis Test (CMT) on all fresh cows. Quarters which show a positive reaction can be aseptically collected, frozen, and delivered to Quality Milk Production Services for culture by your Dairy One technician. Of course, any cow with clinical mastitis should be sampled for milk culture.

Dairy One's Somatic Cell information can also be used to select cows for milk culture. Fresh cows with linear scores greater than 4.5 would be candidates. The Figure 2, graphs linear score at dry off (DRYLS) against linear score at freshening (LS1). The cows (represented by squares) in the upper left quadrant are new infections that occurred during the dry period (low linear score at dry off and high linear score at freshening). Cows in the upper right quadrant are chronic infections that were not cured by dry cow therapy (high linear score at dry off and high linear score at freshening). Both populations of cows should be cultured. Antibiotic susceptibility testing can also be performed to assess whether the current dry cow therapy is effective.

FIGURE 2



### How Can Culture Results Be Used?

As mentioned above, cows with gram-positive bacterial infections (such as *Streptococcus* spp.) that are treated early in lactation have higher cure rates. Faster resolution of mastitis and somatic cell counts means more milk and increased profitability for the dairy. Culture results can also be used to monitor changes in dry cow management and therapy. Fewer than 10% of fresh cows should be culture positive.

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