The Dairy Goat Digest

Issue # 8 October 2005

The Dairy Food Safety Unit at the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) wants to keep you informed of changes and updates to the Raw Goat Milk Quality Program and ongoing quality issues. We hope you find this newsletter helpful and informative.

In this month's issue:

Summary of Raw Goat Milk Quality Testing 2004

By Jeff Perkins, Scientific Support Analyst, Information Systems Unit, OMAFRA and Brenda Norris, Dairy Food Safety Program Coordinator, OMAFRA

OMAFRA began storing raw goat milk quality data electronically in December 2003. Based on the monthly regulatory test results collected throughout 2004 we are now able to produce some statistics of interest to Ontario producers.

Producer Numbers

Between January and December 2004, 34 goat milk producers exited the Ontario industry. Meanwhile 16 new producers started up milking goats to end the year with a total of 156 active goat milk producers in the province. The gradual overall reduction in numbers of dairy goat farms in the province in 2004 is similar to the trend noted in 2003.

Standard Plate Count (SPC) Results

A number of people have wondered what percentage of goat milk producers can meet the SPC standard of <50,000 (less than 50,000 cfu/ml) consistently throughout the year. From the 186 producers who received monthly regulatory SPC test results in 2004 here is the breakdown:

- 65 producers met the <50,000 standard each month (34.9%)
- 48 producers had only 1 count ≥50,000 (greater than or equal to 50,000) (25.8%) in 12 months
- 28 producers had 2 counts ≥50,000 (15.1%) in 12 months
- 21 producers had 3 counts ≥50,000 (11.3%) in 12 months

- 24 producers had 4-8 counts ≥ 50,000 (12.9%) in 12 months

The above data includes producers who may have only been actively shipping milk for a few months. The following summary of results includes those producers who have had **at least eight regulatory SPC tests in 2004**:

- 54 producers met the <50,000 standard each month (36.5%)
- 34 producers had only 1 count ≥50,000 (23.0%)
- 21 producers had 2 counts ≥50,000 (14.2%)
- 16 producers had 3 counts ≥50,000 (10.8%)
- 23 producers had 4-8 counts ≥50,000 (15.5%)

The percentage of producers who were able to meet the <50,000 SPC standard throughout the year were similar whether we look at regulatory samples from all producers (34.6%) or those samples from producers with at least eight tests in the year (36.5%).

Tickborne Encephalitis Outbreak in Estonia Linked to Raw Goat Milk

From Eurosurveillance Weekly, June 23, 2005

In May and June 2005, 27 cases of tickborne encephalitis (TBE) were reported to the Estonia's Health Protection Inspectorate. Encephalitis is a viral infection of the brain. Left untreated, the resulting inflammation can lead to brain damage, coma, and death. However, the majority of victims recover completely.

Patients reported the onset of symptoms over a span of 3 weeks in May that included flu-like symptoms (fever and/or headache), vomiting and neurological symptoms. None of them reported being bitten by ticks before symptoms appeared. So what was the cause of this sudden illness in the local population? Based on the results of the investigation all cases were associated with the consumption of raw (unpasteurized) goat milk that had been offered to customers to taste at a local supermarket earlier in May as part of a promotion. Blood test results on the goats from which the milk originated revealed that one goat was clearly positive for TBE infection.

Information about the outbreak was disseminated to ministries of health and public health institutes throughout Europe via the Early Warning and Response System in order to seek information on TBE cases in tourists who may have visited the supermarket in the affected region of Estonia and tasted raw goat milk.

Three additional outbreaks of tickborne encephalitis associated with the consumption of raw goat and cow milk have been noted in Estonia since 1990.

Yes it's true…you heard that right…

Our name has once more been changed to **OMAFRA** – The Ontario Ministry of Agriculture, Food and Rural Affairs.

Attention Bucket Milkers

By Mike Foran, Raw Milk Specialist, Dairy Food Safety Program, OMAFRA

In Ontario there are currently 23 dairy goat producers using bucket milking machines. Many producers also use bucket milkers to separately milk sick or treated animals. Keeping a bucket milking system (Figure 1) clean often requires more effort and attention to detail than pipeline systems. A thorough cleaning job can be time consuming. Shortcuts can often lead to unclean equipment. Let's look at some of the more common pitfalls of cleaning bucket milkers.

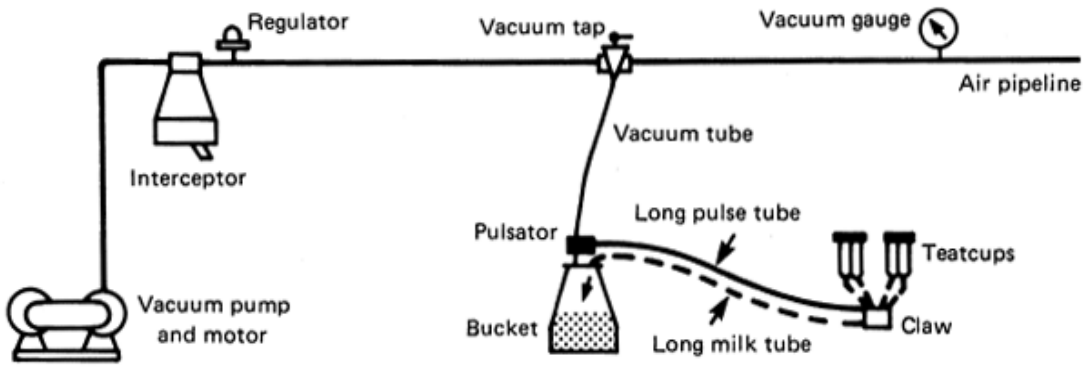


Figure 1: Bucket Milking System

Temperature

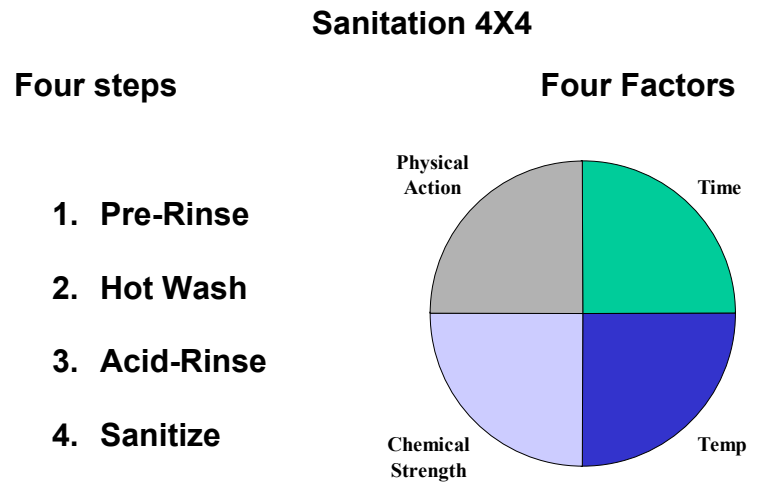
Hot detergent wash needs to stay above 120ºF. This point cannot be emphasized enough. Consistently low or borderline wash solution temperatures, cause fat and protein residues to develop. Many producers using bucket milkers obtain their hot water via heat transfer from a diesel engine used to power the bulk tank cooling unit. Since this system may not provide enough hot water, producers need to check the temperature of their wash solution at the end of the wash cycle, and consider options to provide additional milk house hot water if necessary.

Physical Action and Time

Cleaning the milking cluster, milk hoses and claws can be a challenge with bucket milkers. The problem usually is inadequate contact time with hot dairy detergent and inadequate slugging or turbulence of the dairy cleaners. Using the vacuum system and simply drawing wash solutions through the inflations, claws and milk hoses back into the bucket milker often does not provide adequate slugging or contact time. A contact or circulation time of six minutes is recommended. The trick is the process needs to be repeated. Briefly lifting the milking cluster out of the wash solution can assist in providing turbulence.

Manual brush cleaning of the bucket, bucket lid, gasket, and inlets as well as a pull-through brush cleaning of hoses is also required.

Figure 2: The key steps and factors involved in the cleaning process for hand milking, bucket milking or pipeline milking are basically the same.



1. Pre-Rinse

Removes most milk soil. Immediately after each milking, rinse each milker unit by drawing about 1 gallon of tepid water (100 - 120ºF) through the teat cup assembly. During rinsing, the teatcup assembly should be raised out of the water and lowered back in, to increase turbulence and scrubbing action.

2. Hot Wash

A hot wash using chlorinated alkaline cleaner removes fat and protein. Wash water needs to stay above 120ºF. This means you'll probably need to wear gloves for manual cleaning of buckets, milking units, and strainer to avoid scalding hands.

3. Acid Rinse

Removes residual detergent and prevents milkstone buildup. The acid rinse leaves surfaces with an acidic pH environment which discourages bacteria growth. An acid rinse also helps prevent black rubber from inking. After rinsing, equipment needs to drain dry. Store strainers and buckets inverted on a rack and hang units and hoses to drain.
Some producers flood or soak all equipment in an acid solution for an extended period of time once a week. This also helps prevent milkstone residues; however this practice should not replace routine daily acid rinsing

4. Sanitize

Immediately before milking, sanitize with 200 ppm chlorine. Most dairy chlorine sanitizers use 1/3 oz sanitizer per gallon potable water to make up a 200 ppm solution. Remember that an unclean surface will not be effectively sanitized.

Cluster Cleaning Units

Some producers have a cluster cleaning unit which provides excellent circulation cleaning of milk tubes, claws, and inflations. My experience has been that these units work well and save time since multiple units can be washed at the same time. For a cluster cleaner unit to work effectively proper cleaning **steps** and **factors** need to be observed as outlined in *Figure 2.*

Many dairy equipment dealers do not routinely stock these units, however they can be ordered. Prices generally range from $200.00 to $300.00.
Below are pictures and descriptions of some of the available cluster cleaning units.

DeLaval WA3 Unit (Figure 3)*– Built to be efficient*

The WA3 is a cleaning tool for bucket milking systems which helps ensure the milking cluster's internal parts are thoroughly cleaned. Its automatic function also saves time for other farm tasks.

The WA3 is driven by the vacuum supply system. The unit handles up to three clusters simultaneously and requires minimal space in the milk room. Simple but clever design makes the WA3 very robust and easy to maintain.

Figure 3: DeLaval WA3

Clear Bucket Milker Washer Unit *(Figure 4)*

The Clear Bucket Milker Washer is made of rugged molded plastic and stainless steel and saves labour, time and water by automatically washing up to four milker units at once. Milk tubes, claw and inflations are cleaned simultaneously, eliminating tedious brush cleaning. Clear body allows viewing of the washing process and insures light weight for economy and ease of mounting. Brackets included.

Figure 4: Clear Bucket Milker Washer Unit

Keep the Vacuum Line Clean

Some instances of high bacteria counts are caused by dirty vacuum lines and hoses. Condensation, milk droplets, and airborne contaminants are frequently drawn into the vacuum line and, can eventually accumulate into sludge.

To clean the vacuum line:

1. Prepare a hot wash solution (chlorinated alkaline low foaming pipeline cleaner) as directed on label.
2. Start with the stall cock nearest the vacuum pump. Draw a measured amount (less than the moisture trap will hold) then progressively clean each section of the vacuum line. When sucking the solution into the vacuum line, allow air to be drawn in at the same time by withdrawing the tube from the wash solution at frequent intervals. This will improve scrubbing action.
3. Shut off the vacuum pump and drain the system as necessary to empty the vacuum tank and lines. Check effectiveness by progressively examining at the clean out plugs. Make sure drain valves do not become fouled.
4. Repeat steps 2 and 3 using an acidified rinse following label directions.
5. Remove drain plugs to be sure the entire system is drained.

Review your vacuum line installation to ensure all lines are sloped to drain. Also, all low spots should have automatic drain valves and cleanout plugs. Stall cocks should be located in the top portion of the line.

Keep Vacuum Hoses Clean

Vacuum hoses require regular cleaning with a pull-through brush (*Figure 5*). If your brush is in poor condition or you do not have one, contact your equipment dealer.

Figure 5:Pull through brush

Check valves prevent moisture or any contaminating substance from the vacuum system from contacting the milk. These valves need to be in good repair and seated properly to be effective.

Pulsators are another part of the vacuum system that require regular attention. A pulsator performs millions of operations a year and is therefore subject to considerable wear. Pulsator maintenance and cleaning varies depending on type (electronic, electro-pneumatic and pneumatic) and therefore specific manufacturer instructions should be followed. Filters, air inlet ports and, in the case of pneumatic pulsators, the valve and valve slides require cleaning to optimize their performance.

Bucket milker systems continue to be a viable option for many dairy goat producers. A well maintained system and a consistent sanitation routine go a long way towards producing quality milk.

Testing Goat Milk for Antibiotic Residues

By Mark Mitchell, Drug Residue Lab, Lab Services Division, University of Guelph and Brenda Norris, Dairy Food Safety Program, OMAFRA

Antibiotic residues in foods are of concern as they present potential health risks due to possible allergic reactions, carcinogenicity and promotion of the spread of bacterial resistance to antibiotics used in human medicine. In addition, starter cultures used in cheese and yogurt manufacture can also be affected by antibiotic residues in milk. This may result in considerable economic loss as product batches may be downgraded or discarded. Producers are required to offer an antibiotic free product, and are responsible to ensure illegal antibiotic residues are prevented. The loss of milks superior reputation could be an expensive price to pay.

Antibiotic Use in Food Animals

Antibiotics have been used in food animal production for the treatment and prevention of disease as well as growth promotion for nearly 50 years. Penicillin G was the first antibiotic introduced to veterinary medicine in 1947 for use in intramammary infusions. Since that time the use of antibiotics has become an integral part of managing animal health in agriculture.

Antibiotics are administered to animals by several different routes including injections, orally in the food and water, topically on the skin and by intramammary and intrauterine infusions. Theoretically, all of these routes may lead to residues appearing in foods of animal origin such as milk, meat and eggs if withhold times are not observed. It has been estimated that less than 1% of foods worldwide contain antibiotic residues at low levels.

The most commonly used antibiotics in food animals can be grouped into 5 major classes. These include the beta-lactams (β-lactams) (e.g. penicillins and cephalosporins), tetracyclines (e.g. oxytetracycline, tetracycline and chlortetracycline), aminoglycosides (e.g. streptomycin and gentamicin), macrolides (e.g. erythromycin) and sulfonamides (e.g. sulfamethazine). A recent survey of veterinarians in the United States revealed that antibiotics were the drugs most often prescribed or used in the treatment of lactating dairy cows. Penicillin G was the most frequently used, and except for oxytetracycline, the five most prescribed drugs were all β-lactams approved for use in lactating dairy cattle: penicillin G, ceftiofur sodium, cloxacillin, cephapirin and ampicillin. A similar pattern of drug usage would be expected for dairy goats.

Maximum Residue Limits and Milk Withhold Time

Antibiotic residues in milk are illegal when above maximum residue limits (MRL's). MRLs have been established by Health Canada to ensure public safety and are listed in the Food and Drugs Act. The term MRL may be defined as the maximum concentration of a residue resulting from the use of a veterinary drug, expressed in parts per million (ppm) or parts per billion (ppb) that is legally permitted or recognized as acceptable in or on food. In addition, all veterinary products which have been licensed for use in food animals in Canada must have a published withhold time. This time is the withdrawal period or the minimal period of time between the last recommended treatment and the time of slaughter or collection for use as food (eg. milk and eggs). This time allows the veterinary drug and it's residues to decrease to levels below the established MRL. Currently there are no products registered for use on dairy goats in Canada. Hence, there are no published milk withhold times for goat producers to follow. Therefore, it is

very important that the milk from treated animals be tested with an appropriate test prior to going into the bulktank or if the animal has been treated by a veterinarian that an appropriate withhold time is given.

Antibiotic Residue Testing of Goat Milk in Ontario

The Ontario Ministry of Agriculture,Food and Rural Affairs has extensive programs in place for the testing of goat milk for antibiotic residues. Testing programs can be divided into two major areas.

1) All producers, have their bulk tank milk tested monthly on a random basis at the University of Guelph, Lab Services Division (LSD). The initial screening test is a microbial inhibition test whereby if an inhibiting agent is present in the milk being tested, growth of a bacteria in a test media is slowed or 'inhibited' and results in a 'positive' test result. The test has a very broad sensitivity range to various antibiotic families and has been adapted for screening large sample numbers at LSD. Suspicious samples are further characterized into either the β-lactam family (penicillins and cephalosporins) or non- β-lactam families (aminoglycosides, tetracyclines, macrolides) using the Standard Disk Assay method Positive samples are further classified into a specific family of antibiotics using rapid tests. Residue levels are quantified using High Performance Liquid Chromatography (HPLC).

2) Tanker truck loads of milk found positive at dairies are also confirmed at the LSD. Many processors are screening for β-lactam antibiotics and some are also testing for sulfa drugs and tetracyclines. A positive screen test result at the plant results in a load sample and all associated producer samples being sent to LSD for confirmation using official tests. The truckload of milk cannot be unloaded prior to receiving confirmation that the official test is negative. If the load is found officially positive the milk must be disposed of properly. If the load is officially negative the milk may be marketed. A producer sample found to contain violative levels of antibiotic residues will have milk in the bulk tank placed under detention. If the detention sample test is negative the detention is lifted and the milk may be marketed. In addition the producer may be subject to a penalty by their marketer.

The official tests on which milk marketing and penalty decisions are based are the Standard Disk Assay for of ß-lactams and the HPLC for sulfamethazine. Load and producer samples which give a zone of inhibition greater in diameter than a sample containing 0.01 IU/ml penicillin G per millilitre of milk by the Standard Disk Assay procedure or whose milk tests more than 10 ppb sulfamethazine by the HPLC are considered violative. When an antibiotic is found in a producer's milk a follow-up is conducted by OMAF staff to pinpoint the cause of the inhibitor ending up in the milk and thus prevent future occurrences.

On Farm Test Kits

Currently, there are a variety of screening tests on the market suitable for on-farm testing. Each test has its own benefits and limitations in cost, speed and sensitivity. The major suppliers for the North American market are Idexx Laboratories, CHARM Sciences and DSM Food Specialties. For information on test kits available and ordering visit:

http://charm.com/

http://www.idexx.com/index.jsp
http://www.dsm.com/en_US/html/dfs/dairy-products-tests.htm

Test kits are available for the β-lactam, tetracycline and sulfa families. An important point to remember however, is that most of the tests were developed for testing bovine milk and it has been reported that these tests may give false positive test results when testing goat milk. This is primarily due to the difference in composition between goat and bovine milk. For this reason any positive result on a screening test should be confirmed using official methods.

Preventative Measures by Producers

By far the majority of cases of positive inhibitors are traced back to improper use of antibiotics at the farm. Therefore the onus lies on producers to ensure they are taking all the necessary precautions when using antibiotics including the following standard recommendations:

- Only administer drugs on the advice of a veterinarian
- Follow label and veterinarian instructions including method of administration, dosage and dosing regime
- Identify treated animals with markings or bands and separate from milking herd
- Make a written and permanent record of the animal treated, dosages and dates given
- Ensure everyone involved in the milking is aware of animals that have been treated and special milking procedures are required.
- Milk treated animals separately
- Withhold milk from the bulk tank according to veterinarian or label directions
- Use an appropriate inhibitor test kit to test milk from treated does prior to re-entry into the milking line-up. Testing services are available from the Lab Services Division, (University of Guelph), veterinarian clinics and some milk processors.

Other things to consider that may cause a positive inhibitor test result:

- metabolism of the animal may be slower than expected thus slowing the rate of the drug leaving the animal's system
- using a combination of drugs to treat an animal may lengthen the withholding time for each individual drug
- 'off-label' usage can affect withdrawal rates. Off label usage refers to administration of drugs in a method different from that stipulated on the label. For example, administering intramammary rather than intramuscularly, or giving a higher dosage than recommended.
- withholding milk only from treated quarters
- animals drinking from medicated footbaths
- medicated feeds

For more information on what you can do to prevent antibiotics from ending up in your bulk tank of milk refer to the fact sheet Troubleshooting Antibiotic Residues in Goat Milk on the OMAF website at:
http://www.gov.on.ca/OMAFRA/english/livestock/goat/facts/info_trshtaresgtm.htm

Update of BSE in French Goat case

The February 2005 Dairy Goat Digest featured an article about a case of Bovine Spongiform Encephalopathy (BSE) in a French goat. This was the first confirmed case of BSE in a species other than cattle. The consumption of brain or spinal cord tissue from cattle infected with BSE (known as mad cow disease) has been linked to variant Creutzfeld-Jakob Disease (vCJD) in humans. Approximately 140 people are known to have died of vCJD in Britain.

In July 2005 a panel of European scientific advisors concluded that the likely prevalence of BSE in the European Union goat population is very low and that the current risk is considered to be small for goats born after a European wide ban on feed containing meat and bone meal (MBM) was introduced in 2001. MBM is thought to have been the most likely route of BSE infection to cattle.

Earlier this year the panel also advised on the safety of milk and milk products and concluded that based on current scientific knowledge, milk and milk products from goats are unlikely to present any risk contamination provided the milk is sourced from healthy animals. The scientific panel based its assessment on the following points:

- The European Commission and Member States have so far carried out over 93,000 tests on goats since the first case was identified and none has been found positive for BSE
- BSE has been found in only one goat (in France) and none of the other goats in that herd had the disease
- This goat was born before the 2001 European feed ban on MBM. MBM is thought to be the most likely route of BSE infection to cattle. Since the 2001 ban very few goats, if any, would have had access to MBM.

Currently there is another suspected case of BSE in a UK goat born before a feed ban was introduced in that country in 1988. The suspect goat was slaughtered in 1990 and is undergoing additional laboratory tests for BSE. Results will be completed in two years. Should another case of BSE in a goat be confirmed, the European Food Safety Authority may have to re-examine its risk assessment for BSE in goats.

Where to find previous issues of the **Dairy Goat Digest on line** plus access to related links:

http://www.gov.on.ca/OMAFRA/english/livestock/goat/news.html

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