

Interpreting small ruminant milk quality reports

Andrea Mongini, DVM, MS

M&M Veterinary Practice, 5213 S. Gratton Rd., Denair, CA 95316; monginidvm@yahoo.com

Abstract

Small ruminant dairies have milk quality requirements similar to cattle. Producers often look to veterinarians to help manage milk quality issues. It is important to fully understand the differences between dairy sheep and goats vs cattle in order to provide helpful consultation. This talk will cover the milk quality requirements, common deviations, why they occur, and how to best remedy the various counts when in violation.

Key words: sheep, goat, milk quality, mastitis

Introduction

When interpreting milk quality reports for sheep and goat dairies, it is important to know the legal requirements and standards. The counts we will be discussing in this talk are somatic cell count (SCC), standard plate count (SPC), coli (coliform count), and lab pasteurized count (LPC). Sheep are held to the same standards as cattle under the Pasteurized Milk Ordinance (PMO). Goats have the same standards, except the somatic cell count (SCC) limit is 1.5 million cells/mL. One large difference between sheep, goats, and cattle lies in bacteria shedding and how it affects bulk-tank milk quality counts. Real issues can develop when producers and creameries do not understand how to effectively troubleshoot milk quality issues. Milk barn service people, installers, and consultants related to chemical sales are primarily cattle dairy-based. Many small ruminant dairy producers have lost their ability to ship milk due to misunderstanding how to remedy poor counts.

Current PMO Standards (US) for grade A milk:

- SPC: <100,000 CFU/mL (<50,000 CFU/mL in California)
- LPC: <750 CFU/mL
- Coli: <750 CFU/mL
- SCC: <600k (sheep); <1.5 million (goat)

Critical Milk Quality Issues

Goats and sheep on dairies are commonly infected with *Staphylococcus* spp subclinical mastitis. This is a significant difference from cattle and has far-reaching impacts. *Staph* spp bacteria are shed in very high numbers in the milk, high enough to elevate the SPC into violatory levels. In most cases, the SCC will also be elevated and this is often a clue that there is a subclinical mastitis issue in the herd. The extremely high SCC limit for goats means that many goat dairies already have a subclinical mastitis issue and they are simply managing

to keep the SPC within legal limits. Goat dairies with low mastitis rates (both subclinical and clinical) will often have a bulk-tank SCC between 400 and 600k. A herd with a SCC over 1 million often has a significant herd mastitis issue lurking behind the scenes. There is an exception to this rule for goats. During the fall, or when milk production is low and does are drying off, does will have elevated SCCs as the udder goes through the drying-off process. In herds with high milk production or during spring and summer, the bulk-tank SCC should be under 1 million cells per mL. Sheep have the same SCC limit as cattle. Unfortunately, they also have the same propensity for subclinical mastitis as goats. This can make it very difficult to maintain a legal SCC and SPC. In both sheep and goat herds, managing PMO regulations is very difficult during the springtime when high numbers of ewes and does are freshening. First-fresheners and mature does and ewes can freshen with subclinical mastitis and elevate the bulk-tank SPC and SCC to illegal levels. If a dairy has 3 consecutive samples above the legal limits on any 1 test (SPC, LPC, Coli, SCC) they will lose their ability to ship grade A milk. It can be very difficult for producers to keep up with the rate of animals freshening and the bulk-tank counts during these times. Veterinary support is very beneficial and should be prompt in order for producers to maintain their ability to ship milk. It is not uncommon for creameries and milk barn service companies to recommend milk barn evaluations to look for wash-up problems, and this can waste valuable time when they should be evaluating does or ewes for intramammary infections. The most rapid way to find subclinical infections on a goat or sheep dairy is to perform CMT testing. This should be done during the milking process, after the animal has been prepped for milking, teats stripped 2 to 3 times, and prior to milking machine attachment. CMT-positive animals should be identified, milk cultured, and then either treated, the infected half dried, or culled.

This goat dairy was in violation for 6 weeks with the inspector, but had only 2 samples in violation (Table 1). We were able to isolate 8 first-fresheners with subclinical mastitis. The total milking in Herd 1 is approximately 320 does. Removal of the 8 doelings immediately dropped them into compliance. The creamery was encouraging them to break the milk barn down to find a wash-up or pipeline problem.

Herd 2, in addition to having a high SPC, also has a high LPC (Table 2). This herd has chronic problems with the control panel on the automatic wash program, resulting in ineffective amounts of chemicals being added to wash cycles. The result is a biofilm growth and milk residue left in the tank, which allows for thermophilic bacteria (LPC) and general environmental bacterial overgrowth.

Table 1. Milk quality parameters for Herd 1.

Date	Gallons	Milk fat (%)	Milk protein (%)	SPC	LPC	Coli
6/1	70.1	3.30	3.15	72,000	10	10
6/2	253.5	3.09	2.95	70,000	10	10
6/4	259.1	2.97	2.94	88,000	10	10
6/5	171.8	2.99	2.86	46,000	10	10
6/7	412.1	3.08	2.95	15,000	10	10
6/8	87.9	3.08	2.95	19,000	10	10
6/9	171.3	3.10	2.99			

Table 2. Milk quality parameters for Herd 2.

Date	# goats	Gallons	# milkings	Milk fat (%)	Milk protein (%)	Coli	LPC	SPC
5/16/2020	1069	2795	6.00	3.67	3.21	10	1500	130000
5/18/2020	1075	1888.7	4.00	3.67	3.21	10	1500	130000
5/20/2020	1075	1901	4.00	3.67	3.21	10	1500	130000
5/23/2020	1079	2889	6.00	3.67	3.21	10	1500	130000
5/25/2020	1079	1911	4.00	3.67	3.21	10	1500	130000
5/27/2020	1079	1900	4.00	3.82	3.28	10	60	16000
5/30/2020	1079	2434	5.00	3.82	3.28	10	60	16000

This is the same herd 1 month prior (Table 3). As you can see, the SPC and LPC are within legal limits but the SCC is approaching the legal limit. Due to the fact that this is a large herd, individual CMT testing is not feasible. The first step was to collect and send off individual string samples.

Once the strings with high counts are identified, individual CMT samples can be performed to locate the infected does. Bacterial identification via aerobic culture should occur at this time to determine what types of bacteria are present in the intramammary infections. *Staph aureus* is always a concern when SPC and SCC are both elevated, but coagulase-negative *Staph* spp are also commonly isolated from doe and ewe intramammary infections. In this herd, all 3 strings >1 million SCC were fresh doe strings (DIM<100).

Coliform counts can also rise in tandem with high counts related to wash-up problems. It is not uncommon to see an intermittent high Coli and LPC along with elevated SPC during situations where there are wash-up issues, worn

out seals, or anything allowing dirty milk to remain in the pipelines or tank. I have seen numerous situations where a herd had a high Coli count, but all other counts were within legal limits. In these specific scenarios, the producer was able to isolate 1 to 2 coli mastitis cases. This appears to be unique to goats. When manure contamination occurs or a wash-up is done without removing the milk filter, the Coli and SPC counts are elevated simultaneously.

In order to feel comfortable trouble-shooting milk quality issues on any dairy, it is helpful to understand the basic mechanics of how a milk barn operates. The system is simple once you are able to break down the parts and understand their function. It is not necessary to be a mechanic, machinist, or plumber. Veterinarians have a thorough knowledge of animal physiology and bacteriology. By combining that with milk barn layouts, one can effectively solve milk quality problems on small ruminant dairies.

Table 3. Milk quality parameters for Herd 2 including SCC.

Parameter	Value	Method	Date
IRMA		SMEDP, 16th Ed, 1992	4/22/20
Butterfat	3.73 % (w/w)		
Raw milk products	- -		
Protein	4.03 % (w/w)		
Lactose	4.38 % (w/w)		
Solids, non-fat	8.63 % (w/w)		
Total solids	12.36 % (w/w)		
Optical somatic cell count	1100000 /mL	SMEDP, 17th ed.	4/22/20
* Coliform - petrifilm	140 /mL	SMEDP 17th ed.	4/22/20
LPC	<10 /mL	SMEDP 16th ed.	4/23/20
Standard plate count	15000 /mL	SMEDP, 16th ed.	4/23/20

Table 4. SCC by milking string for Herd 2.

Date:	Sample ID	SCC (cells/mL)
4/11/20	A1	1,400,000
	A4	1,000,000
	B1	710,000
	B2	410,000
	B3	840,000
	B4	970,000
	C1	940,000
	C2	770,000
C3	1,200,000	
C4	870,000	