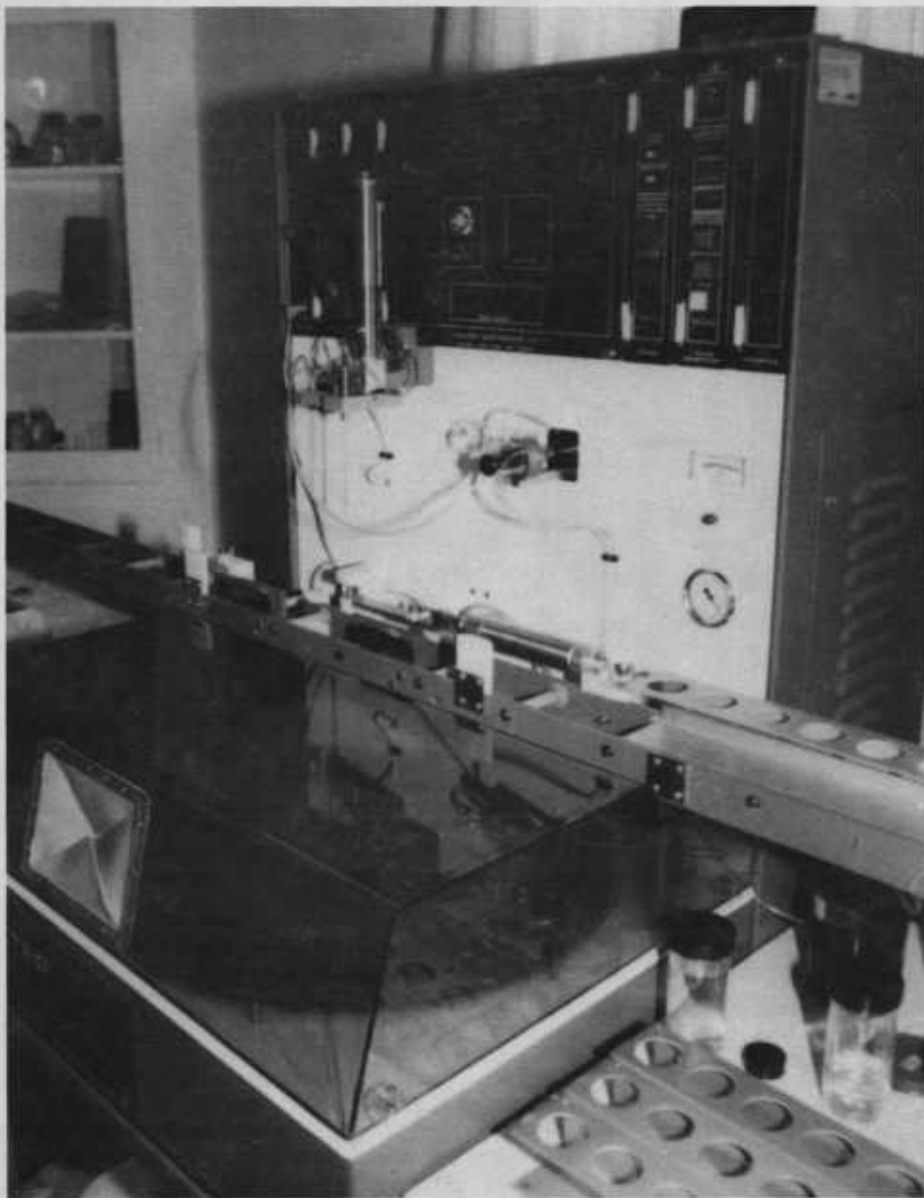


Somatic Cell Counts

What They Mean to Dairy Managers



Somatic cells are body cells. There are two sources of somatic cells in milk. Some are sloughed off from the interior lining (epithelium) of the body during the natural loss of secretory cells in the udder. There are always some of these somatic cells in milk.

Others are leucocytes or white blood cells. When we use the term *somatic cells* here, we basically mean leucocytes.

White blood cells are a part of the body's defense mechanism that helps prevent disease. They concentrate where tissue is injured mechanically or by disease organisms. When these cells are successful, they destroy the disease organisms, and the body or its injured part is restored to health.

A high leucocyte count in milk means either that the udder has been injured or that it is infected by a disease organism.

As a dairy manager, you face the constant challenge of keeping these somatic cell counts to a minimum in your herd. These counts affect your income, the *quality* of your milk—and the amount of milk you lose!

Counting somatic cells

One way of determining the number of somatic cells in milk is to count them with a microscope. In this method, a laboratory technician counts leucocytes in several areas of a milk smear on a slide (leucocytes are much larger than bacteria, so they're easy to separate from bacteria on a slide).

Electronic cell-counting machines provide a new way to count and identify somatic cells rapidly and accurately (see figure 1).

Figure 1.—The Coulter Counter will quickly and accurately measure somatic cells in milk.

Dairy Herd Improvement (DHI) central laboratories that have this equipment can determine udder health with precision. You should be interested in what the somatic cell counts mean and how you need to respond to them.

Of course, you can study individual cow records and respond where you see that treatment is needed, but we consider here only herd-average somatic cell counts.

Milk quality scores and what they mean

First, you should become familiar with the milk quality scores that are printed on the DHI Herd Total Report. Figure 2 shows the "Milk Quality" portion of an actual Herd Total Report (reproduced by permission). These reports use the *linear score system* to grade milk quality.

Note the section headed *% L2 SCORE (SCC)*. At the top of each column under this heading, you see a typed number and (just below it) a printed number. The typed number is the linear score (*L*). The printed number is the somatic cell count (*SCC*)—multiply each one by 1,000.

Next, note the number 48 printed out for this dairy manager in the 0-2/50 column. This 48 means that 48% of the first lactation cows qualify for this score.

All DHI centers are now using this linear scoring system. The linear scale (1 to 9) relates to somatic cell counts, which increase *geometrically* when infection occurs.

This means that the difference in somatic cell counts between linear 3 and 4 (for example) is 100,000, but the difference between 4 and 5 is 200,000. For each increase in linear score, there is a *doubling* of the number of somatic cells.

Figure 2.—This "Milk Quality" section of an actual DHI Herd Total Report uses the linear score system.

| MILK QUALITY | | | | | | | | | | | |
|--------------|------|-------|------------------|-----|-----|-----|-----|------|-------|----|---------|
| PERCENT CMT | | | % L2 SCORE (SCC) | | | | | | | | LACT NO |
| N & T | 1 | 2 & 3 | 0-2 | 3 | 4 | 5 | 6 | 7 | 8-9 | | |
| 500 | 1500 | 1500+ | 50 | 100 | 200 | 400 | 800 | 1600 | 1600+ | | |
| 100 | | | 48 | 34 | 16 | 2 | | | | 1 | |
| 97 | 3 | | 36 | 36 | 18 | 6 | | 3 | | 2 | |
| 83 | 13 | 4 | 17 | 35 | 22 | 13 | 7 | 4 | 2 | 3+ | |
| 93 | 5 | 2 | 34 | 35 | 19 | 7 | 2 | 2 | 1 | T | |

Table 1.—Linear score related to average cell count and lost milk yield

| Linear score | Average cell count | Lb milk lost/head/day | Lb milk lost/head/year | |
|--------------|--------------------|-----------------------|------------------------|---------------|
| | | | 1st Lactation | 2nd Lactation |
| 2 | 50,000 | 0 | 0 | 0 |
| 3 | 100,000 | 1.5 | 200 | 400 |
| 4 | 200,000 | 3.0 | 400 | 800 |
| 5 | 400,000 | 4.5 | 600 | 1,200 |
| 6 | 800,000 | 6.0 | 800 | 1,600 |
| 7 | 1,600,000 | 7.5 | 1,000 | 2,000 |
| 8 | 3,200,000 | 9.0 | | |

Because of this relationship, the linear score has these advantages over the simple somatic cell count:

1. Linear scores are less variable from month to month during a lactation.
2. Linear scores have a higher heritability than the somatic cell count. The heritability of lactation average linear scores is 25%.
3. Linear score has a normal frequency distribution. This means about half the cows in a herd will be above average and half below. Because the somatic cells increase *geometrically* for each single-number rise in the linear score, only 20 to 40% of the herd will be above the herd average.

4. The linear score is easy to use between herds for udder health comparison. This is not true for the somatic cell count (SCC). That's because the somatic cell count can be badly distorted by a few cows with very high counts.

Table 1 associates the linear score with average somatic cell count and average milk loss. A high linear score means udder damage and reduced milk production.

There are a few herds now that are below 100,000. Eventually, it will be possible to get herd average milk samples down to 50,000 cells. If you have one of these, you should be proud of your quality program.

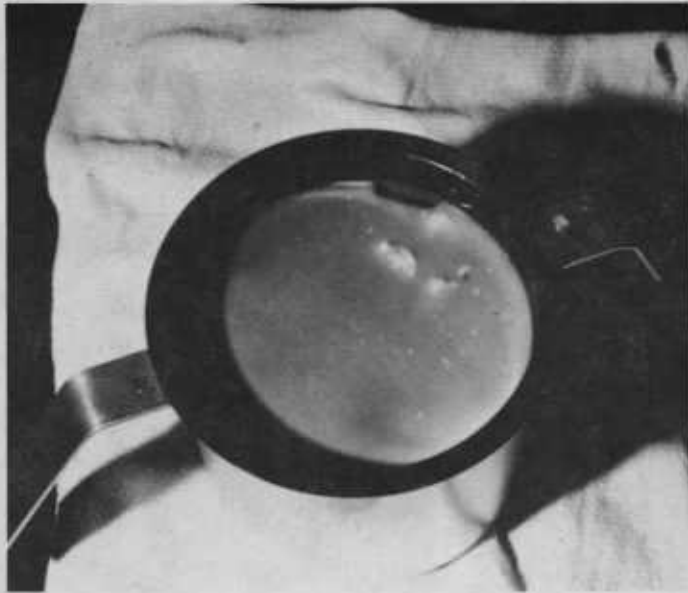


Figure 3.—*Left: Mastitis (udder infection) causes garget (clotted milk), which lowers both the quantity and quality of a cow's pro-*

duction. Right: The garget is barely visible in the strip cup this tester is using.

Recommended actions

These recommendations are based on the somatic cell counts in your comingled tank samples.

A. Fewer than 100,000 somatic cells

1. Thoroughly check your milking equipment twice a year and make routine checks in between.
2. Change inflations as recommended by the manufacturer.
3. Wash cows' teats with a disinfectant solution and wipe with *individual* paper towels. Use as little water as you can.
4. Use an approved teat dip solution.
5. Prevent mastitis by using a recommended antibiotic infusion on all dry cows.
6. Take routine cultures of bulk milk tank samples to your veterinarian or laboratory—to identify disease organisms at an early stage, before they get to be a problem for your herd.

B. 100,000 to 200,000 somatic cells

In this range, you can expect an average loss of 400 to 800 pounds of milk per cow per lactation. Use all of the recommendations in "A" above, plus these:

1. Treat all cows with a dry cow treatment as they go dry.
2. Treat acute cases of mastitis in lactating cows with an approved treatment. See figure 3. Work with your veterinarian and (through your veterinarian) the Oregon State University Veterinary Diagnostic Laboratory.
3. Sell for slaughter those cows with chronic cases of mastitis that do not respond to treatment.
4. Separate cows with mastitis from healthy cows and milk them last.

C. 200,000 to 400,000 somatic cells

It is estimated that 400,000 cells is about the average count in Oregon dairy herds. Those herds that *do* have

a bulk tank count of 400,000 cells average a loss of 1,200 pounds of milk per cow per lactation.

Management for the herd should follow those practices mentioned above ("A" and "B"), plus these:

1. Sell cows that don't respond to treatment. They often infect other cows.
2. Help is available from your local Oregon State University Extension agent. Perhaps a quality incentive program will encourage your milker to do better.
3. Work toward cleaner, dryer free-stalls or loose housing for all cows.

D. 400,000 to 800,000 somatic cells

If your test is in this range, you are losing an average of 1,800 pounds of milk per cow per lactation. Also, your somatic cell count is approaching 1,000,000—and at that point, the Oregon Department of Agriculture will degrade your milk.

If your herd has a count of 800,000 or higher, you have serious problems. Get professional help—through your veterinarian, your OSU Extension agent, and your milking equipment dealer.

Check your *whole operation*, including the loafing and feeding areas where udder injuries may occur. Review proper milking procedures with your milkers. The extra milk will pay for your extra efforts!

Summary

This publication briefly discusses what various somatic cell counts mean and how they affect your income through milk loss.

We've given a number of management suggestions to reduce your somatic cell counts and improve udder health.

There *are* dairy herds with somatic cell counts consistently under 100,000. Producers who achieve this level will realize more milk of a higher quality per cow.

Your customers deserve the best quality in their milk and dairy products!

The Oregon State University Extension Service provides education and information based on timely research to help Oregonians solve problems and develop skills related to youth, family, community, farm, forest, energy, and marine resources.

Extension's agriculture program provides education, training, and technical assistance to people with agriculturally related needs and interests. Major program emphases include food and fiber production, business management, marketing and processing, and resource use and conservation.

This publication was prepared at Oregon State University by H. P. Adams, Extension dairy scientist; Michael J. Gamroth, Extension agent (dairy), Marion County; and Donald Claypool, Extension dairy scientist. The depiction of trade-name equipment does not mean endorsement of such equipment by the OSU Extension Service, and the fact that other equipment is not depicted does not mean any discrimination against such equipment.

Extension Service, Oregon State University, Corvallis, O. E. Smith, director. This publication was produced and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. Extension work is a cooperative program of Oregon State University, the U.S. Department of Agriculture, and Oregon counties.

Oregon State University Extension Service offers educational programs, activities, and materials without regard to race, color, national origin, sex, or disability as required by Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, and Section 504 of the Rehabilitation Act of 1973. Oregon State University Extension Service is an Equal Opportunity Employer.
