Beyond The Bucket



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The Chemical Myth: Five Other Factors Impacting Milk Quality

KEY TAKEAWAYS

- For optimal milk quality, shift focus beyond solely blaming sanitation chemicals.
- Implementing precise water temperature protocols is fundamental to effective sanitation hot water heater size matters.
- A robust cleaning regimen relies on meticulously managed airflow and a high-performing vacuum system.
- Ensuring the functionality of all drainage systems is a prerequisite for preventing contamination and maintaining chemical effectiveness.
- Prioritizing cow cleanliness and strict milking hygiene practices is vital for minimizing bacterial introduction into the milk supply.



The Chemical Myth: Five Other Factors Impacting Milk Quality

In a previous role, I was spending time with a dairy nutritionist who was telling me about an experience he had with a dairy customer. This dairy was struggling with fresh cow issues and lagging milk production in early lactation animals, and he was brought in to see if it was ration-related. The dairyman was frustrated with his current program and wanted to make a change. I was interested to hear what sweeping changes the new nutritionist was going to make and saw this as an opportunity to learn. I wondered things like, "Where do you start? What minerals are you going to add/subtract? What supplements are you going to use? What ration changes are you going to make?".

He replied with "None, right away." He went on to tell me that when he gets called into a new farm, the first thing he does is walk and observe the cows, the feed, and how well the equipment works. He also checks in with management and learns how feeders are graded and how often management follows up on compliance items. Then, after those things are dialed, if the dairy was still struggling, he would adjust the ration.

The old sayings, "they respect what you inspect" and "you can't manage what you don't measure", apply not only to feeding programs, but also to the sanitation program for the milking facility.

When I get called into a dairy for high bacteria counts, the dairy owner/manager often blames the sanitation chemicals. I hear, "Your chemicals don't work! My counts are through the roof!" or "If you want my business from your competitor, you need to fix my counts; their chemicals aren't working!"

I often find that the chemical levels are actually a lot higher than they need to be because they are trying to compensate for either mechanical or management issues. The old saying "more is better" doesn't apply when it comes to chemicals. Here is a list of five factors that can affect the washing of the milking parlor that have nothing to do with chemicals.

1. WATER TEMPERATURE

This one is usually the simplest and easiest to fix. The largest part of the wash is done with the first rinse, which needs to be between 105-



120°F. However, any higher than 120°F and you risk burning the solids onto the equipment.

The other benefit of the initial warm rinse is that it heats the pipes up, which will improve the detergent cycle. The detergent cycle requires temps between 160-180°F to start, with the end temp (dump temp) around 120°F. Time and contact are important. If water temperature is colder than this, the solids can redeposit on the surface of the equipment, causing a buildup. If possible, it's also beneficial to do a hot acid rinse at about 150°F, which helps the acid work better and helps "sweep out" any solids left behind from the detergent cycle.

The size of the hot water system is important to a successful rinse cycle. The first rinse is usually sacrificed if the system is undersized, and can limit the number of washes available. Considering washing Hot water storage is important. Pictured above, we have one 1000-gallon hot water storage tank and two 100-gallon water heaters. Redundancy cannot be understated.

ARTICLE CONTINUED

milk storage tanks is also important when sizing a hot water system, as it can put a strain on the hot water quantity.

Upfront costs are significant when adding storage to an existing system. A dairy could consider costs between \$27,000-\$30,000 all-in for the cost of a 500-gallon glass-lined hot water storage tank and a water heater, as well as the installation, materials and freight to get the system up and running. However, while that is no small investment, adding that storage is easy, and in the long run, it can save money in lost bonuses.

2. AIRFLOW MANAGEMENT

Air is an integral part of the cleaning process. We need measured air to be injected into the lines to create a slug, which is important because the whole pipe is a milk



3. VACUUM SYSTEM

contact surface and needs to be cleaned. If we flooded the line, we would use too much water. Often overlooked, the vacuum system is a critical which would cause us to use too many chemicals. If we use too much air, then we affect the water temperature. If the ambient air temperature is 80°F, and the water temperature is 160°F, then we see temperature fluctuation due to contact between the water and the air. Air also allows us to create water particles in the system that allow for sanitation chemicals to work into the vacuum system, which is also considered a milk contact surface.

The air in the system must be carefully measured with the air injector. Otherwise, we can get inconsistent slugs, caused by air leaks from jetters or hoses, resulting in poor cleaning and water temperature loss.

part of the wash process. Too little vacuum results in inconsistent slugs and a poor system wash. We need 3 CFM per machine to make sure that we have enough vacuum to milk the cows. We need an additional 35 CFM to make sure that we have enough vacuum to operate all of the machines during the CIP process. If we have air leaks, then we would not have the required CFM to wash the system effectively.

Proper maintenance and inspection of the vacuum system are important not only to the milking process but also to the CIP process. Making sure that all vacuum lines are inspected and cleaned on a regular basis is extremely important. All vacuum lines are milk contact surfaces and when the milk is atomized, it can travel throughout the whole system. Primary and back Delaval LVP 8500 vacuum pumps installed for a DeLaval 90-stall rotary. This rotary has a requirement of 305 CFM on air flow. All of the PVC is considered a milk contact surface.

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Jersey cows on a 90-stall Delaval rotary, post milking.

4. DRAIN FUNCTIONALITY

I'm not referring to the floor drains in the milk room or parlor. I am referring to the drains on the vacuum line, CIP line, milk line, and receivers, which are often overlooked as a cause of high counts. If we do not properly drain the lines, we can expect buildup and mixing of chemicals and milk. We know how to make cheese, and the vacuum line is not the place to do it!

Another reason drains are important is that undrained lines can create chemical reactions, such as making chlorine gas. When acid and chlorine are mixed, they create a noxious gas that can cause severe health issues. It can also decrease the effectiveness of the wash chemicals. If there is milk residue in the line, the proteins will negate the effectiveness of the chlorine, and this can cause a protein buildup. If there is chlorine/alkaline residue in the lines when the acid is added, then we neutralize the acid and waste time and money, as well as increase the presence of milk stone in the line where bacteria thrive.

Properly functioning drains in all lines are essential to prevent cross-contamination and ensure the effectiveness of chemicals.

5. COW CLEANLINESS

Bacteria come from three places: dirty equipment, outside the system, and from inside the cow. Clean, dry cows are probably the most important part of the sanitation process. If the cows are dirty and wet, then we are inviting bacteria into the milk stream during the milking process. If you are using a cow wash, it is important to make sure the cows are entering the parlor dry and free of manure and dirt. Using an FDA approved sanitizing pre-dip, like Delaval's Opti-blue product, will also help mitigate the spread of mastitis and pulling bacteria into the milk. Environmental bacteria can also be introduced into the milk if proper milking hygiene procedures are not followed.

The importance of milking clean, dry cows cannot be overstated in a complete milk quality program. Making sure that the milkers are properly trained and graded (like the feeders) is critical to minimizing bacteria in the parlor.

IN CLOSING

While chemicals are an important part of an overall sanitation program, they are just one part. When I assess a barn for milk quality issues, much like what the nutritionist taught me, I look at all aspects of the system. Often, chemicals are not the issue.

At TDSG, going beyond the call means partnering with your operation to support through service and training to improve your dairy's milk quality and maintain on-farm excellence.



The Dairy Solutions Group (TDSG) is a dairy equipment provider with a focus on high-end solutions based around service. maintenance and full parlor installations. The TDSG team focuses on building long-term relationships with producers, with the goal of providing mutually beneficial dairy services for vears to come as we strive to go beyond the call for our dairy customers. For more information. visit www.tdsg.us.