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Risky business

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Indirect risks

- High somatic cell counts have the potential to increase bacteriological risks, especially if pasteurization fails.
- Antibiotic residues jump two to seven times with SCCs above 400,000.
- In a Midwest study, 27% of dairy producers who consumed raw milk produced on their farms had one or more pathogenic bacteria in their bulk tanks.

The good news is that elevated levels of somatic cells in milk, disgusting as they are, won't hurt you. The bad news is that somatic cell counts (SCC) above 400,000 cells/ml are a harbinger of poor on-farm hygiene and pose increased risks of bacterial contamination and antibiotic residues in fluid milk and other dairy products.

"...direct negative effects on the safety of humans have not been documented as a result of consuming dairy products made with milk having high SCC," concludes a National Mastitis Council (NMC) white paper. The paper is authored by Joe Hogan, an Ohio State University mastitis researcher and NMC first vice president. It was presented at this year's annual NMC meeting in Orlando in January.

Hogan also acknowledges that pasteurization and antibiotic residue screening further minimize health risks from high SCC milk. But, he says, such measures don't totally eliminate the risk. And, ironically, dairy producers and their families and employees may be at greatest risk, particularly if they consume unpasteurized milk from their home bulk tanks. Those risks include:

- Human infection with bovine streptococcus agalactiae despite pasteurization, through other paths of cow-to-human infection.
- Heat stable enterotoxin produced by Staph. aureus bacteria have been implicated in food poisoning.
- A positive relationship between the SCC of bulk tank milk and antibiotic residues. Some residues could slip through since all milk is tested for penicillin drugs, but only randomly tested for other drugs.

Hogan also acknowledges that there is currently no way to estimate "the magnitude of decreased risk to consumers that would result from lowering the maximum limit of SCC in bulk milk.

"However, most reports indicate that lowering limits of SCC will positively influence acceptability and suitability of milk as measured by improved safety, milk quality and value-added products," he says.

Strep infections. Strep. infections are so pervasive in women, the Centers for Disease Control and Prevention now recommends prenatal screening of all pregnant women. It further recommends antibiotic treatment of those testing positive.

Such treatment has reduced the infection of infants from 1.7 cases per live births in 1993 to 0.4 cases per 1,000 births in 2002. Depending on when infants are infected, mortality can range from 5% to 15%. Other problems can include pneumonia, meningitis and moderate to severe neurological damage to newborns.

Through DNA typing, at least a portion of these Strep. infections can be traced to dairy cattle, says James Leigh with the Institute for Animal Health in Compton, England. One such bovine strain, ST-17, makes up 10% of Strep. bacteria isolated at the time of birth. But it's a nasty, aggressive bug: ST-17 is currently responsible for about 30% of Strep. infections in human babies.

Pasteurization of milk, Leigh says, minimizes the risk. Nonetheless, this still leaves an at-risk population, "namely, those handling dairy cattle and/or raw milk [and raw milk products] from where new introductions could stem," he says.

Staph. aureus enterotoxins. Mastitis experts say Staph. aureus infections are common in dairy herds and are among the most difficult to eradicate. While Staph. aureus bacteria are killed with pasteurization, a large percentage produces enterotoxins that are not inactivated with heat treatment.

In fact, the most recent large-scale outbreak occurred in 2000 in Japan, caused by the consumption of low-fat milk reconstituted from skim milk powder contaminated with Staph. aureus enterotoxin A, says Steve Oliver, a mastitis researcher with the University of Tennessee. Food poisoning caused by Staph. aureus enterotoxins is characterized by quick onset, cramps, severe vomiting and, in some cases, toxic shock.

Other bugs. USDA's National Animal Health Monitoring System Dairy 2002 survey looked for food-borne pathogens in bulk tank milk samples from dairy farms in 21 of the major dairy states.

Coliforms were found in 95% of the samples. Listeria monocytogenes was isolated from 6.5% of samples, with 93% of the isolates commonly found in humans. Salmonella was found in 2.6% of the samples.

In addition to these bugs, another study in South Dakota and Minnesota found Campylobacter jejuni and Y. enterocolitica. In this particular study, 27% of the dairy producers who consumed raw milk produced on their farms had one or more pathogenic bacteria in their bulk tank milk, Oliver says.

Antibiotic residues. The potential risk from antibiotic residues comes primarily from fear of the creation and transfer of antibiotic resistant microorganisms to humans.

Pasteurization reduces the number of bacteria in milk to negligible levels, but will not reduce the level of antibiotic residues. Milk can also be contaminated with fecal pathogens that exhibit resistance to antibiotics, and raw, unpasteurized milk has been implicated as a vector for transferring these bugs to humans, says Pam Ruegg, a University of Wisconsin mastitis specialist.

In a survey of Wisconsin producers last year, 95% reported using antibiotics in their herds within the two months prior to the survey. Eighty percent of that usage was to treat mastitis.

All tanker loads of milk are now tested for penicillin residues. The good news is that the number of hot loads of milk has decreased steadily since 1999, with 30% less milk being discarded by 2003. However, the number of positive producer samples has fluctuated between 0.14% and 0.18% over those five years. And there was a slight increase in pasteurized milk products that tested positive in 2003, which is the latest data available. Research that was conducted in Wisconsin and Ohio also shows that the higher the somatic cell count, the higher the risk of antibiotic residues. The risk of residues was two to seven times higher in Wisconsin when SCC was above 400,000. Similarly, in Ohio, the risk of residues was two to five times higher.

European strategy. In Europe, where a higher proportion of milk and cheese is sold unpasteurized, SCC standards have been at the 400,000 level for a number of years. As early as the mid-1980s, fluid milk that was heat-treated was required to contain no more than 400,000 cells/ml. Less than 20 years later, in 1998, that standard was applied to all classes of milk.

In Germany, some dairies that sell unpasteurized milk to the public now have an SCC limit of 300,000, reports Walter Heeschen, a mastitis researcher with the University of Kiel, Germany.

While the move to lower cell counts has been controversial in Europe, Heeschen says there is consensus on the following points:

- SCC is a general indicator of herd health.
- Elevated SCCs can have a negative impact on dairy product quality.
- Elevated SCCs can have safety implications due to the potential for Staph. aureus enterotoxins and higher rates of antibiotic residues.

Drinking it raw

An online survey of 253 dairy producers in early January revealed that nearly half consume unpasteurized milk from their own bulk tanks. Note that the survey is not statistically valid, since it was only sent to FARM JOURNAL readers with email addresses and who had earlier indicated an interest in dairy. Responses were cut off after 301 responses. Forty-eight of the respondents were not dairy producers, and were not included in the tallies.

The dairy producer respondents report there were 169 children residing in their households. Of those producers who reported drinking unpasteurized milk, 48% had children in their households.

About 20% of the dairy producers also reported supplying their unpasteurized milk to employees, relatives, neighbors and others. Only 10 responding producers acknowledged herd cell counts above 400,000. Of those 10, seven said they drink unpasteurized milk from their own farms, three have children and one supplies milk to others.

One more time

Sisyphus, the legendary Corinthian king who was condemned to roll a boulder up a hill only to have it come crashing down, wasn't this persistent. For the fifth time over the last six bienniums, the National Mastitis Council will propose lowering the U.S. somatic cell count limit to 400,000 cells/ml at this spring's National Conference on Interstate Milk Shipments (NCIMS).

The NCIMS is the industry's forum for agreeing to changes in the Pasteurized Milk Ordinance, which governs interstate Grade A milk shipments and is enforced by each state. Any changes to the PMO must also be approved by the Food and Drug Administration.

In all of the previous submissions to lower the cell count to 400,000, the measure failed mainly because opponents had argued that there was no clear health threat that could be demonstrated.

That could be problematic this year as well, NMC officials acknowledge. But the indirect effects of high cell counts, principally higher mastitis infection rates and higher risks of antibiotic residues, are real, they say.

"Do we believe that lowering the cell count to 400,000 will have a positive impact on public health? We do," says Leo Timms, an Iowa State mastitis specialist and NMC's immediate past president.

The proposal will also include an implementation date seven years out, giving dairy producers until 2012 to comply. However, how the 400,000 level would be reached—in steps or all at once—is being left up to NCIMS and the states themselves.

Some fear that lowering the SCC limit will put producers out of business. But experience in Canada showed no escalation in farm exits above normal rates of attrition. There, the SCC limit was reduced from 800,000 to 500,000 in 50,000 cell annual increments over six years. The 500,000 SCC level was reached in 1995.