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BUG WARS

THE PHANTOM MENACE

Every thing you need to know about bacteria, and how they affect your milk quality.

Bacteria are what causes hygiene-related milk quality grades. These tiny, single celled critters exist naturally all around us. Usually we more or less ignore bacteria, discounting them as an irrelevant and theoretical menace in much the same way as we think about them at all. Which generally we don't.

However, if we take bacteria *entirely* for granted, there's every chance they will rise up from the foul crevices in which they lurk, and cause us untold trouble and misery. Again, comparison with the Alliance is irresistible.

WHERE DO BACTERIA COME FROM?

Everywhere. Dirt, water, the air, manure, animals, your skin, under the toe strap of your jandals, and any kind of organic matter including milk. These microscopic munchers are all over the place. That's normal, and even healthy (except perhaps for the jandals). Our challenge in dairy hygiene is to keep the "normal" bacteria from increasing to numbers that will threaten milk quality.

THE CARE & FEEDING OF BACTERIA

Bacteria love a warm, moist environment with abundant food, just like we do. That's why we go to Fiji for holidays. But what sets bacteria apart from us, is the rate at which they breed. In ideal conditions, they can double their numbers every 20 minutes. Which means that just one bacterium can become billions in just a few hours. Say between the morning and evening milkings of a single day. But you don't ever start with just one; fresh, healthy milk already contains several thousand bacteria per ml. Left unrefrigerated, it can deteriorate from finest quality to a maximum demerit points grade in less than a day.

MAKING THE GRADE

Bacteria don't multiply at low temperatures... well, the ones we're concerned about don't. So if the milk is OK out of the cow, and your pre-cooling and refrigeration quickly gets it down to below 7°C (at which temperature bacteria lose interest in reproducing - just like us), where do the huge numbers of bugs that cause grades come from? The most common explanation is from contamination. Any milk residue left in your plant after cleaning can,

between milkings, breed and support zillions of bacteria. These are released into your next milking, thus contaminating it. One teaspoon of rotten milk can contain enough bacteria to grade several thousand litres of milk.

Another source of excess bacteria is from the environment. Mud and manure are riddled with bacteria, and sometimes silage too. These environmental bugs often end up on the outside of the udder of your cows. They are then sucked into the milk by the action of the liners, especially if you've hosed the udders before milking and left water draining down to the teats.

BACTOSCAN - BUG COUNTING WITH A BROAD BRUSH

Bactoscan is not the name of a type of bacteria; it's a type of test. The Bactoscan test measures the *total bacterial content* of your milk. It replaces the older, and much slower, APC or SPC tests. Bactoscan grades are caused by one of the following four things (in the order in which they're most likely to occur).

- ◆ A serious hygiene fault on the plant, which is breeding and supporting enough bacteria to contaminate your milk.
- ◆ Mastitis caused by environmental Strep bacteria (nearly always *Strep.uberis*).
- ◆ A cooling or refrigeration fault, which is allowing the "normal" bacteria population of your milk to rapidly increase.
- ◆ Environmental contamination of your milk from bacteria being sucked off the outside of the teats during milking.

A Bactoscan result of A+ relates a total bug count of under 10,000 per ml of milk. That's the limit; your actual total count when you get

an A+ result is more likely to be only 3-5,000. Which explains why you can suffer a Coliform grade or a Thermoturcic grade (see below), while still maintaining as A+ Bactoscan result. A thousand or so coliforms or thermoturcics may not be enough to push your total bacterial count above the 10,000 per ml limit for A+.

COLIFORMS IT'S ENOUGH TO MAKE YOU SICK

Coliforms are the bad boys of bacteria. And they love unhygienic conditions. While healthy milk naturally contains some bacteria, none of them are coliforms (food contaminated with coliforms will make you sick). Coliforms come from dirt, manure and filthy water. There's always a ready supply of coliforms hanging around any dairy farm, playing loud rap music and giving the fingers to the other microorganisms. So it's not unusual for a few of them to get into your plant during or between milkings. But if there's no milk soil in there for them to feed on, they won't survive. Inside your plant, coliforms are attracted to soft, rotten milk soil, and they don't need much to get established. A bit of "cheese" under a perished cone seal, a set of slimy liners caused by a blocked jetter, or even a bit of rotten milk in the air line after a split liner - any of these is enough to cause a bad coliform grade.

Coliforms are also often the first group of bacteria to take advantage of poor cooling or refrigeration. However, they are the easiest bugs to kill with heat, so an immediate response to a mysterious coliforms grade or alert is to check your hot water temperature, and to do two hot washes per day. Coliforms also smell very nasty, so while you can't see them, you can often find them with your hooter.

THERMODURICS - SOME LIKE IT HOT

Thermodurics are a group of bacteria that can tolerate high temperatures. The heat from your hot water won't kill them, and they are also able to survive the pasteurisation process. So they can end up in processed milk and milk products, causing spoilage and reducing shelf life.

Three things cause thermoduric grades:

- ◆ Old, hard milk soil, especially on the upper surfaces of milk lines and also where there are visible protein residues in milk vats. Both of these faults are caused by inadequate wash contact.
- ◆ Environmental contamination off the teats, involving spore-forming thermoduric bacteria from silage, and sometimes from dirt.
- ◆ Combinations of the two above causes.

Thermoduric grading standards in New Zealand are now very demanding. It is quite possible to suffer a thermoduric grade from a hygiene fault that is *entirely invisible* to the naked eye. And of course the spores from silage are invisible as well. So thermoduric grades can be very frustrating, because as often as not the grade is entirely unrelated to the apparent standard of hygiene of the plant. And, just to make sure you're *totally* pissed off, it takes four days for your test results to come through.

HOW TO CATCH BACTERIA IN MOUSE TRAPS

You can't. They're just too small. Bacteria can hold the Microorganism Olympic Games on the point of a pin, and that includes space for parking all their weeny little buses and cars. If they were bigger, say the size of rats, we could go after them with cricket bats. Or you could do your milking plant inspections with a shotgun and a golden retriever.

So if you can't see bacteria with the naked eye, how can you find them? Here's a four-step process that is virtually foolproof:

- ◆ First, do a really thorough plant inspection; you won't see any bacteria but you may see the milk soil deposits supporting them.
- ◆ If you don't find the problem, ask your dairy company for more information - the lab can usually tell you if your Bactoscan problem is mastitis, or if your thermoduric problem is environmental. And get Agmax involved at this stage; call us on our Freephone number **(0508) 524 824**.
- ◆ Next step is to use a tool that can see the bacteria - you can choose between the Agmax Hygiene Test Kit (\$30) or an electron microscope (\$500,000).
- ◆ Finally, if you still haven't found the problem, call Agmax and we'll set up a milk sampling system so the lab can find out exactly where (or when) the bacteria are appearing in your milk.