Tackling Bactoscan Problems

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Holstein Journal – December 2003, p80

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A high Bactoscan Count can affect the dairyman both directly, in the form of a penalty system, and indirectly, through the production of a low quality, poor shelf life milk product that is less acceptable to the consumer and manufacturer. Milk buyers also want low levels of bacteria to minimise and food safety problems. At present, the majority of dairy companies pay a premium for milk with a Bactoscan level under 40,000.

Penalties are imposed if the Bactoscans are high, and thresholds vary between milk buyers. There is no reason why every herd cannot have a Bactoscan Count below 30,000 all year round. High Bactoscans are easy to resolve providing you can identify the source of the problem. This is described in this article. The good news is that high Bactoscans can be resolved very quickly compared to herd cell count problems which take time as the cow is the source of the problem.

Nearly every milk buyer now has replaced the TBC (Total Bacteria Count) with the Bactoscan test. A comparison of the two tests is shown in Table 1. The Bactoscan measures the number of bacteria in milk using an electronic method. The test takes some 10 minutes compared to 72 hours for TBC. It is far more accurate and measures all bacteria, rather than counting colony forming units. It also measures psychrotrophs (bacteria which grow under refrigerated conditions) and a range of dust organisms which were not picked up by the old TBC. There is no consistent numerical numeric correlation between the two tests, however, as a general rule, the Bactoscan is between three and four times higher than the TBC. An added advantage of the Bactoscan is that the farmer can be notified of a high result quickly so he can take action.

There are three sources of bacteria in milk; mastitic organisms from the udder, environmental contamination and a dirty milking plant.

Mastitic Organisms

Mastitis is a common cause of bacterial contamination. Milk from a healthy quarter will have low bacterial levels, usually under 1,000/ml. When quarters become infected with clinical mastitis, the numbers of bacteria can increase substantially. *Streptococcus agalactiae* is shed in extremely high numbers from clinically infected quarters, up to 100,000,000/ml. *Strep uberis* can produce the same effect.

In herds infected with *Strep agalactiae or Streptococcus uberis*, it is easy to understand why the Bactoscan can fluctuate. Take a 100 cow herd, producing 1500 litres of milk per day with an average Bactoscan of 25,000/ml; the addition of 2 litres of mastitic milk from a clinical *Strep agalactiae* or *uberis* cow can increase the Bactoscan to over 150,000/ml!

The presence of Strep agalactiae in bulk milk is of great significance and control measures and action are necessary. Apart from basic bacteriology, there are many other useful tests which can be carried out such as a Staph aureus Count and the Total Staph Count. The Total Staph Count measures all Staphs in milk , whether they come from inside the udder or from teat skin. The Staph aureus Count gives an indication of the level of infection present in the herd.

Environmental Contamination

The most likely cause of environmental contamination is through poor teat preparation before milking combined with poor environmental hygiene. Teats must be clean and dry before milking. Dirty teats not only contaminate milk but also increase the likelihood of environmental mastitis. High levels of environmental bacteria will reduce the shelf life of milk, and hence its acceptability by processors. The Coliform Count measures the level of environmental contamination. A result of under 20/ml indicates adequate udder preparation. Counts over 20/ml indicate a need for improvement.

Contaminated teat surfaces come about as a result of an unhygienic environment for the cows combined with poor premilking preparation, most commonly from washing but not drying teats before attaching the milking unit.

The type of winter bedding is also important. Sawdust and wood shavings can become rapidly contaminated with up to 1,000 million environmental bacteria per gram of shavings 24 hours after bedding down. The Psychrotroph indicator measures dust organisms and a high result may indicate dirty or inadequate levels of bedding. In the winter months, management and diet will both affect the condition of cows entering the parlour. In well run dairy herds, where there is plenty of clean well bedded accommodation, cows should remain clean throughout the housed period.

Milking Equipment

Poorly cleaned milking equipment will result in milk films building up inside the system. These allow thermoduric bacteria to multiply. Thermoduric bacteria can withstand pasteurisation, i.e. temperatures over 63°C, if they have a supply of nutrients such as a milk film. The number of thermoduric bacteria can be measured using the Laboratory Pasteurised Count, or LPC. Levels over 175cfu/ml suggest a wash-up problem.

The most common cause of a wash-up problem is a boiler failure and the water is not hot enough. Other common faults include; insufficient volumes of wash solution, rinsing the plant with cold water prior to the hot circulation wash, soil build-up in dead end areas, blocked wash jetters or air injectors and weak wash solutions.

How to deal with a high Bactoscan problem

Bactoscan problems can be resolved rapidly *provided the source of the problem can be identified.* Bulk Tank Analysis is an essential step to identify the cause of the problem. Different labs carry out different tests and it is essential that you send your milk sample to a lab that can identify all the problems areas.

This test can check the efficiency of the wash-up routine, premilking teat preparation and milking hygiene, and also identify all bacteria, and therefore their origin, in milk. Some of these bacteria may pose a threat not only to the Bactoscan result but also may give an early warning to a cell count problem in the future. Table 2 gives an example of such a result. A farm visit is often necessary in order to advise on specific areas that need to be improved and addressed such as premilking teat preparation, wash-up routine and mastitis detection.

968 words + tables below + photos (dirty teats, soil in milking system, clean recorder jar)

Table 1. Comparison of TBC and Bactoscan

	Bactoscan	**TBC**
Measures	All bacteria	Colony forming units
Time	10 minutes	72 hours
Accuracy	+/- 10%	+/- 30 – 50%
Psychrotroph measurement	Yes	No
Correlation	Approx. 3 - 4 x TBC	

Table 2. Example of the information from Bulk Tank Analysi

	Result	**Target**
Herd SCC [from milk statement]	180,000 and rising	< 150,000
TBC	12,500	< 5,000
LPC	390	< 175
Coliform Count	12	< 20
Strep uberis Count	1,200	, 200
Staph aureus Count	200	< 20
Bacteria cultured	Staph aureus, C. bovis, Strep dysgalactiae & uberis and E coli.	

Comments;

The TBC is above target at 12,500. The Coliform Count is low and indicates good premilking teat preparation. The high LPC indicates a wash-up problem. The Staph aureus count is very high. The presence of C. bovis suggests a problem with post milking teat disinfection. The presence of Strep dysgalactiae suggests damage to the teats. The Strep uberis Count is elevated and this may be due to subclinical or clinical infections entering the bulk supply.

A large number of problems have been identified from this sample, many of which will also affect the herd cell count. All the above need to be addressed, especially as the herd cell count is 180,000 and rising.