Quality Management, Inc.

Fall Newsletter 2014

Unrepresentative Milk Tanker Sampling
A Hidden Cost to the Dairy Processing Industry

Unnecessarily the producer side of the dairy processing industry has to bear the cost of a dumped load of milk because of a positive drug residue test. Unfortunately the producers continue to shoulder this cost when the testing is performed on a sample that is not representative of the milk on the load. Even when a final follow-up HPLC testing on the load validates that there was no drug detectable in the milk, failing the first drug residue test requires dumping the load.

In one case, an investigation of all the facts associated with the rejection of the load showed that the sample pulled at the plant was not representative of the milk on the load. The load was a hold-over load that was assembled one day but not delivered to a plant until the next day. The butterfat was in the 7 to 8 percent range when the load was sampled at the plant. The high butterfat in the test sample, if not the main cause for the false positive result, was certainly a major factor in rejecting this load on a false positive test. The HPLC follow up testing validated that the test was indeed a false positive.

To help eliminate this issue of plants pulling unrepresentative samples from tankers for testing and then rejecting milk on invalid test results from testing the unrepresentative sample, the industry could adopt the use of QMI tanker side sampling ports. These ports have NCIMS approval to obtain a sample of the tanker for (AppN) testing. The QMI tanker side-sampling ports eliminate the stratified high butterfat issue.

The use of the QMI tanker side-sampling ports also can help with the potential safety issue of having to climb up the tanker's outside ladder in all kinds of weather conditions.

Plants that run bacteria and PI tests to evaluate the quality of the milk also are getting invalid results when testing the unrepresentative samples. They are then making decisions about the load that are based on invalid results from testing the unrepresentative samples. The testing can be performed correctly. However, when you start with an unrepresentative sample you will usually get invalid results, wasting time and money.

It is the industry's choice; continue to deal with invalid test results that are arrived at by testing samples that are not representative of the milk on the load, or adopt the proven solution of sampling the tankers by using the QMI tanker side sampling ports.

Sample milk tanker trucks safely and accurately with the QMI® Aseptic Sampling System

www.qmisystems.com

QMI Offers An Easy Method of Monitoring Heat-Resistant Psychrotrophic Bacteria In Fluid Milk

Photo A

QMI Aseptic Sampler and QMI Sample Bag Sampling Pasteurized Milk at the HTST

In previous newsletters QMI pointed out that increasing the quality of fluid milk is dependent on controlling heat resistant psychotrophic (HRP) bacteria. For example, researchers at Cornell University conducted a study which found that 50% of milk sample counts were greater than 1 million after 17 days of refrigerated storage. These researchers found that gram-positive rods made up 87% of the bacterial colonies analyzed. These bacteria were primarily Paenibacillus and Bacillus species which are spore-forming bacteria that can be psychrotrophic (capable of growth at refrigerated temperatures).

Improvements in engineering, sanitation and quality control programs in the dairy plant drastically reduced gram-negative post pasteurization contamination. Reducing the amount of competition from gram-negative contamination has allowed the growth of gram-positive bacteria (HRP).

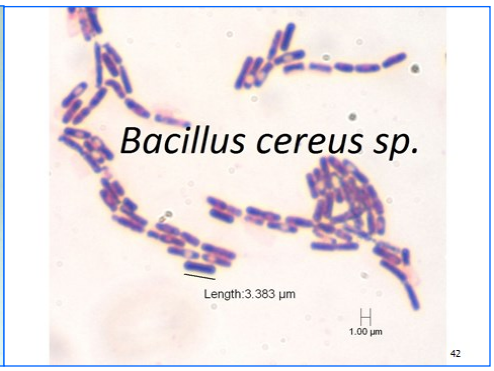
QMI speculates that the primary source of HRP bacteria is raw milk handling equipment. Several factors lead us to support this speculation:

1. *Bacillus* bacteria, the primary organism involved, tend to form biofilms,
2. The cold environment of the raw milk handling equipment favors psychrotrophic bacteria,
3. Stress, such as the removal or reduction of nutrients and water can result in the bacteria sporulating,
4. Effective sanitation of raw milk handling equipment is often neglected,
5. The moist conditions favor sporulation, and
6. Contamination rates as low as 1 bacteria per liter could result in quality defects in pasteurized milk.

Photo B

QMI Aseptic Sampler, Peristaltic Pump and QMI Sample Bag Sampling Raw Milk While a Truck is Unloaded

Effective monitoring of HRP bacteria can be achieved with the QMI Aseptic Sampling System. Monitoring trucks can be achieved with the QMI Truck Sampling System (see photo A) or with the QMI Aseptic Sampler and peristaltic pump (see photo B). In addition, this sampling method can produce a very accurate component sample.



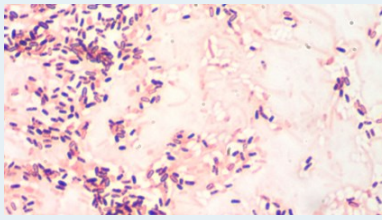
To determine if farm bulk tanks and/or tanker trucks are sources of HRP, QMI suggests the QMI Heat Resistant Psychrotroph Test. This test involves:

1. Aseptically collecting a sample of raw milk using the QMI Aseptic Sampler, a peristaltic pump and a 2L QMI peristaltic bag,
2. Lab pasteurize the sample in a dilution bottle at 75°C for 20 minutes,
3. Place sample in a 45°F incubator, and
4. Determine Standard Plate Counts at the end of code. Identify bacteria using gram-staining procedures for counts over 1 million.

To determine the presence and effect HRP bacteria have on dairy product quality, QMI suggests the following procedures:

1. Using the QMI 2L Composite Sampling Bag and Aseptic Sampler, aseptically obtain a 2L sample of product at the High Temperature Short Time (HTST) (pasteurizer), either with a U-bend equipped with a QMI Sampler or in a QMI elbow.
2. Incubate the bag for 18-24 days (end of code) at 45°F,
3. Conduct a Standard Plate Count, and
4. Identify the bacteria using gram-staining procedures for any counts greater than 1,000,000/ml (gram positive rods would indicate heat resistant psychrotrophs).

U-Bend with QMI Sampler for Sampling Pasteurized Milk at the Flow Verter Panel at the HTST



Paenibaccilus sp.

These bacteria are common heat-resistant psychrotrophs (HRP) found in pasteurized milk. It appears to be gram-negative in staining procedures but is actually gram-variable

CASE HISTORY - Improved Shelf Life in Fluid Milk

A QMI customer has a very effective quality control program that practically eliminated post-pasteurization contamination. The Standard Plate Counts, Coliform Counts and 7-day keeping quality test counts were always within specifications. However, the milk quality at the end of code was out of specifications. There were product quality defects and high bacteria counts, on products stored at 45°F for 25 days.

To correct this problem, the procedures outlined above were implemented. Samples of raw milk from incoming trucks were lab pasteurized and incubated at 45°F to end of code at which time samples were analyzed for total bacteria counts in the bacteria ID. Also, 2L bag samples were collected at the HTST and stored to the end of code. Then bacteria from high bag samples or high product samples were analyzed; both showed gram positive rods. With this information it became clear that it was necessary to implement a more effective sanitation procedure for incoming tanker trucks and the raw silos at the plant. These procedures enable the dairy plant to achieve the specifications at the end of code that they require.

Profile of Mark Schwab
New General Manager at QMI

Mark Schwab
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QMI welcomes Mark Schwab as our new General Manager. Mark has worked in the contract analytical testing field for 18 years and has been an integral part of the testing laboratories growth. Mark received his Bachelor of Arts degree from the University of St. Thomas in 1993 and then pursued a Master Degree in physical chemistry at North Dakota State University. Mark has a solid understanding of establishing management systems that has led to the growth of multiple analytical testing laboratories. Mark is knowledgeable in the implementation of many regulatory guidelines used in today's industries such as ISO, cGMP, GLP, USP, and EPA. In his previous position, Mark served as the company's Technical Director and Director of Analytical Chemistry. He was responsible for the overall product flow of the laboratories that provided services to the pharmaceutical and medical device markets. Mark was also a Technical Advisory Group Member for the Association for the Advancement of Medical Instrumentation (AAMI). In addition to his technical roles, Mark also has a solid understanding of the sales and marketing process and was credited with identifying new business opportunities with his previous employer. Mark is a customer focused leader and is eager to have the opportunity to meet and work with you. We are excited to have Mark on our team.

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