

Making Sanitation Your New Year's Resolution



Image Courtesy of Taylor Johnson, 2022

Elevated microbial counts ending up in your finished product?

Billions of dollars are spent on routine microbiological testing in the food industry each year. Samples are typically analyzed for both internal quality and regulatory programs. All of this money and effort is intended to support the production of safe and wholesome food for the consumer, but that requires that we watch for trends and investigate them – even when it is inconvenient. [Read more to find out what might be lurking inside.](#)

This past Spring, Oregon State University's Food Safety Squad received a call from a local farmstead milk processor that had high Standard Plate Counts (>10,000 CFU/ml) in their vat-pasteurized white and chocolate milk. The Oregon Department of Agriculture (ODA) routinely collects and tests pasteurized milk samples and there had been a pattern of elevated counts over multiple sampling days. On review, pasteurization processes were being followed and cleaning and sanitation procedures, including clean-in-place (CIP), seemed to be appropriate. Something else was wrong, so we were asked by the farm to help figure out the problem.

Through additional analyses, we confirmed that the pasteurization procedure was effective, but there was likely a microbial harborage site somewhere between the vat and the filler. We invited ourselves to the processing facility so that we could

visualize the system and determine the problem. It became obvious that the only possible culprit was the plate cooler.

Our visit to the farmstead processor occurred on a Friday afternoon after they had finished processing, cleaning, and sanitizing. We were certain that the plate cooler was the problem, but knew that dismantling, cleaning, and reassembling would be a full day's worth of work for the farmer.

We got started right away and prepared to take samples as we carefully removed and inspected each plate, looking for cracks and particulates. We started from the cold end of the pasteurizer and for the first half of the plates we found nothing of interest except for the occasional bleached strawberry seed. The plates and gaskets were spotless and in good condition.

We kept at this and eventually, we found the most impressive biofilm (see photo above). This beauty was located in the upper bulk section just past the transition point where the product started to move down the plates. We collected many samples and found the predominant organism involved in the biofilm to be *Leuconostoc lactis*. This psychrotrophic lactic acid bacteria and was causing premature spoilage as reported by customer complaints. The plate cooler was thoroughly cleaned, reassembled, and a full CIP was performed. Milk samples were collected, and we confirmed that removal of this biofilm solved the high SPC problem.

Periodic Equipment Cleaning (PEC) – A necessary inconvenience

We rely and (blindly) trust the CIP procedure to “do its job” for complex pieces of equipment and focus manual cleaning and sanitation efforts on the equipment that don't have a CIP option. Fortunately, this approach works most of the time. However, the efficacy of CIP in heat exchangers is highly dependent on having nearly perfect flow in every plate and every exchange zone in the system. A flow rate change or a small clog/impediment could result in an area of the machine not being effectively cleaned. A crack in a plate could lead to product contamination with a cooling fluid potentially introducing chemical (e.g., glycol) or microbial (e.g., contaminated water) hazards. Small, thin pieces of debris can get stuck between plates and the continuous flow of product erode the surface of the plates. There is no easy way to find these problems unless the equipment is disassembled.

Dismantling, cleaning, and repairing equipment is never convenient. Taking apart plate coolers (or full HTST pasteurizers) is big job for a processing system of any size and scale. Even large milk processing facilities only perform PEC on their pasteurizer on an annual basis – often after the eggnog season (nutmeg particles are hard on gaskets and surfaces). As innovation in dairy products increases and/or dairy processors co-manufacture non-dairy beverages, it is important to consider how particulates may damage your equipment and how that should influence your PEC schedule.

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