

Biolonix Reduces Microbial Contamination In Brine, Extends Shelf Life Of Cheese

McFarland, WI—The control of microbials in cheese brine systems has always been a challenge for cheese makers. A solution may be in hand from a company here that is offering a new method that continuously disinfects brine without the use of chemicals and without creating brine discharges.

Biolonix is the manufacturer of this process. The process uses platinum catalysts, similar to those found in a car's catalytic converter that purifies the exhaust, and uses them to directly disinfect the brine by passing the brine through the system's reactor module.

"We have a breakthrough catalytic disinfection process that disinfects opaque, turbid liquids with organic loads...exactly what cheese brine is," said James Tretheway, president of Biolonix. "We have had commercial installations running virtually continuously in the food processing industry for five years now, and multiple systems running cheese brine for close to two years."

Biolonix recently received an order for two systems from a Hispanic cheese producer and has done extensive testing with other major North American cheese makers as well.

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James Tretheway,
Biolonix

Tretheway noted that the Biolonix system is designed to 3-A standards, uses FDA approved food contact materials, and has Wisconsin Department of Agriculture approval for installation in Wisconsin dairy plants.

"With the Biolonix technology, we addressed the real pain that cheese processors have with their brine," Tretheway said. "Our process is simple. It has no moving parts. There are no chemical jugs to replace. And we have a green light on the control panel that says not only that the system is operating, but also that the instrumentation and controls indicate it is providing strong disinfection control efficacy. You don't need an operator. It doesn't get much simpler than that."

The Biolonix process was developed over a period of 15 years, some of it done for the federal government for other applications, including NASA, Tretheway noted.

Cheese Industry Applications

Biolonix started working with a major meat processor with sister companies involved in fresh Mozzarella and String cheese.

The manufacturer ordered five systems for its huge hot dog and lunch meat lines, where brine is used to rapidly chill the product from cooking to packaging temperatures. Their engineers discussed this with the cheese division, leading to that operation initiating an extensive test program with Biolonix to evaluate the process for cheese brine microbial control.

The extensive microbial control trials and extended organoleptic and shelf life trials had very positive results. That led to the company installing Biolonix on three cheese lines, two for Mozzarella and one for String cheese. These have been in operation for close to two years now.

"Dairy industry brine issues are special," Tretheway said. "Many processors have challenges with yeast contamination in their packaged products, particularly during the summer months."

As more and more cheese is being sliced, diced and shredded, yeast and mold have a greater opportunity to grow, contributing to a shorter product shelf life. Yet processors and their customers want 100-day shelf life and longer.

Commented Tretheway: "A processor has to do a lot of things exactly right to get that shelf life, but Biolonix can be instrumental in helping them reach that goal."

Flocculating Contaminants

The company also found that the Biolonix process effectively flocculates fats and other solids in the cheese brine for easy removal by skimming. The combination of effective disinfection and solids removal may eliminate the need for ultrafiltration or similar high maintenance filtration methods.

"Something our customer pointed out was that with the Biolonix system, even after several months of operation their brine tanks still had the light 'Mountain Dew' color that you like to see in the brine," Tretheway said. "In many cheese plants, you see a brine that is dark green or brown in color."

In one installation where Biolonix is used in front of an ultrafiltration system, the customer has seen positive membrane system improvements, Tretheway said. Flux rates are staying up and there is less membrane fouling and cleaning problems. They expect to see longer membrane life as well.

Tretheway wouldn't be surprised if that company bypasses the UF entirely. "It may not be needed.

We have other systems running just as well without ultrafiltration."

Biofilm Prevention

Another positive discovery in the Biolonix process was the prevention and removal of biofilms, which are sticky substances that adhere to surfaces that are regularly in contact with water. Biofilms are resistant to removal and disinfection, and can corrode stainless steel and damage membranes.

"It's the reactive oxygen species produced by the Biolonix process that can prevent and remove biofilms. Chlorine can't touch them," Tretheway said. "We normally see full disinfection of pathogens in less than a two-second treatment time. Longer lived reactive oxygen species provide residual disinfection power that can prevent and remove biofilms elsewhere in the brine system, including those on any ultrafiltration membranes."

Reducing Chloride Discharges

One big problem that cheese processors face is the EPA's more stringent enforcement of chloride discharge limits in wastewater. Tretheway noted, "When we first visit a customer, their comment often is that they never discharge their brine. But when we discuss it further, they tell us of the truckloads of ultrafiltration retentate they haul away as a hazardous waste."

Plant personnel then sometimes report that they actually discharge and replenish their brine for a variety of other reasons, from roof leaks to high microbial levels. "With the positive continuous brine microbial control provided by the Biolonix process, many of these hidden brine discharges can be eliminated," Tretheway said.

Suited For All Brined Cheeses

Tretheway said the Biolonix process can be used for all brined cheese varieties, including eyeformers like Swiss. One question the company received is whether disinfecting brine with the Biolonix process might affect Swiss cheese eye formation. The concern was that somehow the Biolonix disinfectants would penetrate the cheese and kill the bacterial strains creating the eyes in the Swiss.

To address this, Biolonix partnered with another major cheese producer to do tests in one of their Swiss cheese plants. The trials compared Swiss cheese blocks salted in their brine with those salted in their brine that had Biolonix microbial control.

Initially, and at three other aging dates, the customer analyzed the levels of each of the starter culture bacterial species, including



the propioni bacterium responsible for creating the Swiss cheese eyes. Organoleptic tests were also done at the same time.

"The results showed that there were no differences in the cheese salted in Biolonix treated brine and the control. Swiss eye development, flavor profile and other organoleptic properties were unchanged," Tretheway said.

The company has a white paper available on this research, Tretheway noted.

Fully Automated Process; No CIP

The Biolonix process is fully automated and no operators are required. The system automatically adjusts the disinfection strength depending on the organic and microbial load in the brine.

The control system monitors a combination of sensors and the results are displayed in a highly visible and easily understood green-yellow-red format on the control screen and remote stack lights.

In addition, Biolonix provides an online disinfection efficacy estimate, which Tretheway said is a Biolonix exclusive. If the system is in green mode, the customer can expect with reasonable certainty that lab results coming in a day or two later are going to be negative for any pathogens including Listeria.

"The Biolonix process is the only one that provides an online disinfection estimate. While traditional wet lab tests are the gold standard for brine microbial quality, their results only come in long after the cheese is produced," he said. "While Biolonix's disinfection efficacy estimate can't guarantee these results, it's proven to be a reliable proxy in our systems in the field."

For more information, visit www.biolonix.com; e-mail info@biolonix.com; or call (608) 838-0300.