



"The Chlorine Dioxide People"

Application Note #47

Listeria Decontamination with Gaseous Chlorine Dioxide

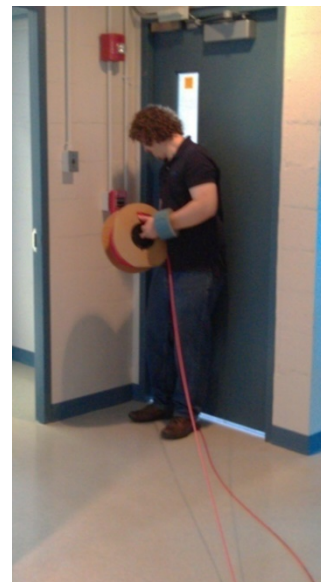
Food safety attorney Shawn K. Stevens of Food Industry Counsel wrote that "given the risk created by the FDA's war on pathogens, food companies should invest in technologies to better control pathogens in the food processing environments." Improved detection methods are finding more organisms in food production facilities than ever before. Advances in environmental monitoring and microbial sampling have brought to light the shortcomings of sanitation methods being used. Many times, bacteria such as *Listeria monocytogenes* and *Salmonella* are able to survive simply because of limitations of the cleaning method utilized by the sanitation program. In order for any decontamination method to work, every organism must be contacted by the chemical, for the proper amount of time and at the correct concentration by an agent effective against that organism. Processing equipment and machinery contain many hard-to-reach areas, which challenge the routine cleaning process. Even with all the sanitary design considerations possible, it is impossible to have equipment that does not contain any hard-to-clean areas.

Common sanitation methods such as isopropyl alcohol, peracetic acids, bleach and ozone have a limited ability to reach all surfaces, and some are incapable of killing all microorganisms. One method that is able to overcome the inherent difficulties of reaching all pathogens within a food processing environment is chlorine dioxide (ClO_2) gas. ClO_2 gas is a proven sterilant capable of eliminating all viruses, bacteria, fungi, and spores. As a true gas, chlorine dioxide follows the natural gas laws filling the space it is contained within evenly and completely. The chlorine dioxide molecule is smaller than the smallest viruses and bacteria. Therefore, ClO_2 gas is able to contact all surfaces within a space and penetrate into cracks further than pathogens can, allowing for the complete decontamination of all microorganisms. It also does not leave residues, making it safe for the treatment of food contact surfaces.

Case Study: Produce Blend Room Decontamination

Our Decontamination Service Team helped a company eliminate a *Listeria* problem in the produce blend room. This facility was not in production and was finishing a punch list of installations, upgrades, and maintenance activities. Our Decontamination Team slid in alongside the customer's schedule in order to limit the disruption and enable production to begin as soon as possible.

The almost 500,000 ft³ Blend Room was turned over to our team at 4:00pm. At this time, gas injection tubing was run to 10 different locations in order to speed up the natural distribution of the gas. Gas sample tubing was run to 6



different locations within the Blend Room in order to measure gas concentrations throughout the decontamination process. This enables our team to confidently control the process, making sure that the entire room has been subjected to the proper dosage of chlorine dioxide gas necessary to achieve a 6-log sporicidal reduction. Biological indicators were placed in 20 different locations throughout the space, including placement under trash cans, as well as beneath and behind equipment. Conveyors, doors, and the HVAC system handling the room were then sealed. At approximately 11:15pm, gassing started. At 3:15am, all areas within the room reached the appropriate dosage, and aeration began. Upon completion, equipment was removed from the space along with biological indicators. The next day, biological indicators were dropped in growth media and incubated for 36 hours to check if any of the million bacterial spores contained on the indicator were left viable to grow and multiply. After 36 hours, none of the 20 biological indicators showed any growth, proving that a 6-log sporicidal reduction took place within the Blend Room. The project was successful and the company was able to start production shortly after.



Conclusion

With the new era of food safety upon us, ensuring a clean food production environment is more important than ever. Food safety attorney Shawn K. Stevens wrote “If food companies do not take extraordinary measures to identify *Lm* in their facilities, perform a comprehensive investigation to find the root cause or source, and then destroy and eliminate it completely, the pathogen will likely persist and, over time, intermittently contaminate their finished products.” Traditional cleaning methods are incapable of reaching all surfaces and crevices within a space. In order to eliminate the risk of “recurring contaminations,” the pathogens need to be fully eliminated from their source. The treatment of crevices and harbor locations, which evade traditional sanitation, makes chlorine dioxide gas highly suitable for both contamination remediation as well as routine preventative decontamination during scheduled downtimes to help reduce the risk of contamination in your facility.