AntimicrobialTestLaboratories LLC

Disinfectant Development Specialists

Procedure for Cleaning and Sanitizing Dairy Facilities Using Microgen DISNFX D-125™

Written by Benjamin Tanner, Ph.D, 2/6/08

Author Background:

Benjamin Tanner is the president of Antimicrobial Test Laboratories, a commercial microbiology laboratory. He holds a Ph.D. in Microbiology and Immunology and has worked in the disinfectant industry for several years. He is the author of the book, "Legal Aspects of Infectious Diseases." Before launching Antimicrobial Test Laboratories, he worked as a microbiologist for the Clorox Company (Oakland, CA), developing disinfectants and other antimicrobial consumer products.

Introduction:

The purpose of this document is to provide those in the dairy industry with guidance when sanitizing and disinfecting to control the spread of foodborne illness. Additional procedures may also be recommended, depending on local regulatory requirements.

Microorganisms spread by contaminated food processing environments are a major source of disease. Care should be taken to control the spread of microorganisms in the dairy environment, since milk represents a food source for bacteria and since contaminated lines or surfaces can contaminate entire batches of milk and milk products.

Microgen, Inc's DISNFX D-125™ is a dilutable, quaternary ammonium disinfectant that is approved for sanitization of food-contact surfaces in the United States by the United States Environmental Protection Agency (USEPA) and the United States Department of Agriculture (USDA) for sanitization for all surfaces not always requiring a rinse in official establishments operating under the Federal meat, poultry, shell egg grading and egg products inspection programs. It is a good choice for sanitization of food contact surfaces because it has demonstrated an unusually high level of efficacy in laboratory testing and because it has been tested and proven effective against an unusually broad range of microorganisms[1,2], i.e.: *Actinomyces pyogenes*.

Microgen's American-developed disinfection dossier is based on AOAC "carrier" testing methods, which require reproducible and complete kill of all target microorganisms on test surfaces. This is in contrast to CEN suspension methods that satisfy European authorities, which require only partial kill of microorganisms in liquid suspensions (e.g., 5-log kill within 5 minutes). This is an important distinction, because microorganisms are more susceptible to the action of disinfectants when suspended rather than dried onto a surface.

Notably, D-125's data was used and relied on as the predicate by US FDA, US EPA, CDC, US Department of Labor and OSHA in updating the Blood Born Pathogen Rule 29 CFR 1910.1030[3].

Microgen DISINFX D-125™ Dilution Table

D-125	Use Site	Dilution
Disinfection (Virucide, Bactericide, Fungicide, Mildewstat, Deodorizer)	Hard Non-porous Surfaces	2 oz. per gallon of water; 1:64 or 16ml per liter (703 ppm)
Sanitization	Food Contact Surfaces	4 oz. per 7 gallons of water; 1:224 or 4.5 ml per liter(200 ppm)
Sanitization	Non-Food Contact Surfaces	2 oz. per gallon of water; 1:64 or 16ml per liter (703 ppm)
Sanitization	Carpet	1 oz. per gallon of water; 1:128 or 8ml per liter (352 ppm)
Sanitization	Residual Laundry Additive	8 oz./100 lbs dry laundry

Procedure for Disinfection/Sanitization of the Dairy Processing Environment Using D-125™:

The following guidelines will help ensure safe food and beverage product:

(Adapted from "General Specifications for Dairy Plants Approved for USDA Inspection and Grading Service"[4])

1) Equipment and utensils shall be kept clean.
    a. The equipment, sanitary piping and utensils used in receiving and processing of the milk, and manufacturing and handling of the product shall be maintained in a sanitary condition.
    b. Sanitary seal assemblies shall be removable on all agitators.
    c. Pumps, and vats and shall be inspected at regular intervals and kept clean.
    d. All equipment not designed for C.I.P. cleaning or mechanical cleaning shall be disassembled after each day's use for thorough cleaning.
    e. Dairy cleaners, detergents, wetting agents or sanitizing agents, or other similar materials which will not contaminate or adversely affect the products may be used, including Microgen' s D-125™ disinfectant/sanitizer.
    f. Steel wool or metal sponges shall not be used in the cleaning of any dairy equipment or utensils.
2) Product contact surfaces shall be subjected to an effective sanitizing treatment prior to use, except where dry cleaning is permitted.
    a. Utensils and portable equipment used in processing and manufacturing operations shall be stored above the floor in clean, dry locations and in a self-draining position on racks constructed of impervious corrosion-resistant material.
3) C.I.P. cleaning or mechanical cleaning systems shall be used only on equipment and pipeline systems which have been designed, engineered and installed for that purpose. When such cleaning is used, careful attention shall be given to the proper procedures to assure satisfactory cleaning.
    a. All C.I.P. installations and cleaning procedures shall be in accordance with 3-A Suggested Method for the Installation and Cleaning of Cleaned-In-Place Sanitary Milk. Because of the possibilities of corrosion, the recommendations of the cleaning compound manufacturer should be followed with respect to time, temperature and concentration of specific acid or alkaline solutions and bactericides. Such cleaning operation should be preceded by a thorough rinse at approximately 110 - 115 F, continuously discarding the water.
    b. Following the circulation of the cleaning solution the equipment and lines shall be thoroughly rinsed with lukewarm water and checks should be made for effectiveness of cleaning.
    c. All caps, plugs, special fittings, valve seats, cross ends, pumps, and tee ends shall be opened or removed and brushed clean.
    d. All non-pasteurized product contact surfaces should be sanitized. Immediately prior to starting the product flow, the pasteurized product contact surfaces shall be given sanitizing treatment.
4) Milk cans and can washers.
    a. Milk cans and lids shall be cleaned, sanitized and dried before returning to producers.
    b. Inspection, repair or replacement of cans and lids shall be adequate to substantially exclude from use cans and lids showing open seams, cracks, rust condition, milkstone or any unsanitary condition.
5) Washers.
    a. Washers shall be maintained in a clean and satisfactory operating condition and kept free from accumulation of scale or debris which will adversely affect the efficiency of the washer.

b. Only washing compounds which are compatible with the water for effective cleaning should be used. The can washer should be checked regularly during the run for proper operation. At the end of the day, the wash and rinse tanks should be drained and cleaned, jets and strainers cleaned, air filters checked and changed or cleaned if needed, and checks should be made for proper adjustment and condition of mechanical parts.

6) Milk transport tanks
   a. A covered or enclosed wash dock and cleaning and sanitizing facilities shall be available to all plants that receive or ship milk in tanks.
   b. Milk transport tanks, sanitary piping, fittings, and pumps shall be cleaned and sanitized at least once each day after use: Provided that, if they are not to be used immediately after emptying a load of milk, they shall be washed promptly after use and given bactericidal treatment immediately before use. After being washed and sanitized, each tank should be identified by a tag attached to the outlet valve, bearing the following information: Plant and specific location where cleaned, date and time of day of washing and sanitizing, and name of person who washed and name of person who sanitized the tank. The tag shall not be removed until the tank is again washed and sanitized.
7) Building.
   a. All windows, glass, partitions, and skylights should be washed as often as necessary to keep them clean. Cracked or broken glass shall be replaced promptly. The walls, ceilings and doors should be washed periodically and kept free from soil and unsightly conditions. The shelves and ledges should be wiped or vacuumed as often as necessary to keep them free from dust and debris. The material picked up by the vacuum cleaners shall be disposed of in sealed containers, which will prevent contamination or insect infestation from the waste material.

Conclusion:

Microgen's D-125™ disinfectant is an effective sanitizer of food contact surfaces at 200 ppm. The product has also been proven to kill a broad range of pathogens relevant to food production, including *Yersinia enterocolitica, Salmonella typhi, Campylobacter jejuni, Listeria monocytogenes, Bacillus cereus, Shigella dysenteriae, Staphylococcus aureus*, and various strains of pathogenic *E. coli* including the hemorrhagic 0157:H7 strain. Since only 4 ounces of product are required per each 7 gallons of water to make the 200-ppm sanitizing solution, so use in the food and beverage-processing environment is not cost-prohibitive. In terms of Microgen's D-125 bactericidal stability of use-dilution; laboratory testing confirms that this product, when diluted in 400 ppm hard water in the presence of 5% soil load, remains effective against *Pseudomonas aeruginosa, Staphylococcus aureus, Salmonella choleraesuis* for up to 64 days when stored in a sealed container at room temperature.

References:

1. Microgen D-125™ USEPA Master Label. May 17, 2007. Downloaded 2/6/08. (http://www.microgeninc.com/milestones/PDF/D-125%20Master%20Label.pdf).
2. (http://www.microgeninc.com/milestones/PDF/Microgen%27s%20USDA%20Sanitizer%20D-2%20Acceptance%20letter%20for%20D-125.pdf)
3. US Department of State Authentication for Microgen, Inc D-125 under 22 CFR. Part 131.
4. General Specifications for Dairy Plants Approved for USDA Inspection and Grading Service. Downloaded 2/6/08. (http://www.ams.usda.gov/dairy/genpecs.pdf).
5. World Food Programme - United Nations Global Marketplace Registration No.138780