



Cornell University

Milk Quality Improvement Program
Department of Food Science
Stocking Hall, Ithaca, NY 14853
Phone: 607-255-2893

Dairy Foods Science Notes

Version 02-08, Update

Sanitation in Soft-Serve Frozen Dessert Operations

Soft-serve ice cream is a food that is widely available from countless vendors and enjoyed by many. Although served frozen, it is generally prepared from a refrigerated ice cream mix that is perishable (e.g., it can spoil) and is subject to microbial contamination (“germs”) during handling; thus it has the potential to be a source of foodborne illness. Typically, local health departments regulate and inspect retail operations that provide soft-serve ice cream and other foods to ensure that sanitary standards are met. The Food and Drug Administration’s (FDA) Food Code (available at: <http://www.cfsan.fda.gov/~dms/foodcode.html>) provides the general guidance for retail food and food service regulation. Other regulatory agencies may be involved depending on the nature of the business. In NY State, the Department of Agriculture & Markets, Division of Food Safety & Inspection oversees retail food stores that provide soft-serve ice cream, while the Division of Milk Control has jurisdiction over wholesale distributors and manufacturers of frozen deserts and mixes. Following are guidelines to help soft-serve ice cream operations meet the sanitation requirements and provide safe dairy products of high quality.

Personal Health & Hygiene

All persons handling food must be properly trained in order to understand the importance of maintaining good personal hygiene, reporting illnesses and using effective sanitation practices. General guidelines include:

1. Report all illnesses and infections, especially those with symptoms of foodborne or more severe illnesses including vomiting, diarrhea, fever, severe sore throat, jaundice or infected cuts/sores. Anyone, including owners/management, with a potentially infectious disease must not handle food for human consumption.
2. Keep hands and fingernails clean. Hands carry “germs.” Wash hands before beginning work and when ever soiled. Scrub thoroughly at least 20 seconds with soap and hot water, rinse and dry with a clean towel. Avoid direct hand contact of food items (e.g., cones – use a clean napkin), the inside of service containers and food equipment or utensils that have been cleaned and sanitized. Wear sanitary gloves where appropriate and change frequently; gloves become soiled the same as bare hands. Do not handle money or other possible sources of contamination when handling food. Wash hands after handling any potentially unsanitary object.
3. Dress appropriately; clean cloths, no jewelry (except wedding bands) and appropriate hair restraints. Refrain from eating, smoking, chewing tobacco or gum while working with foods.
4. Prevent cross-contamination and adulteration of foods and food contact surfaces with unsanitary objects, chemicals, dirt, debris and pests. If soft-serve machines are in close proximity to other food prep areas, keep all utensils, containers, brushes and other items used for the soft-serve separate, especially from raw food items (e.g., meats). Protect all containers, cones and condiments by keeping them in closed containers or re-sealable bags. Keep the area clean and free from clutter, pests, chemicals and other possible contaminants.

Storage and Handling of Mixes

Most frozen dessert mixes are not sterile, but generally have a low bacteria count when fresh. To prevent the growth of spoilage and harmful bacteria, the mix must be stored under refrigeration at 41°F or less at all times. Storage temperatures as close to 32°F as possible, with out freezing are recommended. Mixes should be rotated following the “First In - First Out” principle and should not be used beyond their code or use-by date.

Mixes stored frozen should be thawed in a refrigerator and not allowed to warm above 41°F. In an emergency, running cold water over the package can be used to thaw mixes if the temperature is not allowed to exceed 41°F. Never place frozen mixes in hot water, sunlight, under heat lamps or at room temperature to thaw.

Transferring mix to the freezer supply tank should be done in a manner that prevents contamination; wear gloves, use sanitized utensils, do not recover spilled product. Hoses used to transfer mixes should be as short as possible, kept under refrigeration and washed immediately after use and sanitized with the same program as the freezer. Keep fresh sanitizer solution handy; use clean towels immersed in sanitizer solution for clean-ups.

Cleaning and Sanitation Program

All soft-serve freezers should be completely disassembled, washed and sanitized on a daily basis, following the manufacturers' instructions. The washed parts should be allowed to air dry and inspected before they are sanitized and reassembled. Only properly formulated dairy type cleaners and approved sanitizers should be used. Common household and glassware detergents are not satisfactory for cleaning ice cream freezers.

The ten steps for cleaning and sanitizing soft-serve freezers are:

1. Drain leftover mix from the freezer into a clean, sanitized, sealable container. Refrigerate immediately.
2. Rinse the freezer barrel & supply tank with cold water, drain, rinse again with lukewarm water, drain.
3. Disassemble all removable parts, rinse with warm water, and wash with hot detergent solution, made according to manufacturer's instructions. Using appropriate brushes, sized for fit and reach, brush all parts including the barrel, dasher, valves, freezer head, supply tank, lid and hoses. Brushes used for hoses should just fit the diameter and reach end to end. Use brushes designated for the freezer only; not to be used for non-food items or other foods (esp. raw foods). Inspect and replace hoses routinely; other parts as needed.
4. Rinse all parts thoroughly with warm water. Note: Rinse with a commercial acid rinse at least twice per week or more frequently if the water is hard and is leaving mineral deposits. Inspect for cleanliness.
5. Allow all parts to air dry, preventing contamination with dust, hands, other foods, insects, pests and so on.
6. Immediately before assembling for use, prepare at least 2 gallons of sanitizer solution. Chlorine at 200 parts per million (ppm) is recommended. Other approved sanitizers can be used at equivalent concentrations, prepared as recommended by the manufacturer. Inspect dried parts for cleanliness (soil's more obvious dry).
7. Submerge all disassembled parts in the sanitizer for at least one minute, immediately before assembling.
8. Assemble freezer wearing sanitary gloves. Use food grade lubricants applied in a sanitary manner, only as needed (avoid using in excess). Store lubricants in a sanitary manner.
9. Add the sanitizer solution to the tank and sanitize all surfaces of the tank and lid with a designated brush (a brush used for sanitizer only to prevent cross-contamination).
10. Drain the sanitizer into the barrel while running the dasher to sanitize the dasher, barrel, and scraper blades. Do not run for longer than 30 seconds or follow recommendations of the freezer manufacturer. **Drain thoroughly. Do not rinse with tap water after the system is sanitized and drained.**

Care of Holdover Mix

Leftover or "holdover" ice cream mix is one of the major sources of bacterial contamination in soft-serve operations. The following should help reduce the risk of high bacteria counts from the use of holdover mixes.

- ✓ Use all of the remaining mix to make frozen ice cream pies, sandwiches, and other frozen novelties at the end of each day. Freeze immediately. Use any reclaimed hold-over mix (see below) the next day.
- ✓ Regulate the addition of new mix at the end of the day to minimize the amount of holdover.
- ✓ Transfer hold-over in a sanitary manner into sanitized containers and store as close to 32°F as possible.
- ✓ Recharge the freezer in the morning with fresh mix. Add holdover during high volume periods.
- ✓ Discard the leftover mix in the freezer at least twice a week to break the chain of bacterial contamination.

For more information:

FDA Food Code: <http://www.cfsan.fda.gov/~dms/fc05-toc.html>. FDA Retail Food Protection: <http://www.cfsan.fda.gov/~ear/retail.html>
NYS Agriculture & Markets, Milk: <http://www.agmkt.state.ny.us/DI/DIHome.html>; Food: <http://www.agmkt.state.ny.us/FS/FSHome.html>

Prepared by; D. P. Brown & S. C. Murphy