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# Seven Steps to Sanitary

Features - Sanitation

There can be no shortcuts in the process. Every step must be done and done in the proper order.

October 12, 2012
Lisa Lupo (/author/5032)



A sanitary processing environment is essential to food safety, and ensuring a sanitary plant means implementing cleaning standards as well as sanitation standards.

“Cleaning and sanitation are different because the cleaning steps address physical soils that are loose or adhering to a surface. Sanitation is directly related to microorganisms,” said Alan Parker, managing director of Parker Associates consulting organization.

Parker defines cleaning as “the complete removal of unwanted matter.” Removing these soils enables the sanitizers to work effectively. Thus, attaining a sanitary environment involves seven essential steps:

1. Inspection, Identification, Equpment Breakdown
2. Sweeping and Flushing
3. Washing
4. Rinsing
5. Sanitizing
6. Rinse/Air Dry
7. Validation

As stated in the publication “Sanitation, the Foundation of Food Safety,” developed by the Minnesota Department of Agriculture (MDA), “There can be NO shortcuts in this process—each step must be done and done in the proper order.”

**1. Inspection, Identification, and Equipment Breakdown**

Prior to beginning the cleaning program, equipment should be broken down, and an inspection conducted to identify any areas needing particular attention and select the application methods and chemicals to be used. While a plant will generally have standards for selection, it is also important to determine if any extenuating conditions exist that may require extra cleaning or sanitation, different detergent or sanitizer, or other variation.

#### 2. Sweeping, Scraping, and Flushing

The first step in the cleaning and sanitation is, then, the physical removal of gross solids and large particles. This could include the use of brooms and scrapers or simply physical lifting and disposing of items. The more food residues removed ahead of time, the cleaner the wash water will stay.

This is often followed by flushing or rinsing of the surfaces to remove as much of the solids and particles prior to cleaning as possible. Parker recommends that warm water, of 105° to 115°F be used for rinsing. “If the water is too hot, it can cause the soils to become more adherent,” he said.

#### 3. Washing

The second step of cleaning is the application of a detergent. This may be applied manually, but a mechanical foamer is generally preferred, Parker said. “This gives a very good cling to the surface so the contact time can be enhanced,” he explained, adding that it is particularly effective on vertical surfaces. Manufacturer directions for dilution rates and contact time should be used, then physical cleaning conducted to scrub the surfaces.

If operating in a dry facility, equipment and components may instead be cleaned with alcohol or other solvents that evaporate over time.

#### 4. Rinsing

Following washing, a potable-water rinse is conducted to ensure that all the detergent is removed. The rinse step is critical because detergent residues will neutralize many sanitizers. As Parker explained: Detergents are alkaline, whereas most sanitizers are acidic; detergents have a negative charge, while most sanitizers have a positive charge.

At this point, more and more companies are also conducting a validation step, Parker said. That is, using ATP testing in a system to measure the effectiveness. “If the ATP test comes in above the limit, then the equipment needs to be re-cleaned,” he said.

#### 5. Sanitizing

Once the surfaces are verified as “clean,” the sanitizing steps are begun. A variety of applications are used for sanitizing processing environments, from heat to chemical disinfectants. “In the food and beverage industry, there are probably four or five general categories of hard-surface sanitation that are used,” Parker said. The most common of these are chlorine-based, sodium hypochloride, commonly known as bleach.

Other common sanitizers include “quats,” or quaternary ammonium compounds; PAA—peroxyacetic (or peracetic) acid; chorine dioxide, similar to hydrogen peroxide; and iodine, in certain applications. “Each has different characteristics, advantages, and disadvantages that make it appropriate for different uses,” he explained. Some may be more corrosive, others more effective in hard water, and others more easily inactivated by organic soil.

Selection should, thus, be based on the materials to be treated and available time, e.g., whether or not the sanitizer is to be left overnight. “How it will be used governs your choice of the most effective sanitizer,” Parker said, adding that the sanitizer label should be consulted for selection of most applicable product. “There will be registration information showing what it has been tested on and what bacteria it is effective against.”

And, just as with detergents, sanitizers should be applied at the concentration and contact time recommended by the manufacturer.

#### 6. Rinsing/Air Dry

Sanitizers come in two forms: leave on and rinse off. According to Food Industry Quality Control Systems by Mark Clute, QA Manager of Turtle Mountain, most food processors currently use leave-on sanitizers due to the “glove-like protection” they provide. These, he said, can be left on the surfaces for several hours and still maintain their effectiveness.

As with detergents, rinse-off sanitizers should be completely rinsed from surfaces prior to operational start-up, and label directions should be followed for dry time for leave-on sanitizers.

**7. Validation and Verification**

Validation should be conducted through both visual inspection and protein swabs. Additionally, MDA recommends that all cleaning and sanitizing procedures be regularly monitored for effectiveness, through pre-operational inspections or audits and microbial sampling of the environment and food-contact surfaces. Verification criteria should include that no visible residue be present and micro counts be within acceptable limits.

**Conclusion.** For an effective cleaning and sanitation program, these steps should be fully defined with your plant's specifications, cleaning schedule, and assigned responsibilities detailed in written SSOPs. Then staff should be trained, not only on the SSOPs, but on chemical safety and effectiveness, and the importance of the final validation and corrective action for any remaining allergens, soils, or micros. "Those," Parker said, "are the critical elements in having an effective sanitation program."

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COMMENTS

# Sandridge Refrigerated Foods

Features - Cover Story

Where innovation bridges culinary arts with industry

October 12, 2012
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If a line-up of homemade and processed potato salads were to be sampled by a random group of consumers, in most cases, the tasters would be able to distinguish the homemade from the store bought. This is primarily because the preservatives that need to be added to processed salads also add distinguishing characteristics. It is not to say that homemade always taste better, there is just "something" about store bought that makes it different.

*Sandridge's (from left) Senior Director of Food Safety and Quality Joel Riegelmayer and Quality Manager Ken Schafner have been instrumental in the implementation of HPP at the plant.*

That is, until an innovative use of High Pressure Processing (HPP) by Sandridge Food Corporation, in Medina, Ohio, eliminated the need for preservatives and their distinguishable store-bought aspects.

HPP is not a new process, but its use with foods is still evolving. It has been used in the medical industry and some food ingredients for a number of years, but it was only in 2009 that Sandridge became one of the first companies in the U.S. to use the process on fresh refrigerated prepared foods, enabling a bridging of the culinary arts with industry.

As described on Sandridge's FAQ web page, "High Pressure Processing, or HPP, is an advanced food processing method that uses cold water under extremely high pressure to kill bacteria in food. Since all harmful bacteria are destroyed, food stays fresher much longer, allowing us to eliminate the use of

preservatives and expand our distribution. For the consumer this means great tasting products with a wider variety of ingredients and ultimate food safety." (See "What is HPP" below sidebar for more information on this process.)

But HPP is just one of the innovative and quality practices employed at Sandridge. The company has five full-time chefs on staff to develop recipes. It has won numerous awards for innovation, including a 2011 Edison Center Award for Excellence from the Center of Innovative Food Technology, for which it was also presented with a Resolution from the Ohio House of Representatives. Managers and chefs take annual trips to Europe and other parts of the U.S. to bring back new ideas. And the company maintains a firm hold on the brand promise that has brought its success: *fresh refrigerated foods with handmade quality.*

**Freshness.** "Freshness belongs to the consumer," said CEO Mark Sandridge. "It doesn't belong in the warehouse or in the store." To enable this, the company builds to order rather than building to inventory. That is, Sandridge said, a foodservice or retail customer can place an order in the morning and have the food in the store or restaurant that night.

This flexibility also ensures that both the company and its customers are quickly and continuously reactive to their customers' changing buying habits. Citing buying trends that changed with the downturn of the economy, Sandridge said, "Consumers' needs change frequently, therefore retailers need to change frequently."

To maintain this commitment to freshness and flexibility, the company chooses to remain a regional brand. Sandridge produces product under its own brands, such as Grandma's Original Recipes, as well for other retail and foodservice brands. While it does ship some product to the West coast through its national contracts, its primary distribution is east of the Mississippi, maintaining an area to which product can be shipped within 24 hours. And Sandridge's CEO is the first to say that its product is not for everyone. For example, it doesn't sell to retailers who are seeking low-priced quantity over quality, rather it partners with those whose philosophy, like Sandridge's is, "Buy the best ingredients you can, and charge a fair price."

"We've never been about getting big. We've always strived to be best," Sandridge said. For the same reason, the company concentrates only on fresh refrigerated prepared foods. Although customers have requested development of frozen products, Sandridge said, it does not venture into that process because it is of a completely different mindset and does not fit into its "fresh, never frozen" principle.

Mark Sandridge is the second-generation leader of this family company and his primary goal is to continue its success for passage on to his own two sons. A food scientist himself, Sandridge's original intention in installing HPP equipment in 2009 was for preservation, extending the shelf life of the refrigerated foods without additional chemicals and preservatives.

With that intent, Sandridge was not one to lay low and try to weather the recent recession. Rather, he said, "We made the decision to make the biggest purchase we'd ever made—HPP equipment, and build around it."

*High Pressure Processing (HPP) enables Sandridge to make a product more like that which a consumer makes at home and commercialize it with no chemicals, preservatives, or accelerators.*

**Innovation in Safety.** HPP is, in fact, a very old technology dating back to 1919, but it only started being used in food products about six years ago, Sandridge said. In a visit to a meat processing plant, Sandridge Senior Director of Food Safety and Quality Joel Riegelmayer saw the equipment being used and thought it may work for Sandridge products as well, so he proposed the idea.

The company's first test was with a tuna salad. One-half the product was put into a pouch and run through the HPP system, then refrigerated. After seven days, it was tested in the plant's micro lab and found to be as clean and fresh as the day it was made. Testing was continued, and even after 65 days, the product still had no bacterial growth, Sandridge said. In comparison, the half of the product that was not put through HPP spoiled in seven days.

It was quickly realized that the system would enable the company to make a product more like that which a consumer makes at home and commercialize it with no chemicals, preservatives, or accelerators, he said.

One caution Sandridge extends, however, is that HPP can't substitute for quality or sanitation. Rather, as the company has always done, it uses only quality ingredients and follows strict sanitation standards and GMPs. "You can't take a rotten product and make it better than it is," he said. "And you have to start with the rest of the plant, so the product is clean when it gets there."

*At Sandridge, each step of the fresh, refrigerated-salad process—from raw ingredient receiving through cleaning and dicing to packing of the salads—is conducted in separate rooms.*

**Throughout the Plant.** Starting with the rest of the plant at Sandridge takes on a number of facets to ensure food safety and, as Riegelmayer said, "to keep clean things clean." These include:

- A physical separation of areas. Sandridge incorporates a cellular design throughout its plant, separating each area into distinct rooms.
- Depending on the level of sanitation required for each area, workers (and visitors) must don specific lab coats and hair nets, wash hands, clean boots, and walk through automatic foamers—both when first entering the plant and between separate rooms.
- Sandridge has five separate receiving areas for incoming ingredients. These include areas for: processed ingredients (such as cheeses and cooked meats); frozen ingredients; required for each area, workers (and visitors) must don specific lab coats and hair nets, wash hands, clean boots, and walk through automatic foamers—when entering the plant and between separate rooms.
- Sandridge has five separate receiving areas for incoming ingredients. These include areas for: processed ingredients (such as cheeses and cooked meats); frozen ingredients; bulk potatoes; vegetables; dry, shelf-stable products; and raw meats.
- In most areas, workers wear green lab coats, but in the areas where produce is not yet washed, red coats are worn, and employees who work in that area, work only in that area to ensure that no contaminants are carried into the sterile processing rooms. As such, Riegelmayer said, "Red can't go into green, and green can't go into red."
- In the raw meat area, workers wear disposable coats and, he said, "Nothing comes out except the employee."
- Maintaining a comfortable environment for workers is also important at Sandridge where the temperatures must be kept low to ensure the freshness of the ingredients through their journey to becoming a refrigerated salad or soup. Although cool air continually flows into the processing rooms, it is vented through inflatable air diffusers lined by tiny holes, so that no workers have the air blowing directly on them. This idea, Riegelmayer said, came from one of his trips to Europe.
- Until 2000, employees were wearing their own shoes into the plant. But during the Europe visit, Riegelmayer saw a plant that had a physical boot room where employees donned plant-only, company-issued boots. The room is a last-stop just before handwashing and floor foam and includes lockers and benches.
- Ongoing training and reinforcement of the workers' initial orientation training is conducted through Line Huddles, in which 13 QA technicians meet on a regular basis with line workers to review quality and food safety practices, and take any process-change recommendations back to management. "It's intended to be a team-building approach instead of a quality police force," said Quality Manager Ken Schafner.
- Sandridge's QA lab whose primary purpose is ensuring consistency of the final product; in-house microbiological laboratory and on-site USDA inspector; and metal detector on every line provide final tests and assurance.

**A Potato's Journey.** While ensuring safety, the process also takes quality in hand, as the journey of the potato from ingredient to salad shows best:

- Once any possible foreign debris is removed from incoming bulk potatoes, they are run through a peeler, then into the next room where an automatic dicer is adjusted for consistently sized pieces, small to large, depending on the recipe.

**What Is HPP?**

*This article is extracted from The Ohio State University Extension's High Pressure Processing Fact Sheet for Food Processors.*

- A camera-equipped visual sorter detects any bad pieces, which are then shot from the line by air currents. The good potatoes “fly over the line” and into cooking, Riegelmayer said.
- Once cooked, the potatoes come out into a separate cooked-potato room and are loaded onto a conveyor to move onto mixing.
- Meanwhile, in their own rooms, the other raw ingredients are cleaned in ozonated water, diced, weighed, then combined in a tank with the liquids (such as mustard, mayonnaise, or other in-house-made salad dressing) and the potatoes. Consistency is ensured through a computer system, through which the line worker consults the stored recipe, then adds the proper amount of each ingredient—pushing a button between each which automates the mixing.
- The finished potato salad is piped into the next room where it fills containers or bags depending on whether it is consumer or foodservice bound, then sent on to the cooler. (Following a similar path, the ingredients for Sandridge’s soups are prepared and weighed and put into blue tanks in a prep room, so the workers in the cooking room need only focus on the cooking process.)
- It is at this point that the packaged salads are put through the HPP equipment. As of yet, Sandridge uses the technology for only some of its products that have been developed specifically for the process, but its goal is to eventually process all its foods with HPP.

**Bridging Culinary & Industry.** While Sandridge’s initial intention in its use of HPP was food safety and extended shelf life, once it was comfortable with the food safety and freshness that could be achieved with the technology, Sandridge said, “The next step was to work on flavors. And who does that best? Chefs.”

The company has five full-time chefs on its culinary and research team, led by “resident celebrity chef” Dan Zakri, who holds a degree from the Culinary Institute of America. As manager of new product development, Zakri, with the team of certified chefs, develops products for both Sandridge’s own brands and those of its customers. A customer may come to Sandridge requesting commercial duplication of a specific recipe or may simply say, “I’d like you to create a new fall pasta salad for us,” Zakri said.

The culinary team will then have a development session, listing ingredients and creating ideas. The salads, sometimes 20 at a time, will be created, and the customer will return for a presentation and tasting.

While this has long been a process followed by the company, the addition of the HPP technology has greatly expanded the team’s capabilities. “We can now use ingredients that, in the past, weren’t an option because they wouldn’t stand up to the preservatives,” Zakri said. Additionally, when HPP is used, the taste of each individual ingredient is enhanced and stands alone, rather than melding together into a single taste as occurs when preservatives are brought into the mix. As a result, the HPP-processed product tastes more like homemade and the chef’s original single-batch recipe. Because HPP also intensifies the spices in the product, less salt is needed, giving the product greater nutritional value.

Another advantage of HPP technology, Zakri said, is the product’s “clean label.” Because a variety of chemicals and preservatives aren’t needed, the label has a short list of familiar ingredients. Also, the extended shelf life enables the product to taste the same on day 30 as it did on day one.

High Pressure Processing provides an alternative means of killing bacteria that can cause spoilage or foodborne disease without a loss of sensory quality or nutrients.

HPP is a method of food processing where food is subjected to elevated pressures (up to 87,000 pounds per square inch or approximately 6,000 atmospheres), with or without the addition of heat, to achieve microbial inactivation or to alter the food attributes in order to achieve consumer-desired qualities. Pressure inactivates most vegetative bacteria at pressures above 60,000 pounds per square inch. HPP retains food quality, maintains natural freshness, and extends microbiological shelf life.

In a typical HPP process, the product is packaged in a flexible container (usually a pouch or plastic container) and is loaded into a high-pressure chamber filled with a pressure-transmitting (hydraulic) fluid. The hydraulic fluid (normally water) in the chamber is pressurized with a pump, and this pressure is transmitted through the package into the food itself. Pressure is applied for a specific time, usually three to five minutes. The processed product is then removed and stored/distributed in the conventional manner. Because the pressure is transmitted uniformly (in all directions simultaneously), food retains its shape, even at extreme pressures. And

Because of all these advantages, Zakri said, “That’s all we think of now when we develop new product—developing it for HPP.”

Such development is not quick or easy, however. Although the company installed the equipment in late 2009, it did not produce an HPP product until 2011. “We didn’t launch any product for 12 to 14 months because it took that long to test and reformulate the product,” Sandridge said. “We have a culinary team that makes the product, but we have a scientific team that makes the decisions on the product,” Sandridge said, adding that the scientific team has final say. “They have that much power—and respect for me.”

And with a year of HPP production now under its belt, word is beginning to spread. “What we are finding is that celebrity chefs are now becoming attracted to us,” Sandridge said. “Every celebrity chef wants to have a retail product, but preservatives have been a barrier to entry.”

**Never ‘Good Enough.’** With such a history of innovation, what is next for the company?

“What drives me has always been to try to get better at what we do,” Sandridge said. “I want to build cleaner food—better food for people. I do believe part of the future should be functional food.”

It will also continue its emphasis on teamwork. “It is important to make sure that all 600 of us really know that the customer trusts us to do the right thing every day,” he said. “If we didn’t have that culture, we wouldn’t have done well in ’08 and ’09 when the world was upside down.”

“But,” he added, “I don’t know what is next for us. You can always get better at what you’re doing. You can never be good enough.”

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because no heat is needed, the sensory characteristics of the food are retained without compromising microbial safety.

HPP cannot yet be used to make shelf-stable versions of low-acid products such as vegetables, milk, or soups because of the inability of this process to destroy spores without added heat. However, it can be used to extend the refrigerated shelf life of these products and to eliminate the risk of various foodborne pathogens such as *Escherichia coli, Salmonella,* and *Listeria*. Another limitation is that the food must contain water and not have internal air pockets. Food materials containing entrapped air such as strawberries or marshmallows would be crushed under high pressure treatment, and dry solids do not have sufficient moisture to make HPP effective for microbial destruction. HPP does not present any unique issues for food processors concerning regulatory matters or labeling.

The full fact sheet is available at http://ohioline.osu.edu/fse-fact/0001.html (http://ohioline.osu.edu/fse-fact/0001.html).

COMMENTS

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