

## Chapter 8

# DEVELOPMENT OF A SANITATION PROGRAM

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The sanitation program is an important prerequisite program. Effective prerequisite programs form the foundation of any HACCP system.

An effective sanitation program:

- Prevents pest infestation;
- Reduces the potential for cross-contamination;
- Minimizes the chance for injury; and
- Helps create a more pleasant work environment.

### **Should office toilets be included in a sanitation program?**

It depends. If office area toilets are available to processing personnel, or if processing area toilets are accessible to office personnel, the processor must determine how to control hazards. This might require including toilets in the Sanitation Standard Operating Procedures (SSOP).

## 1.0 THE SANITATION PROCESS

Cleaning procedures in modern food facilities vary greatly. Such procedures depend on the product, process and equipment used.

For example, the type of cleaning needed in a facility producing ready-to-eat meats might differ very much from a flourmill's cleaning requirements. Similarly, the process in a ready-to-eat product facility could differ from a plant whose products are cooked immediately before being eaten.

Sanitation of food-contact surfaces is usually done in the following order:

1. Scrape all loose debris and food particles from surface;
2. Clean surface using some type of cleaning method (wet or dry);
3. Sanitize using an effective and approved sanitizer (wet cleaning only);
4. Rinse (where necessary); and
5. Cover or protect the cleaned equipment.

*Cleaning means to remove physical contaminants such as soil, food and dirt particles.*

*Sanitizing refers to reducing disease-causing organisms to safe levels.*

*Once the equipment is washed, sanitized and rinsed (where necessary), keep equipment free from re-contamination.*

Let utensils or other equipment air dry after sanitizing, and then cover them. Remember that towel drying can re-contaminate the cleaned and sanitized surface. Also remember that unprotected storage where splashing occurs can also re-contaminate surfaces.

## 1.1 Wet Cleaning

The main cleaning method used in most food processing facilities is wet cleaning. This involves using a liquid (most often water) and some form of agitation (scrubbing or scraping) to remove soil.

Tools such as brushes, high pressure pumps, air or steam are used in wet cleaning.

Generally, wet cleaning is recommended to get rid of sticky residues containing allergens.

Wet cleaning has several steps:

- 1. Flush or rinse excess soil (dirt, debris, or other unwanted material) with water.** The first step is to remove visible soil. Most cleaners aren't designed to work with large amounts of surface contamination.
- 2. Use the right cleaner and procedure for each surface.** The chemical supplier can help you choose the cleaning chemicals, procedures and tools needed for each process. Keep in mind that agitation (such as manual scrubbing) might also be needed.
- 3. Rinse the cleaner from the equipment with water.**
- 4. Sanitize areas that are hard to reach once reassembled.**
- 5. Reassemble the equipment.**
- 6. Sanitize the assembled equipment parts.**
- 7. If necessary, rinse the sanitizer off with clean water.** Some sanitizers, at specific concentrations, can be left on without rinsing.
- 8. Dry the equipment.** Equipment is usually air dried.
- 9. Cover or protect the equipment from re-contamination.**

Make sure that all cleaning tools:

- are rugged;
- made from non-absorbent material;
- do not retain soil; and
- dry quickly.

Clean and sanitize all tools when finished cleaning. Do not use brooms or brushes in wet cleaning operations because they promote microbial growth.

### **Occupational Health and Safety and Chemical Hazards**

A major issue facing all facilities is the potential for reactions between cleaning products. Some highly reactive chemicals, like bleach, will produce toxic fumes when in contact with other cleaners. This often happens when an acid cleaner is mixed with a base or caustic cleaner.

When using, storing or mixing chemicals, always look at the chemical's *Material Safety Data Sheet*. If you have doubts about how to use chemicals, or need information on possible chemicals reactions, ask the chemical supplier.

Before using bleach of any concentration, rinse the area. Drain or clean equipment completely of all residual soils, cleaners and chemicals. Never use bleach in a confined space. Always make sure there is adequate ventilation.

## **1.2 Dry Cleaning**

Not all operations can be wet cleaned. In bakeries, flourmills, dry-blending facilities and similar operations, microorganisms are of less concern than moulds, insects, rodents and foreign objects. In these facilities, clean-up crews use brooms, brushes, shovels and vacuum systems to remove waste and spills.

Unlike wet cleaning, dry cleaning does not use a step-by-step procedure. In dry cleaning, the method is to start high and work down.

Use dry cleaning only when there are no sticky, glutinous allergen residues. Remember that allergens can easily become airborne, especially in facilities with a common air supply. Dry cleaning in such facilities could draw allergens into the air supply system and contaminate non-allergenic products. Use a vacuum cleaner to do most of the cleaning.

### 1.3 Managing Clean Out-of-Place (COP) Programs

Most facilities will have some kind of Clean Out-of-Place (COP) equipment. COP equipment includes items that have to be manually cleaned and sanitized. Examples of COP equipment include removable piping, fittings, gaskets, valves, pumps and product handling utensils.

COP can occur in various ways. Cleaning knives in a sink is one example. Another COP method is chemical agitation cleaning in specialized tanks (e.g. dishwashers).

When developing COP protocols and procedures, pay attention to areas underneath and around pipe gaskets. Also watch for any other small cavities, gaps, niches and harbourage points (places where pests can hide). Residue and bacteria can gather in these areas.

Here are some tips to make COP systems more effective:

- **Try to do all COP tasks in a prescribed order.** Chances of cross-contamination from unsanitized to sanitary surfaces, or overspray, are more likely when sanitation team members perform different activities.
- **Look into using basket, tote or pail washers.** Often facilities will use many small containers in process operations. Washing many containers at once, in a larger washing system, decreases the risk of cross-contamination. This can also reduce the amount of staff needed for the job.
- **Consider having COP operations done on production floors.** Members of the sanitation crew can work directly on the floor or temporary tables. Before putting these in place, it's important to look at the impact such procedures can have on process flow. Also look at how they affect contamination controls.

- **Use racks or COP tanks to hold parts and utensils while they are cleaned.** Place the removed parts either on a rack for cleaning or in a COP circulation tank. Then make sure they are cleaned using hot water, a chemical solution and some form of agitation.
- **Make sure tools and equipment aren't sources of contamination.** Be sure to choose rugged, easy-drying cleaning brushes made from non-absorbent materials.
- **Colour coding or labeling brushes and cleaning utensils as food-contact and allergen surfaces can reduce contamination.** Separating utensils used in different areas of the facility (e.g. barn, kill floor and processing areas) helps reduce cross-contamination.

## 1.4 Managing Clean-in-Place (CIP) Programs

Clean-in-place (CIP) sanitizing cleans the inside surfaces of pipes and tanks of liquid. It also cleans semi-liquid processing equipment.

CIP usually involves forcing detergent through equipment with a spray or spray balls. These remove soil through agitation. Another CIP method uses water spray to push brushes through pipes to clean and remove debris.

CIP systems can use computerized controls. These can monitor and control the flow, mixing, temperature, time and detergent. CIP might also use manual methods to control pumps, spray systems and the addition of chemicals.

Remember that CIP systems are limited. Before designing a CIP system, assess the production process thoroughly. Determine what will work best for each operation.

Some guidelines for developing a CIP system include:

- Lines carrying cleaning chemical should have permanent, easy-to-take-apart fittings;
- Pipelines should be rigid, supported and self-draining;
- CIP pipelines and tanks should be designed with access points or viewing windows. This helps during inspection;

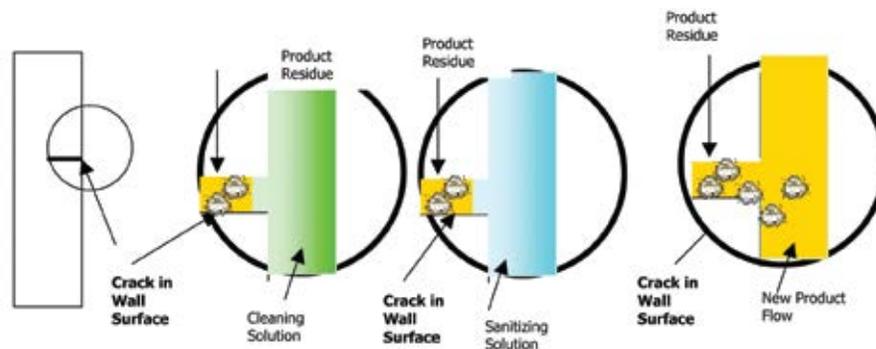
- Use an air break to prevent cross-connections between cleaning solutions and product water. Another choice is to use an approved back-flow prevention device;
- Follow the original manufacturer's specifications for flow rate, time and temperature. Follow these guidelines for cleaning and sanitizing solution strengths as well; and
- Build CIP pipes and tanks from 'food grade' material.

Designing tanks and pipe systems are both important to stop the build-up of soil. It also makes cleaning and sanitizing easier.



*For more information about sanitary design, see Chapter 4: Developing a Premises Program.*

*Figure 1: How Joints, Cracks, or Crevices in Tanks and Pipes Reduce or Limit Operation of CIP Systems*



When designing the sanitation program for CIP equipment, include the following information:

- Equipment and utensils to be cleaned;
- Accurate circuit diagrams of the CIP system;
- Installation instructions;
- Duties of the person responsible; and
- Methods for checking the concentration and effectiveness of chemicals.

An effective cleaning program should clean equipment, not damage it. Many facilities use traditional 'green scrubbing pads' for cleaning equipment. Remember, green pads are VERY abrasive and can damage equipment. Instead, use 'white pads.' These may cost less and have a less abrasive surface.

## 2.0 DEVELOPING A SANITATION PROGRAM

Remember these important tips when developing the sanitation program:

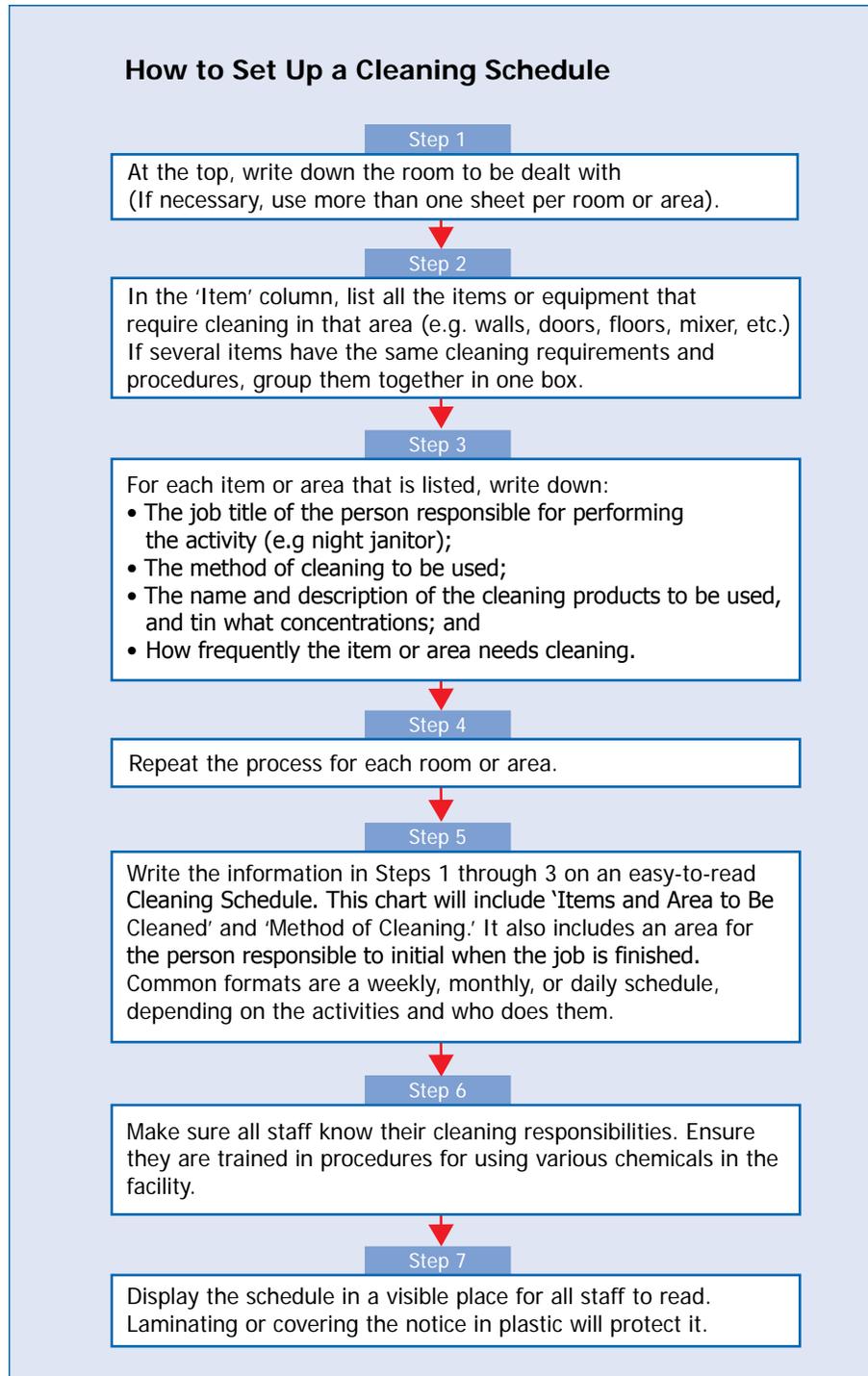
- Make thorough cleaning and rinsing part of the daily cleaning schedule;
- Make sanitizing around floor drains part of the daily cleaning schedule;
- Use sanitizer rings in drains and cooling units;
- Follow the manufacturer's instructions when using cleaning chemicals; and
- Talk to the chemical supplier to learn about the sanitizer and how to use it in the facility.



*For examples of Cleaning Schedules, see Forms E.1.1 and E.1.2.*

Figure 2 outlines the development of a sanitation program and would be used by production and maintenance staff. Follow this step-by-step guide along with a training and communication program.

Figure 2: How to Set Up a Cleaning Schedule



When developing any form of sanitation program, keep in mind:

- Disease causing microorganisms can be found on almost any surface in a facility including:
  - Floors
  - Drains
  - Overhead beams and pipes
  - Equipment surfaces
- Inspect 'dead spots' on and around equipment. If material can get in, contaminants can get out;
- Clean and inspect more frequently in storage areas with higher humidity and heat. Heat and humidity allow microbes and pests to flourish;
- Check for bits of food left inside empty bins and containers that can attract pests;
- Inspect for condensation, which is a potential source of product contamination;
- Schedule cleaning with routine maintenance activities. Equipment disassembled for maintenance can be cleaned at the same time;
- Display cleaning and sanitation instructions in areas where production or maintenance activities happen;
- Encourage staff to 'Clean As You Go.' This reduces contamination, shortens clean-up time and decreases pest activities;
- DO NOT use untreated, re-circulated water. Make sure that all water used for sanitation is drinkable. Make sure that it meets the requirements of Health Canada's "Guidelines for Drinking Water Quality;"
- Ensure all waste material disposal routes are short and direct; and
- Create a verification system to check on these points. The results may not always distinguish between microorganisms and organics (e.g. in ATP testing). However, results should indicate when surfaces are not clean.

## 2.1 Dairies

Taste is a key quality indicator for milk. One cause of off-flavour in milk is microbial contamination due to poor sanitation, cooling, and/or rotation. Contamination is effectively controlled by using SOPs (Standard Operating Procedures) and SSOPs (Standard Sanitation Operating Procedures).

When developing a sanitation program for a dairy facility, consider the following:

- Fresh soil (dirt, debris, or other unwanted material) on a cold surface is easier to remove than dried or baked-on contaminants;
- White or greyish materials on the surface of equipment may be milk or waterstone (calcium or lime). This may require different cleaning materials; and
- Reduce the use of hot water to limit baking soil onto equipment.

Many dairy facilities use Clean-in-place (CIP) systems for vats and piping systems. When developing the program with the engineering staff:

- Keep the temperature of the cleaning solution low enough to ensure that the CIP does not bake on soils. This increases cleaning time and the need for cleaning compound;
- Set rinse water temperature to avoid waterstone (calcium or lime) deposits on the equipment; and
- Pay special attention to the type and style of spray devices used. Make sure they meet the requirements of the cleaning program.

## 2.2 Fruit and Vegetable Processors

Fruits and vegetables are often eaten without cooking or further preparation and because of this they require extra caution.

Many microorganisms can survive and grow on fruits and vegetables. All produce processing facilities (from fresh-cut to packaging) should use the wet cleaning method. This should be the main method of cleaning equipment and facilities.

When developing a sanitation program in a produce facility:

- Separate any unacceptable or returned goods from production, shipping or general storage areas. These goods can be infested and can then lead to contamination of good product;
- Remove as much dirt and mud as practical from fresh produce before it reaches packing facilities or areas;
- Make sure all packaging is undamaged and free of contamination; and
- Protect unused, cleaned, and new packing containers from contamination during storage.

### 2.3 Beverage Processors

Most bacteria are not a concern for the beverage industry. This is because raw materials, processing techniques and the final product usually don't support bacteria growth. However, yeast, mould and certain types of bacteria that can cause disease, may still be a problem in beverage processing plants.

In a dairy or beverage facility, CIP is the most common cleaning process. When deciding on methods for removing soiling material from conveyor systems, remember that:

- Most soils will be spilled product, grease and filings from containers; and
- Foam cleaning with high pressure rinses work best.

Research has shown that biofilms (slimy layers that develop when bacteria attach to equipment or surfaces) can grow inside cooling towers. They can also grow inside and outside warmers and pasteurizers and inside coolers. The use of cleaners containing quaternary ammonium will help stop the formation of these films.

## 2.4 Low-Moisture Food Processing

The most common low-moisture food processing facilities include bakeries, nut, seed, pasta, candy and snack food facilities. These products tend to contain little water and therefore don't generally support microbial growth. The biggest concern these operations is the absorption of unnecessary moisture that may lead to mould growth.

Dry cleaning is best in a low moisture food processing environment. Use brushes, brooms and dustpans to remove heavy debris.

When developing the sanitation program for a low moisture facility, ensure that some cleaning is done during operation to help keep the facility tidy.

The two most common methods of dry cleaning are vacuum cleaning and compressed air. Vacuum cleaning is the best equipment cleaning method in many areas, because:

- It's a good way to remove light or moderate debris;
- It reduces dust, which reduces cross-contamination with airborne particles; and
- Vacuums come in many sizes that suit the unique need of a facility.

Be aware that poorly maintained vacuum systems can transport dust over large areas, which will increase the likelihood of contamination from air particles.

Compressed air is also a common method for cleaning equipment in low-moisture environments. It's good for removing debris from equipment and also an easy way to clean hard-to-reach areas.

Follow these tips when developing a compressed air sanitation program:

- Filter compressed air;
- Use low volume and pressure when working with compressed air; and
- Control dust in storage and handling areas.

## 2.5 Meat Production Facilities

Meat and meat products are more likely to be affected by microbial growth. This is because of their neutral pH and high protein content.

The sanitation program in facilities that handle meat products must pay special attention to the control of bacterial growth. The program must also prevent cross-contamination of the finished product.

It is important to place inedible product in designated tubs or in gut tanks and to physically separate them from edible product.

Inedible waste should be stored in a separate room. Ensure that inedible product is never placed in bins or containers that will at any time hold edible product.

It's important to make sure that the sanitation schedule includes non-processing rooms. It must also include facility areas that aren't cleaned every day. Examples of these areas include:

- Smokehouses
- Coolers
- Cooling units
- Screens
- Water storage facilities
- Spice rooms
- Storage areas
- Delivery vehicles

These areas may not always be checked on pre-ops. Therefore, cleaning staff need to understand the schedule. They must know when to ask a pre-op verifier to inspect certain areas for cleanliness.

## 2.6 Ready-to-Eat Production Facilities

Ready-to-eat products are not cooked before being eaten, so the sanitation program for these producers must:

- Control physical contamination;
- Control chemical contamination;
- Address bacterial growth, and
- Prevent cross-contamination of the finished product.

### **Control of *Listeria Monocytogenes***

*Listeria monocytogenes* is an example of a pathogen that grows easily under normal storage conditions and can continue to grow when the product is refrigerated.

*Listeria monocytogenes* can survive with or without oxygen and is found in many food processing plants. It can grow in cool, damp areas (such as those found in any processing area), in coolers or on the slaughter floor.

Sanitation is the key to controlling and eliminating *Listeria monocytogenes*. Pay special attention to:

- Equipment
- Floors
- Walls
- Light fixtures
- Cooling units
- Ceilings and overhead structures
- Floor drains

### 3.0 DOCUMENTING A SANITATION PROGRAM

Sanitation program documents are important for three reasons:

- They demonstrate due diligence;
- They allow a third party audit the facility on behalf of customers; and
- Documentation of the sanitation program is a regulatory requirement.

The current trade environment demands that manufacturers prove due diligence in all activities. Documentation encourages employees to perform all key activities.

For any food safety program to be auditable, the manufacturer must document what they do. It's important that they prove their activities are following the stated methods. This is shown through documentation.

The *sanitation program* is key to food safety production. Because of this, auditors will likely check the sanitation program in their assessments.

The law requires many food production facilities to have documented prerequisite programs. This is required by:

- The Food Safety Enhancement Program (FSEP), through the Canadian Food Inspection Agency (CFIA);
- The Meat Facility Standards (MFS); and
- Other regulatory standards.

Remember that documentation improves the probability of long term success.

To an auditor, if it's not in writing, it wasn't done.

Everything in the program should be documented. This includes:

- Training
- Dilution rates
- Pre-op inspection findings

The facility should be able to show that the sanitation program supports all other prerequisite programs.

Three formats commonly used to document sanitation program requirements are:

- Sanitation Standard Operating Procedures (SSOPs);
- Matrix or schedules; and
- A combination of matrix and SSOPs.

### 3.1 SSOPs (Sanitation Standard Operating Procedures)

Sanitation Standard Operating Procedures (SSOPs) are usually written in an essay or report form.

Write out each cleaning procedure so that a new or untrained employee will be able to follow the instructions. They must know exactly what to do. These employees must know what, when, and how to do the job.

A typical SSOP will include a description of the activity to be done. It will also include:

- Information about the chemical(s) to be used – including concentration and procedures for using them, and any personal protective equipment (PPE) needed;
- Detailed step-by-step process instructions – including a list of sanitation equipment to be used, and instructions on taking equipment apart.

Be sure to document:

- Sanitation process to be used (COP or CIP);
- Cleaning and sanitizing instructions;
- Temperature of water;
- Water pressure needed;
- Reassembly instructions;
- Frequency that this activity must be performed;
- Document name of where completion of the activity is recorded;
- Job title of the person(s) responsible for the activity;

- Job title of the supervisor or person who will monitor and supervise the SSOP;
- Job titles of personnel to sign off and date the document after the SSOP is accepted or altered; and
- Pre-op inspection or verification instructions.\*

*\*These instructions should include the title and name of the person who will perform the pre-op inspection or verification of the SSOP. They should also include documents where results are to be recorded. They must state deviation procedures to follow if situations change.*

When a typical SSOP is completed, a person should be able to fill in each space of the following Sanitation Matrix.

	Sanitation Activities	Verification Procedures	Deviation Procedures
Who			
What / How			
Frequency / When			
Records			



*For another example of how to document sanitation procedures, see Form E.1.3: Cleaning Procedure Sheet.*

### 3.2 Sanitation Matrix

Like the sanitation program, the sanitation matrix addresses a processing facility's unique needs.

The required information should be completely contained within the matrix. It should also be easy to understand.

There are various ways to develop a sanitation matrix. Some recommended columns to include are:

- Room, area, equipment;
- List of tools and equipment needed;
- Frequency (daily, monthly, yearly or as needed);
- The person responsible (and designated alternate);

- Chemicals used;
- Appropriate chemical instructions (including mixing instructions, concentration, temperature and contact times);
- Cleaning method to be used (manual, automatic, foam, etc.);
- Specific sanitation procedures;
- Disassembly instructions where required; and
- Sign-off record, or associated record.

It's important to make sure that the matrix is completed by relating it to

- Training
- Verification
- Deviation SSOPs

### 3.3 Monitoring the Sanitation Program

As with any prerequisite program, develop a method to monitor how the sanitation program is working.

These procedures can include:

- Checking the concentrations of the cleaners and sanitizers while in use;
- Checking the temperature of the water during cleaning at a regular frequency; and
- Observing sanitation employees during cleaning to make sure that SSOPs are followed correctly.



*See Form E.1.4: Daily Sanitation Report.*

### 3.4 Training

It's important that staff understand chemical usage and sanitation policies. This reduces the possibility of accidental contamination of food products.

Staff should understand written sanitation procedures. Pest control and sanitation in a HACCP facility requires extensive documentation. Train employees to maintain records they are responsible for.

Sanitation staff need to know the following:

- Why sanitation is important to the facility's food safety system;
- Different kinds of dirt and how to remove each type;
- How to use the tools necessary to clean the facility;
- How each cleaning chemical works;
- Skills needed to use each chemical;
- Skills to make sure that all procedures are complete; and
- Documentation.

Remember, the cost of training employees is small compared to the costs that arise from poor sanitation. Such costs include:

- Product line shutdowns;
- Reduced shelf life;
- Product recalls;
- Damage to the brand; and
- Consumer complaints or lawsuits.

## 4.0 DEVELOPING VERIFICATION AND VALIDATION PROCEDURES

Environmental swabbing (swabbing equipment and surfaces in food production areas) or testing is the most common way to check a sanitation program.

These procedures are not developed to determine if the product should be released. Instead, they are developed to monitor whether current system controls are working.

Generally, these tests are done on both food-contact and non-food contact surfaces. They are part of daily pre-operational activities. These procedures need to be documented within the sanitation program.

### 4.1 Strategic Sampling

Pre-operational swabbing will help identify trouble spots. These swabs provide baseline information that a facility uses to decide whether its control of microbes is getting better or worse.

Many facilities develop their verification procedures around trouble spots. Locations to sample in the facility will depend on:

- The layout of the facility;
- The kind of product being manufactured; and
- The type of processing line the product is being run on.

On production line equipment take samples from the following two areas:

- Food-contact surfaces – where product comes directly into contact with the surface; and
- Non-food contact surfaces – where contaminants could move from and come into contact with food-contact areas.

Don't just look at equipment and surfaces. All environmental sampling systems should include some form of air sampling. Microorganisms exist in the air as passengers on dust particles. They're also found in condensation droplets and exist as individual organisms.

In-plant sampling sites should include hot spots (check air as well as equipment/surfaces). They should also include unusual locations such as posters or signs. The sampling should change to new locations from time-to-time.

## 4.2 Sampling Methods

Various methods are available for environmental testing. These include:

- Rapid microbial testing techniques;
- Standard microbiological testing; and
- Allergen residue testing.

### **ATP Testing Methods**

ATP (Adenosine Triphosphate) testing is usually done with specific ATP equipment.

In general, ATP takes little time or work to prepare. The testing units require appropriate training to use properly.

ATP tests provide instant feedback on how the cleaning program is working. They are considered to be 'real-time' because the results are available in a minute or two and not days later as with microbial testing.

ATP testing does not require a laboratory at the facility or sending samples to a third party lab.

ATP swabs are often used to assess microbes and allergens. This process is sometimes unable to provide the exact amount or level of organic material or allergens present on a surface. However, it helps fine tune and correct the program.

In addition to ATP testing, it's important to occasionally do a full microbiological analyses or allergen assessment of a facility environments.

### **Microbiological Testing Methods**

There are a variety of rapid microbial testing methods available. These may not be as fast as ATP testing, but they can assess the cleanliness of the facility.

Results of microbial testing can serve as useful guidelines. However, interpreting results based on absolute numbers can be misleading. Sometimes this is even counterproductive. Certain conditions (such as fatty films) can make these bacterial counts inaccurate.



See Form E.1.5: Microbial Swab Record.

### **Allergen Testing Methods**

There are few approved methods to test for the presence of allergen proteins.

Manufacturers may use allergen specific swabbing kits such as ELISA (Enzyme Linked Immunosorbent Assay), which detect allergenic proteins.

A concern with allergen protein test kits is that they don't recognize denatured proteins. These proteins may cause a reaction in sensitive individuals.

### **DNA Testing Method**

Polymerase Chain Reaction (PCR) is one of the newer methods of allergen and microbial testing. PCR tests for the DNA associated with the material of interest.

The main disadvantage of this method is that it doesn't test for proteins. Instead it tests for DNA. This means that a positive allergen PCR test may result in a negative ELISA or ATP result.

Further, a positive microbiological test may end up scanning as negative. This is because of the extreme sensitivity of this testing. The PCR method can find dead and damaged cells as well as living microbes. As a result, most manufacturers have decided not to use PCR testing at this time.

## 5.0 SANITATION FORM TEMPLATES

- E1.1 Cleaning Schedule (Option 1)
- E1.2 Cleaning Schedule (Option 2)
- E1.3 Cleaning Procedure Sheet
- E1.4 Daily Sanitation Report
- E1.5 Microbial Swab Record

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