The Mango Industry Food Safety Training Kit

Cleaning and Sanitizing Practices in the Mango Industry

Producing Safe Mangos

Mango.org

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Introduction

The “Mango Industry Cleaning and Sanitation Practices Food Safety Training Kit” provides uniform food safety training for the benefit of the mango industry and the consuming public.

The program is designed to deliver food safety training to the sanitation crew employees about cleaning and sanitizing practices in the mango farms and packinghouses. Proper sanitation is one of the most important activities for minimizing the risk of contamination in the mango industry.

Target Audience

The “Mango Industry Cleaning and Sanitation Practices Food Safety Training Kit“ was developed for sanitation supervisors, quality control personnel, extension agents, and/or industry consultants who wish to conduct sanitation training at mango farms and packinghouses.

This training is specifically targeted at workers who are part of the company’s sanitation crew.

Learning objectives

After completing this program, participants will be able to:

- State how sanitation directly affects the mango food safety.
- Understand how biofilms and harborage sites impact food safety and mango quality.
- Understand the importance of proper cleaning and sanitizing practices.
- Understand the company’s formal sanitation program.
- List the steps for cleaning and sanitizing.
- Understand the sanitation verification procedures.

How to use the "Mango Industry Cleaning and Sanitation Practices Food Safety Training Kit"

The training has been developed to rely on illustrations and visual aids containing simple messages related to sanitation at mango farms and packinghouses.

This training kit contains lessons designed to provide sanitation crew workers with the knowledge and skills they need to follow while performing sanitation activities.

The information in this training kit will also help workers understand "Why" certain practices must be conducted diligently to help reduce the risk of mango contamination at the farm or packinghouse. Training activities are also included in the kit.

In the pages that follow, copies of each slide are provided along with text. The figure on the following page depicts the format of a lesson plan.

This lesson page contains the PowerPoint slide that will be seen by the participants. On the page opposite to each slide there is text that the instructor can use to explain the material.

There is also information within brackets for the instructor about how to improve the learning experience — this is not meant to be read to participants.

Additionally, there are several activities and demonstrations in the program. These are included in the PowerPoint slides and come with specific instructions for conducting them.

The actual PowerPoint presentation can be downloaded from:
www.mangofoodsafety.org

It is not necessary for the instructor to memorize all of the text. However, to make the training session more effective, it is advisable for him/her to become familiar with it beforehand and to thoroughly understand it.

Company policies

Before starting the training, carefully review and become familiar with the company's food safety and sanitation policies and make sure that what you teach is consistent with these rules. For instance, some companies might require the use of a specific sanitizer on a particular piece of equipment; also or the cleaning frequency for certain areas or equipment could differ between mango packinghouses. It is advisable that when teaching the program to relate the content of the slide with the practices at your company.

Documenting food safety training

If your training is not documented, a food safety auditor will assume that it never happened. To provide evidence that each sanitation crew employee has received food safety training, the instructor should create a simple attendance sheet that records the date and the topics covered and signatures of employees present.

Each participant should sign the sheet, which should be filed along with other required audit documents. A sample training log is available at: www.mangofoodsafety.org

Acknowledgments

The Mango Industry Cleaning and Sanitation Practices Food Safety Training Kit was prepared by:

Dr. Sergio Nieto-Montenegro, José Luis Almanza Rubio, Edwin Carrillo and Luisa Ortega
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National Mango Board, 3101 Maguire Blvd. Ste. 111 Orlando, FL 32803

Food Safety Consulting & Training Solutions LLC, 2300 George Dieter Drive, El Paso, TX 79936

It should be noted that all the improper situations that are included in the photos of this program were staged.

Disclaimer

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Introduction

Thank you for assisting in this training session about cleaning and sanitation. It is great to be with you, please raise your hand if you have any questions during the presentation. All questions are welcome; they may help to make sure that the subject was well understood.

Let's start by asking you a question:

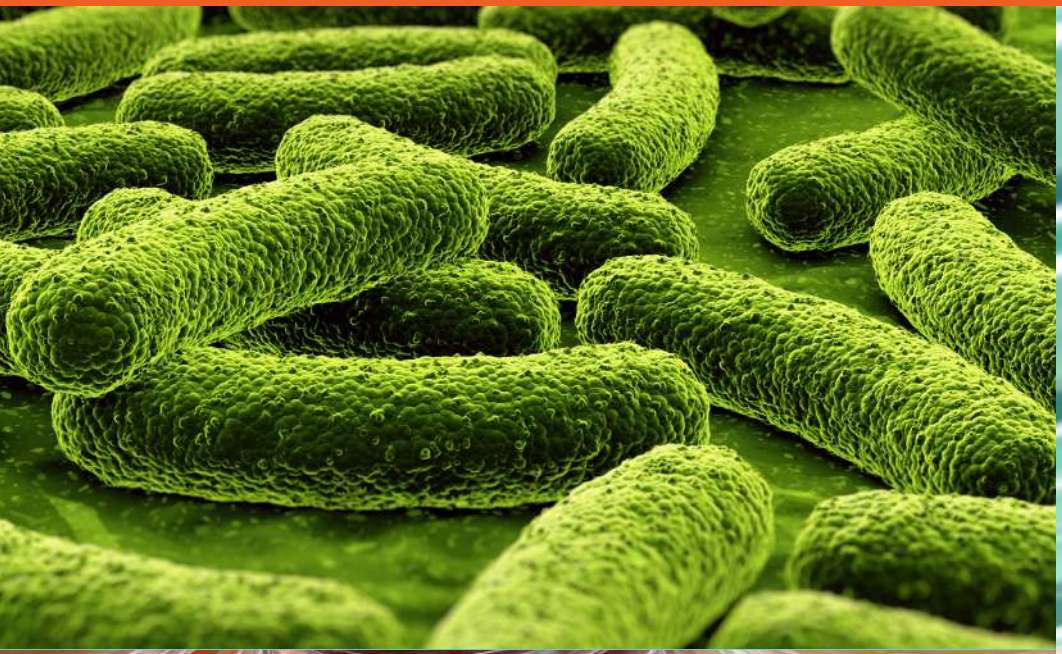
Why are cleaning and sanitation practices important in a mango farm or packinghouse?

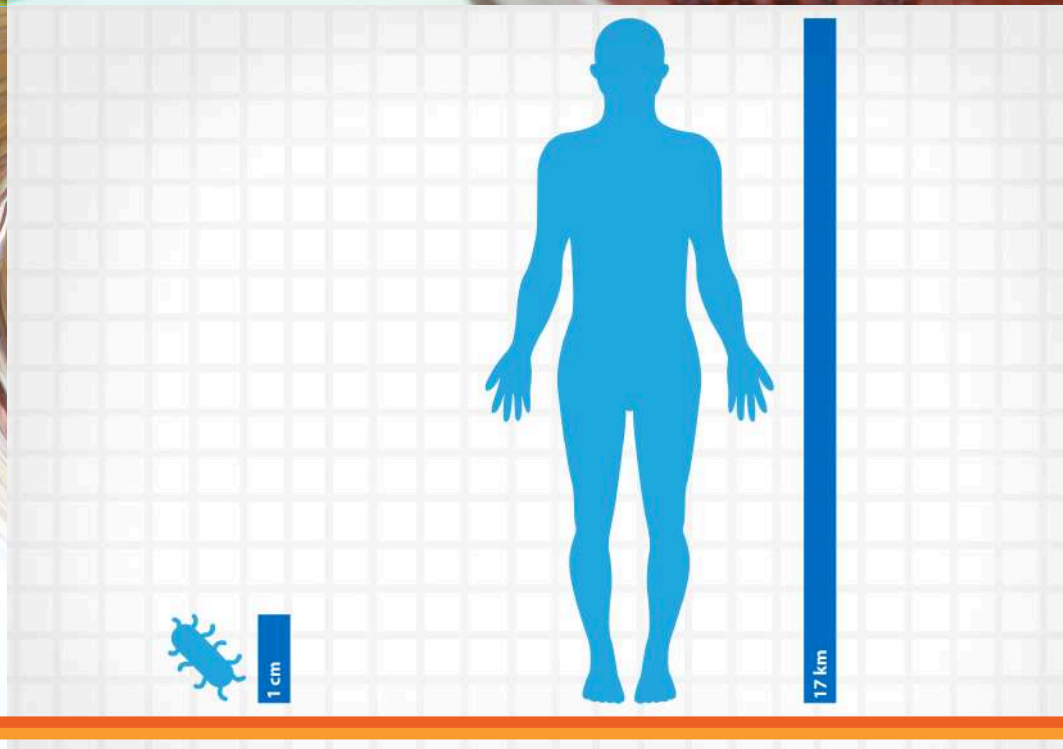
[Let participants answer.]

Proper sanitation helps minimize the risk of food contamination with microorganisms that cause spoilage or illness.

As a member of the sanitation crew you play a key role in providing safe to consumers.

This training will help you to understand the general cleaning and sanitation practices in the mango industry and why sanitizing procedures are necessary.

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17 km

Microorganisms

Microorganisms, or microbes, are living organisms so small that they can only be seen through a microscope. To put that in context, if microorganisms were 0.40 inches long (1 centimeter), then an average man would be 10.5 miles tall (17 kilometers).

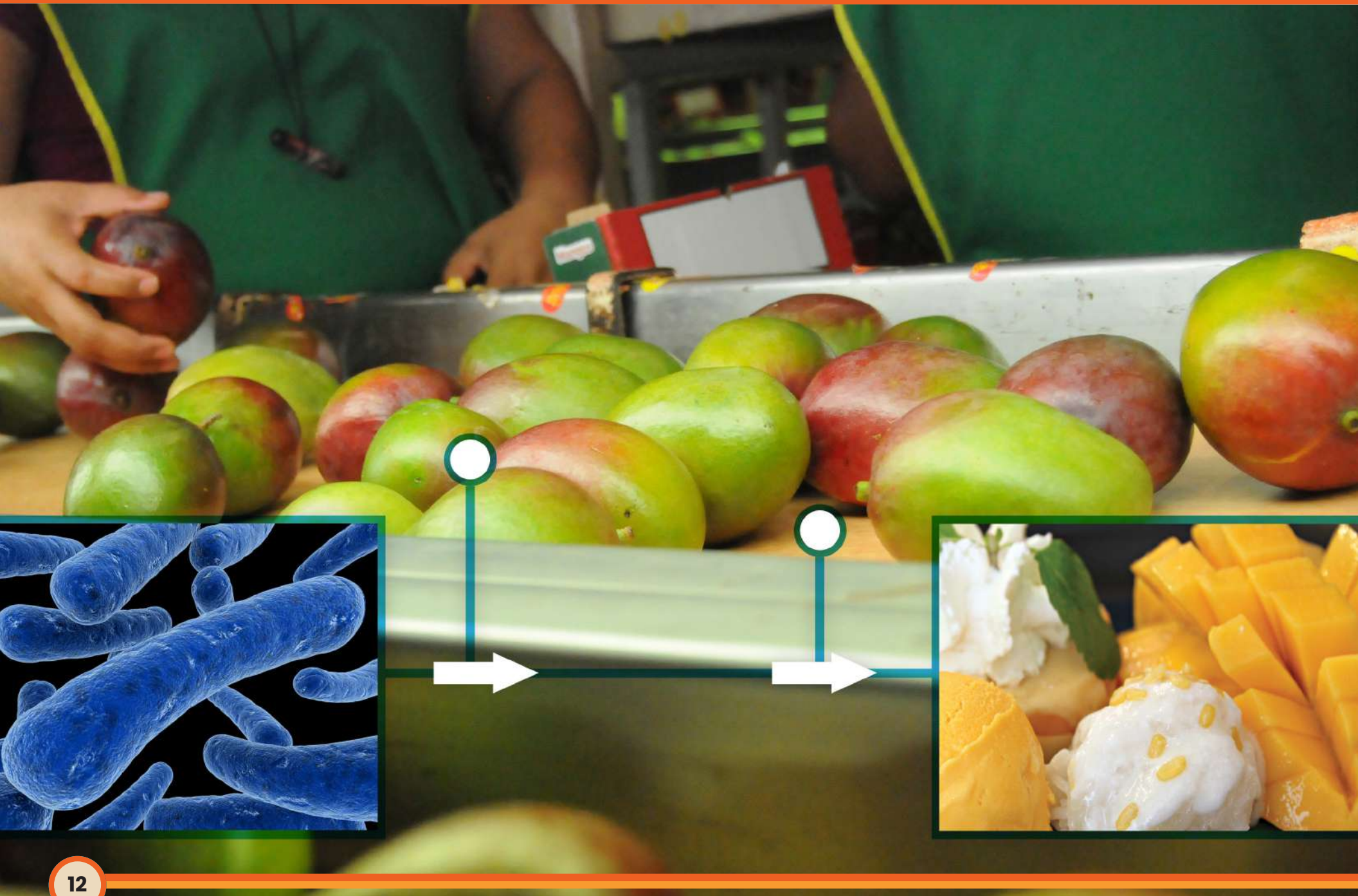
There are microorganisms everywhere: in the air, water, soil, on skin, and even in food. Most microorganisms will not harm us, but there are several that, if present, could make us sick.

Microorganisms that cause diseases are called pathogens. Pathogens are undesirable, so in order to prevent them from reaching the mangos, all equipment and utensils should be cleaned and sanitized thoroughly to prevent them from becoming a source of contamination.

Some examples of human pathogens include:

- *E. coli O157:H7.*
- *Salmonella.*
- *Listeria monocytogenes.*

Notes



Cross-contamination is the transfer of harmful substances or microbes (contaminants) from something DIRTY to something CLEAN. In the case of mangos, they can become contaminated by using dirty equipment or from poor employee sanitary practices. Proper sanitation helps minimize the risk of cross-contamination with microorganisms that cause illness.

In the mango farm or packinghouse, there is always potential for cross contamination. This can occur when the mangos come in contact with dirty equipment surfaces, dirty utensils or other sources of contamination. Cross contamination from equipment can contribute to food borne illness.

Look out for conditions that can lead to cross contamination of mangos, and work to prevent them. Conveyor belts, rollers, work tables and any other equipment or utensil used in packing operations must be visually inspected daily before work begins and periodically throughout the work day (e.g. during breaks).

Cross-Contamination

Notes

Sanitation is the maintenance or restoration of clean, hygienic conditions. In mango production, sanitation programs are needed to eliminate microorganisms that can cause food spoilage or illness.

Sanitation programs include cleaning and sanitizing steps. Cleaning and sanitizing are two different activities with two different objectives. It is important to make the distinction, as one without the other results in a process that does not work.

Sanitation

Notes

Cleaning and sanitizing are more than just keeping things clean: they are important activities in the mango packinghouse.

Cleaning is the physical removal of dust, soil and debris such as leaves and stems; in general, all of the visible and invisible soil is removed from food contact and non-contact food surfaces. Soil provides the nutrients for microorganisms to grow. It can originate from the food or from the field (dirt, dust, grease, animal hazards, etc.)

Most often, the cleaning process will require physical action (i.e., scrubbing — elbow grease) to ensure that the surfaces are clean. During this step, a specified cleaner (or detergent) is applied and used according to the manufacturer's directions. These directions may include cleaner type, concentration, contact time and temperature. The cleaner helps remove grime through the interaction of detergent and soil.

After cleaning, no mango residues should remain on any part of the equipment or utensil. The purpose of cleaning is to remove soil so that sanitation can occur.

Cleaning

Notes

The sanitizing process consists of treating a clean surface with a chemical sanitizer to reduce the number of microorganisms to safe levels.

Remember, “you cannot sanitize a dirty surface.”

The equipment must be cleaned before it can be disinfected properly. All surfaces should be thoroughly cleaned and all detergents and cleaners rinsed off before the sanitizing step. You cannot disinfect a dirty surface: dirt and debris will not allow the sanitizer to do its job.

When sanitizing, always sanitize using food-grade sanitizers at the concentration stated in your company’s policies & procedures. The concentration of your sanitizer must be tested with the appropriate test strip to ensure that it is in line with company procedures.
Note that test strips are designed to be used with specific types of sanitizers. A test strip can only be used with the chemical sanitizer it is designed for. For example test strips for paracetic acid do not work to test chlorine concentration.

Sanitizing

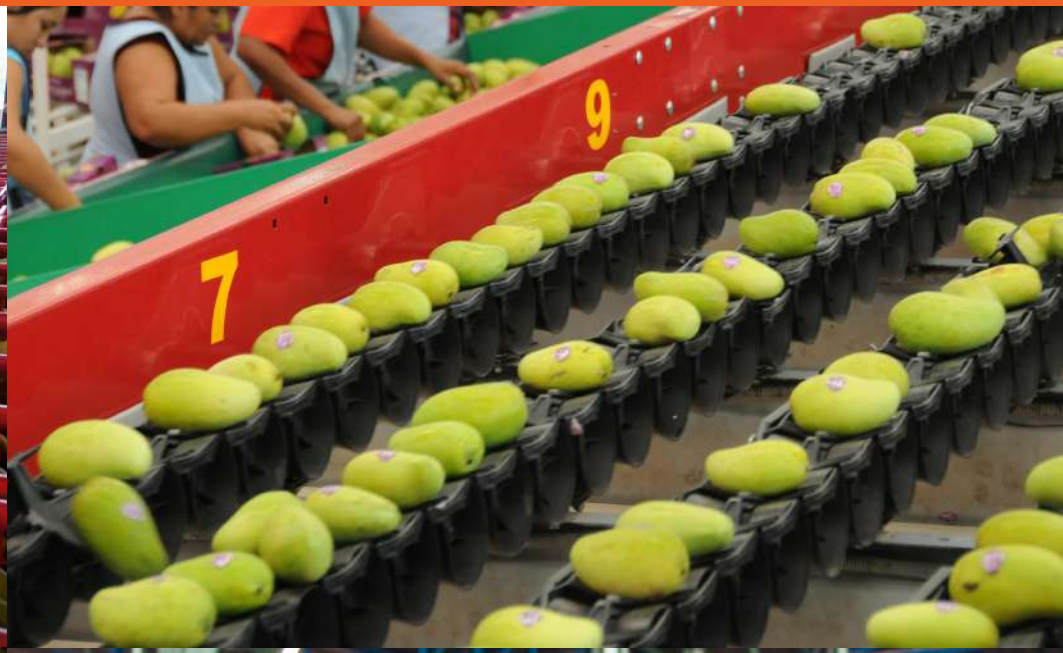
Notes

Food-contact surfaces are surfaces or areas that may come in direct contact with mangos.

Some examples are: conveyor belts, brushes, table tops, working tables, elevators, mango herders and pushers, boxes and plastic crates. Food-contact surfaces are more likely than other surfaces to be sources of cross-contamination. Take special care when cleaning and sanitizing these areas.

Food Contact Surfaces

Notes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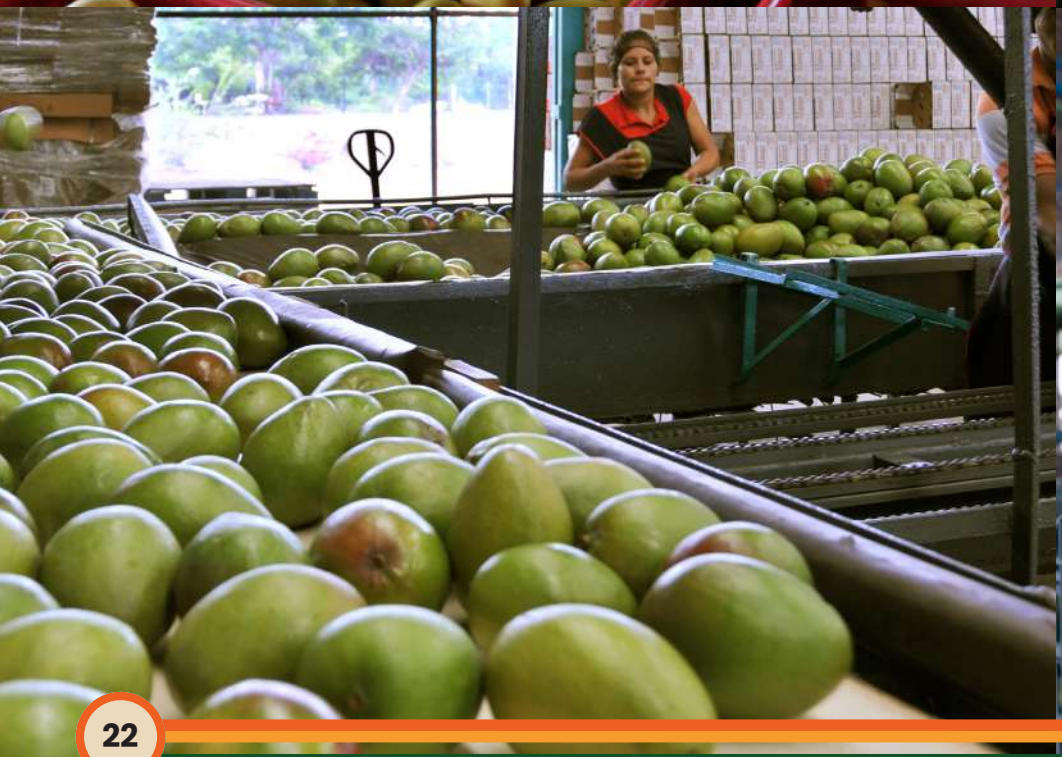


The next slides on the screen will show some examples of food-contact surfaces you may find in a mango packinghouse.

Food Contact Surfaces

Notes

Non-food-contact surfaces such as outer parts of machines, machine framework and structures, walkways, walls, ceilings, drains, etc. are exposed areas that do not have contact with mangos. Even though these surfaces were not designed to have contact with food, they can still become a source of contamination.

We need to be aware of these areas and clean and sanitize them properly on a regular basis.

It is important to clean non-food contact surfaces in the equipment to prevent the accumulation of debris, dirt and residues. The accumulation of these materials may create a good environment for the growth of microorganisms.

These slides show a few examples of non-food contact surfaces that can be found in a mango packinghouse.

Non-Food Contact Surfaces

Notes

Another situation we have to address when cleaning and performing sanitizing tasks are harborage sites associated with the equipment in the packinghouse.

A harborage site is an area that is difficult to clean and sanitize effectively. Dirt, product, and other types of organic material can accumulate in these areas providing nutrients and water for microbes and making them ideal areas for bacteria to grow.

These sites can be particularly dangerous when combined with other factors, like time and temperature, which nurture bacterial growth. Harborage sites need special attention during cleaning and sanitizing; do not take shortcuts and always take your time cleaning the hard-to-reach areas of equipment.

Packinghouse equipment has many places that can become harborage sites for microorganisms.

Harborage sites include:

- Ledges and protective coverings.
- Rollers.
- Conveyor belts.
- Equipment seams.
- Equipment nooks and crannies.
- Temporary repairs.
- Welds.
- Pad segments or wrapped sponge.

Harborage Sites

Notes

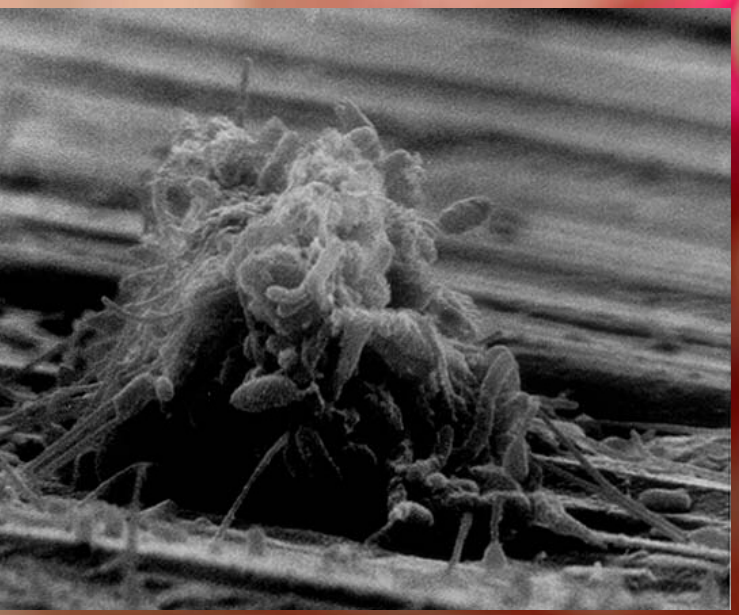

BOHN

A special consideration is the spaces between the cushioned working areas on the worktables. The water used to clean them, food and dirt can accumulate between these spaces and become a source of contamination. Some companies cover these spaces with plastic, while others dismantle the tables for cleaning. Your job is to always follow your company's policy.

The slides on the screen show potential harborage sites in several locations of the equipment and the packinghouse. Let's go over each one of them and identify the potential harborage sites.

Harborage Sites

Notes



Biofilms

Biofilms are the accumulation of microorganisms stuck on a surface and are frequently found in a hard-to-remove structure of bacterial origin. This structure houses and protects them from the external agents of the environment in which they are in, and provides an anchorage point for other microorganisms and colonies to join the biofilm's surface.

Biofilms form on surfaces that have not been cleaned and sanitized properly.

An excellent example of a biofilm is the scum or plaque that builds up on your teeth. If you brush your teeth at night, by morning the bacteria will have built up a film on the surface of the teeth. Even after brushing, bacteria remain in the warm and moist environment of your mouth.

The same sort of film can build up on equipment surfaces in the packinghouse and lead to product contamination. The porous, wet, and hard-to-reach surfaces on equipment are the perfect environment for microorganisms to grow. As the colonies grow, microorganisms produce more of the biofilm to protect them from cleaning chemicals and sanitizers.

Biofilms are an area of concern when it comes to cleaning and sanitizing equipment in the packinghouse. If not cleaned properly, the water and mango debris can become a source of nutrition for the microorganisms in the biofilm, contributing to their growth.

Because of this, regular cleaning and sanitizing is the best way to prevent the formation of biofilm and prevent mango contamination. Scrub the food contact surfaces on the equipment thoroughly when cleaning, giving special attention to harborage sites.

Notes


Master Cleaning Schedule
Sanitation Standard Operating Procedures (SSOP's)
Monitoring of Cleaning and Sanitizing Activities
Verification Activities
Corrective Actions
Records

A mango packinghouse like this one has a sanitation program in place. A comprehensive sanitation program is not only the cleaning and sanitizing of equipment and areas. It also includes all the sanitary procedures that must be carried out at a mango packinghouse.

A sanitation program will help the packinghouse assure that buildings, equipment, fixtures, and other physical facilities of the plant are maintained in a sanitary condition to prevent mangos from becoming contaminated.

The sanitation program at most mango packinghouses includes, but is not limited to, the following components:

- Master cleaning schedule.
- Sanitation standard operating procedures (SSOP).
- Monitoring of cleaning and sanitizing activities.
- Verification activities (environmental monitoring and/or bioluminesce / ATP testing).
- Records.
- Training.

Sanitation Program

Notes

Master Cleaning Schedule. What Needs to be Cleaned and Sanitized?

The company's sanitation program includes a master cleaning schedule. This schedule details how frequently ALL of the equipment and utensils should be cleaned, and who is responsible for executing and supervising the cleaning and sanitation tasks.

There are some areas in a mango packinghouse where special emphasis should be placed on cleaning and sanitation, such as mango transportation equipment and food-contact surfaces.

Food-contact surfaces should be cleaned and sanitized at least daily, or more often, as necessary.

Non-food-contact surfaces must be cleaned regularly to maintain sanitary conditions.

Exterior areas must also be cleaned and neatly maintained.

The features in design, construction, and materials of the equipment used in the packinghouse and its components must be detailed in the cleaning and sanitation procedures.

Master Cleaning Schedule. What Needs to be Cleaned and Sanitized?

Notes

The slides on the screen are some examples of the "components" that need to be considered when cleaning and sanitizing equipment:

- Packing tables.
- Conveyor belts.
- Rollers.
- Hydraulic systems such as elevators, hoses, engines or pistons.
- Dip pans.
- Water tanks.
- Main water supply.
- Equipment structures.

[Ask participants to mention some examples of food-contact surfaces and of non-food-contact surfaces in your mango packinghouse.]

ALWAYS follow your company's policies and do not skip procedures.

[Display and review a hard copy of the company's master sanitation schedule with participants so they are aware that there is an actual schedule for cleaning all the areas in the packinghouse.]

Master Cleaning Schedule. What Needs to be Cleaned and Sanitized?

Notes

There are specific procedures or step by step instructions for cleaning and sanitizing each area and the equipment in the mango packinghouse.

As part of the company's sanitation program, mango packinghouses must develop, implement and maintain sanitation standard operating procedures (or SSOPs).

SSOPs are written documents developed by the quality control management. They impart the detailed procedures on how each item and area should be cleaned and sanitized to prevent contamination. SSOPs include:

- Common names of equipment or targeted areas to be cleaned.
- Tools necessary to perform the task.
- If applicable, steps for disassembling the area or equipment.
- Cleaning and sanitizing method.
- The concentrations of chemicals required for cleaning and sanitizing.

Do not take shortcuts while performing a cleaning task. It is your job to always follow the proper SSOP for each piece of equipment or area that you are cleaning and sanitizing.

SSOPs should be carried out without any deviation or modification to guarantee the desired outcome. They detail the procedure required to clean and sanitize equipment and utensils to keep them from becoming contaminated.

Sanitation Standard Operating Procedures (SSOPs)

Notes

We have covered many basic concepts related to cleaning and sanitizing, but let's learn the basic steps for performing the cleaning and sanitizing tasks.

Remember that cleaning is the removal of all visible soil and dirt from a surface. A surface must be cleaned before it can be sanitized.

During the sanitizing process, a CLEAN surface will be treated with a sanitizer to reduce the number of disease causing microorganisms to a safe level.

Can any of you explain how many steps you use to properly clean and sanitize a food-contact surface?

[Let participants answer and generate a brief discussion.]

Steps for Cleaning and Sanitizing Equipment

Notes


1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4

Let's review the steps for cleaning and sanitizing in detail.

Each piece of equipment or utensil has its own cleaning and sanitizing procedure. However, there is a general sequence of activities for cleaning and sanitizing equipment.

In general, the established sanitary procedures for cleaning and sanitizing equipment include 8 steps:

1. Area and equipment preparation.
2. Removal of debris.
3. Pre-rinse or pre-cleaning.
4. Cleaning.

Steps for Cleaning and Sanitizing Equipment

Notes


5


6


7


8

5. Rinsing.
6. Sanitizing.
7. Air-drying.
8. Equipment reassembly and inspection.

Let's review each one of them in detail.

Steps for Cleaning and Sanitizing Equipment

Notes

Step number 1 is the preparation of the equipment and the different areas in the packinghouse before it is cleaned and sanitized.

In this step the equipment is disassembled and the parts are placed in designated areas, boxes, pallets, or racks before cleaning.

Do not place the parts on the floor to clean them.

Some parts of the equipment such as electrical boards, motors and connections may need to be covered with plastic to protect them from water.

Before you can start cleaning an area, it is very important to remove all mangos from the area. It is also very important to cover or remove all packaging materials from the area.

1. Area and Equipment Preparation

Notes

Step two is the removal of debris.

In this step, all product debris is removed. This step includes activities such as sweeping, scraping, shoveling, vacuuming, etc.

Mangos and trash on the floor must be collected and thrown away.

Make sure you do not clog any drains in the area with mango debris or trash. Puddles and standing water can be a source of contamination.

2. Removal of Debris

Notes

In step number three equipment parts are rinsed with water to remove remaining debris.

Remove all visible soil and do not forget to rinse harborage sites such as welds and joints.

Be careful if you use a high-pressure water hose so that you do not splash water all over the area. Rinsing should be done from top to bottom.

Rinse the parts that were taken apart to remove mango pieces and other debris.

3. Pre-Rinse or Pre-Cleaning

Notes

Step four is cleaning. Cleaning focuses on the need to remove organic matter from food-contact surfaces so that sanitization can occur. Cleaning also removes soil from non-food-contact surfaces so that pathogenic microorganisms will not be allowed to accumulate, and insects and rodents will not be attracted.

In summary, cleaning is the removal of all visible soil and dirt from a surface.

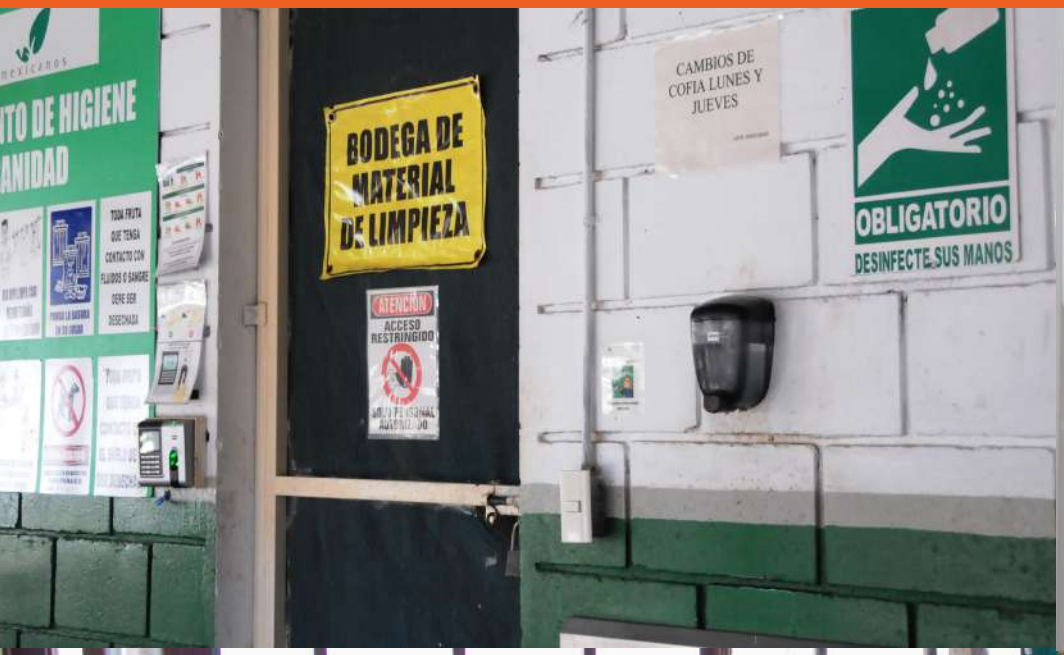
In this step, a specified cleaner is applied to the equipment parts, and they are cleaned according to manufacturers' directions, (which may include cleaner type and concentration, temperature, etc.). If needed, apply physical action; scrub the equipment and all its parts to remove soil and dirt. Again, do not forget to clean any potential harborage sites. Proper physical action is essential to ensure proper cleaning.

Remember, you cannot sanitize a dirty surface; it must be clean before being sanitized! The soil and dirt will prevent the sanitizer from doing its job — killing the microorganisms.

It is your job to ALWAYS follow the procedure you are given. If you are not sure what to do, ask your supervisor.

4. Cleaning

Notes


BODEGA DE MATERIAL DE LIMPIEZA
CAMBIOS DE COFIA LUNES Y JUEVES
OBLIGATORIO
DESINFECTE SUS MANOS
ATENCION
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STORAGE
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There are many different types of cleaning agents available. Each one is designed especially for a specific type of soil.

There is no one-size-fits-all cleaning agent.
Therefore, a different cleaner may be used, depending on the area or type of soil. Your supervisor will tell you which one you must use.

Manufacturers design cleaning agents to work better for particular types of soil and to be used under specific conditions such as pH, water temperature, etc. There are basically four groups of cleaning agents:

1. Detergents.
2. Degreasers.
3. Acid cleaners.
4. Abrasive cleaners.

Cleaners are not to be mixed arbitrarily; mixing can cause injuries since cleaners are designed for specific uses.

ALWAYS follow your company's policies and the manufacturer's instructions while handling cleaners. If you are not sure what to do, ask your supervisor.

Cleaning Agents

Notes


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Concentration: Each cleaning agent works at a certain concentration. These compounds are usually diluted or prepared manually or automatically at the mango packinghouse. It is your job to ALWAYS use the appropriate concentration and the type of cleaner that has been assigned for that task.

Remember: More is not better, since residue may be left on the food-contact surfaces and may become a source of chemical contamination.

Contact time refers to the amount of time that the detergent needs to be exposed to the surface being cleaned.

Do not take shortcuts by rushing the cleaning process — detergents and foams need time to work properly. For instance, if the procedure (SSOP) reads 15 minutes, you must leave the cleaner on the equipment for 15 minutes, not 5 or 10 minutes. ALWAYS follow the manufacturer's instructions.

The temperature of the cleaning solution needs to be appropriate for optimal performance. If the cleaner calls for water at room temperature, use it at room temperature.

Working Conditions for Cleaners

Notes


WEST HIGH
STEER

Step five in the process is rinsing the surface that was cleaned. Rinse the equipment parts with potable water. Remove all detergent residues and any visible soil or mangos debris that may have been left.

After you are done, inspect the equipment looking for any missed residues. If you find any residues on the equipment, you will need to clean it again.

Rinsing is an important step to avoid any residue that may dilute or inactivate the sanitizer.

5. Rinsing

Notes


WEST HIGH
SOCCER
BETCO
Sanibet Multi-Range

6. Sanitizing

In Step number six, equipment and food-contact surfaces of equipment are sanitized after cleaning.

During the sanitizing process, a clean surface is treated with a sanitizer that will reduce the number of microorganisms to safe levels, but the appropriate sanitizer contact time and concentration must be followed to accomplish this task.

Equipment is sanitized by applying heat or an approved chemical sanitizer. Most mango packinghouses use an approved chemical sanitizer. Chemical sanitizing occurs when a sanitizer is put in contact with the different surfaces of the equipment.

This process can be accomplished by immersing the piece of equipment or utensil in a sanitizing solution at a given concentration or by applying or spraying the sanitizing solution on the surface.

Keep in mind that you cannot sanitize a dirty surface. It must be thoroughly cleaned and all detergents or cleaners removed before being sanitized!

Any remaining soil and dirt will prevent the sanitizer from doing its job, which is to kill the microorganisms.

Make sure you apply sanitizer to all parts of the equipment — both contact and non-food-contact surfaces.

Notes


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Chemical Sanitizers

The four basic types of sanitizers are chlorine, iodophors, peracetic acid, and quaternary ammonium compounds (quats). As with cleaning agents, manufacturers design sanitizers to work under specific conditions. Employees are probably not responsible for choosing the sanitizer, but they are responsible for using it correctly. Three basic factors must be taken into account when using a sanitizer:

Concentration. Sanitizers should be used at the proper concentration to ensure their effectiveness. More is not necessarily better, be sure to follow your company's procedures and manufacturer's instructions. Use a test kit or other appropriate device to check the concentration of the sanitizing solution. Lastly, do not mix them arbitrarily because it can be dangerous.

Temperature. The temperature of the sanitizing solution does have an influence on the effectiveness of the sanitizer. Always follow the manufacturer's instructions.

Contact time. Do not rush the sanitizing process. Sanitizers should have enough contact time with the surface that is being sanitized to allow for sufficient inactivation of microorganisms.

Rotating sanitizers is a good practice that may increase their effectiveness. If you only use a single sanitizer, microorganisms can become resistant to it and become harder to eliminate. You are responsible for ALWAYS following your company's recommendations.

[In this section the instructor should go over the cleaners and sanitizers and the concentrations that are being used in the facility. It is advisable to physically display or show the products to the participants.]

Notes

Air-drying is the next to last step or in the cleaning and sanitizing process. Depending upon the concentration and type of sanitizer you use, some of the equipment needs to be air-dried.

Some sanitizers call for rinsing the equipment after cleaning and sanitizing. This rinse must be done with potable water.

Items must be allowed to drain and to air-dry before they are used again.

Cloth drying of equipment and utensils is prohibited in order to prevent the possible transfer of microorganisms onto equipment.

7. Air-Drying

Notes

In the last step, the equipment is reassembled and then inspected.

Avoid touching the food-contact surfaces when reassembling the equipment.

In some instances the equipment may be re-sanitized with an approved sanitizer, and rinsed with potable water, if required.

Be careful to not expose equipment to drain splashes, dust and other potential sources of contamination.

Mango packinghouses conduct a final check to make sure equipment and working areas are clean without the presence of any visible debris that could contaminate food. This check is a verification of the sanitation process to make sure procedures were completed satisfactorily.

During the inspection, a checklist detailing each area of the plant and each piece of equipment is used so nothing is missed. The packinghouse has a person responsible for conducting this inspection, and if needed, this person can order re-cleaning of an area or equipment.

The packinghouse must keep records of inspections to document that sanitation procedures are being accomplished at correct intervals and that correct procedures are used.

8. Equipment Inspection and Reassembly

Notes

Monitoring is another component of a sanitation program: it is a planned sequence of observations or measurements that assess whether the program is being properly implemented.

Monitoring is the responsibility of the sanitation crew leader or the supervisor. The individual(s) responsible for observing cleaning crews should spend time in the packinghouse supervising the cleaning crew's work.

Monitor food contact surfaces, paying attention to the hard to clean areas of the machines, and making sure the harborage sites have been properly cleaned and sanitized.

All of the food contact surfaces should be closely monitored. Also make sure that the chemical concentrations stated in SSOPs are used at all times.

Monitoring

Notes

There is equipment in the packinghouses such as metal detectors, overwrappers, conveyor belts, light fixtures, electrical boxes, etc. that can't get cleaned and sanitized using a hose or a pressure washer because excessive water would damage them.

These pieces of equipment can still be cleaned and sanitized using the "bucket method."

Take your time to perform this operation. Fill a bucket with water and the proper cleaner at the proper concentration.

With a clean, damp towel or sponge, wipe down the entire unit. Allow the cleaner enough time to act according to the instructions from your written procedure (SSOP). If needed, brush/scrub the surface with a damp towel.

Rinse thoroughly with water using a sponge or clean damp towel dedicated to this purpose.

Fill another bucket or sprayer with sanitizer at the appropriate concentration and wipe the equipment down with sanitizer on all surfaces. When you are done, do not rinse — air-dry.

If you use single-use disposable sanitizer wipes, use them in accordance with the manufacturer's label instructions.

Make sure you UNPLUG any electrical connections and ensure that NO water gets into any of the panels, electrical components or sensors. If necessary, cover them with plastic even though this task may take you some more time.

The Bucket Method

Notes

Take participants to a workstation to conduct a demonstration.

What are the company's procedures for cleaning and sanitizing?

Can any of you remember the 8 steps for cleaning and sanitizing equipment?

[Let participants answer]

Let's demonstrate the proper way to clean any piece of equipment in the packinghouse.

Conduct a demonstration. Select a piece of equipment to be cleaned and gather all the utensils and supplies.

Demonstrate the proper way to clean a piece of equipment using your company's sanitation standard operating procedure (SSOP). During the demonstration, go over in detail each of the 8 steps for cleaning and sanitizing equipment and how they apply to the piece of equipment that is being used in the demonstration.

1. Area and equipment preparation.
2. Removal of debris.
3. Pre-rinse or pre-cleaning.
4. Cleaning.
5. Rinsing.
6. Sanitizing.
7. Air-drying.
8. Equipment reassembly and inspection.

Make sure participants get some hands on experience. Get them involved in this activity.

Demonstration

Notes

Records are a key component of a sanitation program. Records are kept in the form of checklists that will help you and your team to take care of all the required details and to develop good sanitation habits.

Auditors will look for signs or evidence that a program is in place.

Records are the evidence that proper sanitation takes place every day. If you can't show me that you did it, then you did not do it. The most common sanitation checklists include daily sanitation checklists, monthly/quarterly sanitation checklists, daily ATP bioluminescence tests for food-contact surfaces and non-food contact surfaces and pre-operational sanitation inspection logs.

Some of you are probably in charge of filling out sanitation logs.

These logs cover the entire area of the facility and equipment and must include: date, list of areas/equipment that were cleaned, the individual accountable and sign off for each task completed.

Keep in mind that there are some good documentation practices that must be followed:

- Logs must be filled out completely using permanent ink, not pencil.
- No use of "correction fluid" ("white-out") is allowed. If a mistake is made, no scratches or overlap of data are allowed, the mistake should be crossed out and initialed by the employee making the change.
- Falsification of data may result in an automatic failure of an audit.
- Each log must be completed at the time of performing the task.

Records

Notes

Completing and signing records carries a great responsibility. If you do not understand something or have a question, ask your supervisor immediately.

[Bring few sample checklists to the class and run a demonstration on how to fill out records properly. Provide participants with pens and checklists so they get hand-on experience with this. Guide them through the process of filling out the checklists.]

Documentation and records are critical components of a sanitation program: they should not be overlooked or performed haphazardly. Individuals responsible for filling records have a big responsibility.

Records

Notes


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How do we make sure we are doing a good job?

You learned the importance of cleaning and sanitizing and are now aware that the equipment used in the packinghouse should be properly cleaned and sanitized to minimize the risk of mango contamination. However, how do we make sure we are doing a good job cleaning and sanitizing?

Packinghouses generally use 3 methods to verify that their cleaning and sanitizing practices are effective:

1. Visual inspection, to verify that there is no visible dirt or debris However, microorganisms can't be seen with the naked eye.

2. Microbiological sampling of equipment surfaces. This method provides a count of microbes on a given surface; however, the results are not provided instantly. The sampling is conducted by the quality control employees and an external laboratory at a predetermined frequency according to the company's sampling plan.

3. Using a luminometer. This is a handy tool that measures a small amount of light given off in a chemical reaction. The amount of light is related to the amount of bacteria on the surface – the more bacteria, the more light. The cleanliness of a surface can be assessed in few seconds using a luminometer; these measurements help you to make decisions onthe spot / immediately.

Verification

Notes


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Do not verify your own work. If you perform the activity, your supervisor must verify it. Monitoring is the sanitation crew leader or the supervisor's responsibility. The individual(s) responsible for observing cleaning crews should spend time in the packinghouse supervising the cleaning crew's work.

Monitor food contact surfaces paying attention to the hard to clean areas of the machines and making sure the harborage sites have been properly cleaned and sanitized.

Closely monitor all of the food contact surfaces and make sure that the chemical concentrations stated in SSOPs are used at all times.

Verification

Notes


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When working with cleaners and sanitizers, remember that they are chemicals and can be dangerous if not handled properly. Store chemicals in the designated areas and never near mangos.

Do not mix and match chemicals. For instance, when chlorine is mixed with acid solutions, chlorine gas can be generated, which is not only corrosive, but can cause respiratory irritation to humans.

All cleaners and sanitizers, both in use and in storage, should be clearly labeled and identified at all times. Secondary or smaller containers must be labeled with the name of the contents. Do not put chemicals in food containers.

ALWAYS use the proper concentration of chemicals, follow the manufacturer's instructions and use the appropriate personal protection equipment.

Keep in mind that more of a chemical or sanitizer is not necessarily better.

If your company has a color coding system in place for utensils, follow it at all times and remember that certain utensils are exclusive to certain areas, such as brushes for use in the bathroom or those brushes used to clean drains.

Labeling, Use, and Storage of Chemical Products

Notes

Activity: Testing a Sanitizer Concentration Using Testing Strips

The purpose of this activity is to demonstrate the procedure for testing a sanitizer concentration using testing strips.

Materials

- 4 cups, jars, or buckets.
- Water.
- A sanitizer used at the mushroom packinghouse (i.e. chlorine).
- Test kit strips.

Preparation

Before starting the training session, prepare four containers of sanitizing solution at four different concentrations. Include one container with no sanitizer (just water) and another one that exceeds the recommended concentration. For instance, if using chlorine labeled for use on food-contact surfaces at a concentration between 50 and 200 ppm, prepare a solution at 0 ppm, 50 ppm, 150 ppm, and 300 ppm.

If the packinghouse requires that the concentration be monitored, bring a blank log for record-keeping purposes during the demonstration.

Introductory remarks

It can be a problem if the sanitizer is not at the appropriate concentration. If the concentration is too low, it will not do its job of killing microorganisms. If it is too high, it can become a source of chemical contamination. Therefore, it is necessary to monitor the concentration of the sanitizer constantly using a test kit to measure chemical sanitizer concentrations. There are test kits for each type of sanitizer, but they are not interchangeable.

If the kit runs out of supplies, let a supervisor know immediately.

Notes

Activity

1. Place the sanitizing solutions in front of four participants.
2. Provide a test strip to each participant.
3. Ask one participant at a time to dip the test strip into the solution and remove it immediately.
4. Tell them to hold the strip for 15 seconds without shaking the excessive water from the strip.
5. Compare the strips with the color chart included in the package.
6. Ask each participant to record the findings on the concentration log.
7. Ask participants to tell you what they should do when the concentration is too low or too high.
8. Have them record the information and the corrective action, if any, in the sanitizer concentration log.

Closing Remarks

Remind participants about the importance of measuring the strength of sanitizing solutions.

Finish the discussion by reminding employees that everyone should follow the company's policies when it comes to sanitizer solutions.

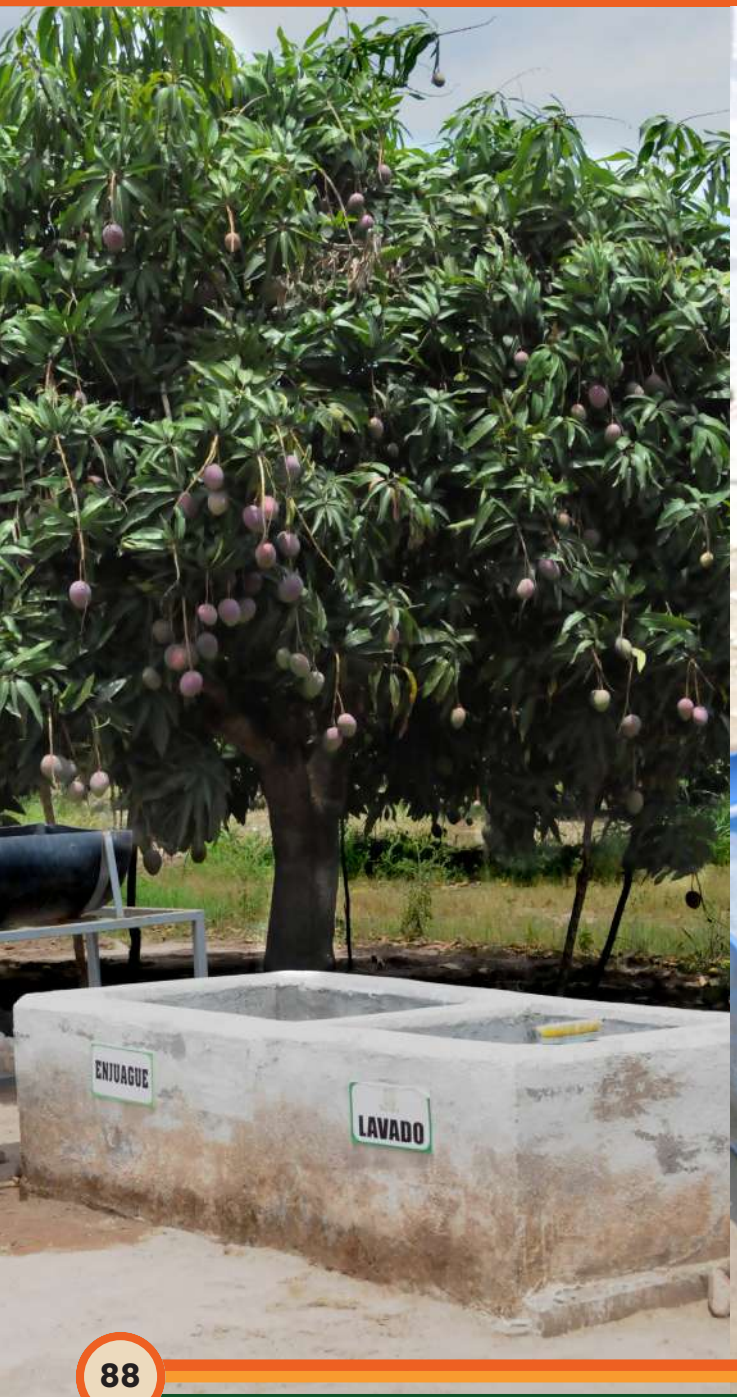
Remember, more is not better, since residue may be left on the food-contact surfaces and may become a source of chemical contamination to mangos.

If they are not sure what to do, employees should contact their supervisor immediately.

[Note that, if your company uses a titration kit to measure the sanitizer's concentration, you can still run this activity by demonstrating the concentration of the four different containers using a titration.]

Activity: Testing a Sanitizer Concentration Using Testing Strips

Notes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There is a variety of equipment and utensils used to harvest and transport mangos from the field to the packinghouse.

Some harvesting utensils to consider include:

- Nets.
- Knives.
- Scissors.
- Hooks.
- Characas or tenates.

Each unit of equipment and utensil presents different challenges in its cleaning and sanitizing procedures. Get to know the equipment well in order to understand the challenges to effectively cleaning and sanitizing each unit.

In addition to "harvesting equipment and utensils", there are other types of equipment that are part of the harvesting operation. Everything needs to be part of the cleaning regime and have its own dedicated set of cleaning and sanitizing procedures.

The cleaning and sanitation procedure for harvesting utensils consists of three steps:

1. First the harvester cleans the net with a detergent, scrubbing it with a fiber to remove dirt and debris.
2. The net is then rinsed with clean water.
3. Finally it is submerged in a sanitizing solution.

Cleaning and Sanitizing Harvesting Equipment

Notes

Proper cleaning and sanitizing of plastic baskets or containers is key to the mango industry's food safety efforts.

Cleaning and sanitizing help prevent cross-contamination by eliminating dirt and disease-causing microbes that could be present on mango-contacting surfaces.

If your job includes cleaning and sanitizing activities, always follow the procedures indicated by your supervisor. If you have any questions, be sure to ask them.

Harvesting Containers

Notes

The vehicles for mango shipments must be in acceptable condition. Transport vehicles can be trucks or trailers but also include forklifts.

Before loading the product, the vehicles must be clean, without any odor, food debris, or dirt.

Vehicles used to transport mangos must not have been used for animal transportation; if so, they must be cleaned and sanitized to prevent contamination.

Some packinghouses apply sanitizers to the back of the truck before loading it with mangos. Always follow your company's policy.

Mango Transportation Equipment

Notas

Instructions

Read each of the next case studies out loud and ask participants to describe what should have been done in each situation. Discuss the answers with the entire group.

Hugo was in charge of the cleaning and sanitation of the conveyor belts in the mango classification equipment. He was in a hurry and wanted to finish before the start of the football game. He did not want to wait the 15 minutes that the foam cleaner has to be in contact with the equipment, so he doubled the foam concentration and only waited five minutes before rinsing the equipment. What should have Hugo done?

Jose, the person in charge of the company's chemical products storage, had left the packinghouse to go to the bank when he received a call from a worker in the sanitation crew. The sanitation crew was out of foam/detergent needed to clean the mango-washing tank and needed Jose to supply them with more. The bank closed at 4:00 pm, so Jose was in a hurry and told them to use the detergent used to clean the offices and that he would supply the foam/detergent the following day. What should have Jose and the cleaning crew have done?

Edwin finished sanitizing the equipment and was filling in his inspection records while it was air-dried. The production supervisor arrived at the packinghouse and was in a hurry to start the process. The cleaning crew used a wet rag to finish drying off the equipment so that other workers could start work early and maybe even return home early. What should the cleaning crew and the production supervisor have done?

Luisa likes to fill out the sanitation records with a pencil and then go over them with a permanent ink pen. Her documents are generally crossed out and disorganized but legible. What is the correct practice that Luisa should follow?

Luis is the sanitation crew's supervisor; he was monitoring the crew which was finishing the cleaning step when he realized that the sanitizer tank was near empty. Production was scheduled to start very soon, and he didn't want to go back and prepare more sanitizer to fill up the tank, so he decided to fill up the tank with pure water. The solution in the tank was applied to the equipment and the equipment was left to air-dry before production started. What should have Luis and the cleaning crew have done?

Adriana, the sanitation crew's supervisor, had to run out of the packinghouse for a personal errand and couldn't make it back in time to do the final sanitation inspection on the mango conveyor belts. She filled out the inspection record in advance, and since there was no one there to inspect the equipment, the workers only cleaned those parts of the equipment that were visibly dirty and didn't use any sanitizer. What should have Adriana and the cleaning crew have done?

In this lesson we learned:

- The importance of good sanitation and the difference between cleaning and sanitizing. We want to remind you that you should always follow all the steps listed/described in the company's SSOP (standard sanitation operating procedures); each step is required for performing a proper sanitation process.
- The basic steps for cleaning and sanitizing equipment. Always take all the steps, do not take sanitation shortcuts. While shortcuts may make your job go faster, it may compromise the safety of mangos that are going to consumers.
- Remember, a surface must be cleaned in order to be sanitized.
- What are biofilms and harborage sites? Pay extra attention to harborage sites. These sites may need a little extra effort to properly sanitize, since they are the most likely places for bacteria to hide and grow.
- Basic concepts for handling chemicals. Have respect for the chemical products you handle, always use them according to the manufacturer's instructions.
- Lastly, it is important to notify your supervisor of any sanitation lapses or hygiene issues that you see in the packinghouse.
- This is the end of our discussion about sanitation in mango packinghouses.
- Are there any questions?

Thank you for participating.

Please make sure you have signed the attendance sheet.

What did we Learn /What is my Job?

Notes

Mango Industry Cleaning and Sanitation Practices