# CHAPTER 10
# Managing Tools and Equipment

# Overview

Tools and equipment are essential for the growing and production of fresh produce but can also be sources of physical, chemical (including allergen) and microbiological contamination.

Careful selection, design, maintenance, cleaning and sanitising of tools and equipment is essential to minimise these risks and ensure food safety.

Guidelines for maintaining, cleaning and sanitising vehicles (including harvesters) are provided in Chapter 12, while guidance for facilities is outlined in Chapter 9.

Considerations:

- equipment and tools should be designed for easy inspection, cleaning and sanitising, particularly when they come into direct contact with produce
- regular maintenance helps prevent accidental contamination and ensures equipment remains in optimal condition
- cleaning and sanitising, along with maintaining tools and equipment are fundamental practices to ensure the delivery of safe produce to consumers
- the likelihood of contamination is influenced by several factors, such as design, material composition, function, maintenance history, type of produce, location of use and level of cleanliness
- implementing good practices in equipment management will help safeguard food safety and reduce contamination risks in production and processing environments.

## 10.1 How tools and equipment can act as sources of contamination to produce

Equipment surfaces that come into contact with produce pose the highest risk of microbial contamination, especially when wet or soiled.

These surfaces include picking bags, buckets, tanks, water flumes, spray nozzles, brushes, rollers, conveyors, filters and flaps. Contamination can occur when tools and equipment from one area are transferred to another without first being cleaned and sanitised. Consideration should be given to having dedicated tools for critical or especially dirty areas or for each zone the produce passes through (e.g. outside the facility, inside holding area, preliminary washing zone and packing area).

Potential ways in which tools and equipment can act as sources of contamination to produce are outlined in Table C10:1.

**Table C10:1 | Ways in which tools and equipment can act as potential sources of contamination.**

| Hazard group | Potential sources of contamination |
|---|---|
| **Physical** | Metal shavings, bolts, nuts, glass, plastic fragments, knife blades and other foreign objects from damaged tools and equipment.<br>Poorly maintained or damaged equipment introducing foreign objects into produce. |
| **Chemical** | Grease and other lubricants coming into contact with produce.<br>Use of inappropriate cleaning and sanitising products on equipment or tools.<br>Accidental spillage of pesticides, fuel, oil and other chemicals. |
| **Allergen** | Inadequate allergen control can result in equipment surfaces, picking bags or buckets becoming contaminated with allergens, which may then cross-contaminate fresh produce [refer Chapter 16]. |
| **Microbiological** | Presence of faeces from birds, rodents and other animals.<br>Contaminated produce, soil or other debris.<br>Use of contaminated water for cleaning tools and equipment.<br>Dripping of contaminated water from equipment.<br>Splashing of contaminated water during cleaning of tools and equipment. |

## 10.2 Equipment design, maintenance, cleaning and monitoring

Good practice for the way in which equipment is designed, operated, maintained and cleaned is outlined in Table C10.2. Adhering to these principles ensures tools and equipment remain in optimal condition, reducing contamination risks and enhancing food safety.

For monitoring the effectiveness of cleaning microbial testing or Adenosine Triphosphate (ATP) test kits can be used. ATP is a molecule found in all living cells, including microorganisms and organic matter. The presence of ATP indicates the presence of biological material, which can be an indicator of contamination. ATP test kits can quickly assess the cleanliness of surfaces or equipment by measuring the amount of ATP present.

## 10.3 Good practice for managing tools and equipment

**Table C10:2 | Summary of good practices for managing tools and equipment.**

| Management area | Good practices |
|---|---|
| **Design** | Equipment should be easily disassembled for thorough inspection and cleaning, including enclosed components.<br><br>Surfaces that contact produce should be made of material that can be easily cleaned and sanitised.<br><br>Do not use porous materials like wood or carpet.<br><br>Conveyor guides, splash guards and safety guards should be designed for easy cleaning.<br><br>Avoid hollow structures that can trap water and debris, making them difficult to clean and inspect.<br><br>Conveyors should not have roll-under edges, creases, gaps or open seams, where contaminants can accumulate.<br><br>Welds should be smooth and continuous to prevent the accumulation of debris.<br><br>Equipment should not have sites (ledges, ends) where product and debris can accumulate.<br><br>Plumbing should not have dead ends where soil can collect and where turbulence and sanitiser concentrations are low which enables microbes to survive or multiply. |
| **Installation** | Equipment should be positioned at least 200 mm above the floor to enable effective cleaning and reduce the risk of contamination from floor surfaces. Food safety standards widely support this guideline, with industry best practices recommending elevations between 150 mm and 300 mm (Codex Alimentarius, HACCP, GMP, ISO 22000, FSANZ). |
| **Maintenance** | Equipment and tools should be designed and constructed to facilitate regular cleaning and maintenance.<br><br>All equipment food contact surfaces should be free from damage or defects that could trap bacteria, hinder effective cleaning or create a source of physical contamination.<br><br>A documented preventive maintenance plan should be in place, detailing:<br>• areas and equipment covered<br>• specific maintenance procedures<br>• frequency of maintenance<br>• responsible person ensuring completion.<br><br>Equipment should be stored properly to minimise contamination risks.<br><br>Lubricants should be applied carefully and not excessively to prevent accidental contact with produce. |

| Management area | Good practices |
|---|---|
| Cleaning | A documented cleaning and sanitising plan should be followed for equipment and tools that come into contact with produce.<br><br>A documented cleaning plan should be in place, detailing:<br><br>• areas and equipment requiring cleaning<br>• specific cleaning and sanitising products and methods<br>• frequency of cleaning and sanitising<br>• responsible person ensuring completion.<br><br>Food contact surfaces should be cleaned at least daily or at product or shift change over.<br><br>Only approved chemicals for food contact surfaces should be used following manufacturer instructions.<br><br>Storage of cleaning and sanitising materials should be carefully managed to prevent contamination of produce [refer Chapter 8]. Tools used for cleaning floors should never be used on food contact surfaces.<br><br>Label cleaning tools clearly or apply a colour-coding system that corresponds to the zone where they are used. |
| Monitoring | To ensure cleaning and sanitising are effective, verification should be carried out through visual inspection, microbiological swab sampling or ATP testing [refer Chapter 18].<br><br>Monitoring outcomes should be carefully documented and evaluated. |

**Image C10:1 |** Good practice example of a packing line constructed from smooth rubber; a non-absorbent, durable material.

**Image C10:2 |** Good practice example of a packing line constructed from stainless steel. This surface is easy to clean and maintain, reducing the risk of contamination.

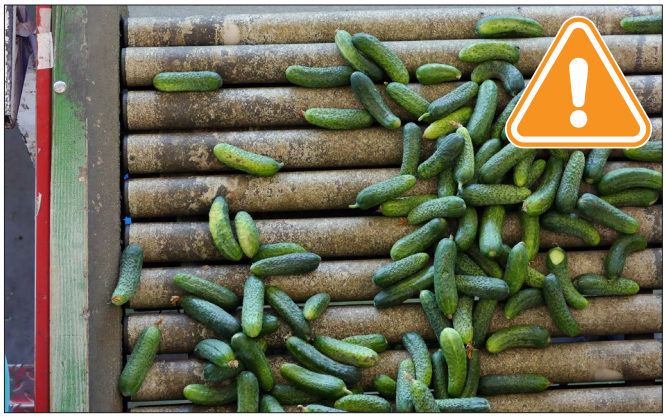


**Image C10.3 |** Unacceptable practice example of a packing line using absorbent or deteriorating materials. Wooden rollers are difficult to clean and could harbour pathogens.

**Image C10.4 |** Unacceptable practice example of a packing line with rust and flaking paint which can introduce a potential hazard.

# 10.3 Cleaning and sanitising regimes

Cleaning and sanitising are distinct yet complementary processes, typically involving different chemical agents and application methods. These procedures are intended to eliminate physical, chemical (including allergen) and microbiological hazards, thereby minimising the risk of surfaces becoming sources of contamination.

## 10.3.1 Cleaning

The purpose of cleaning is to remove soil, debris and residual organic matter from surfaces. This process also removes the majority of microorganisms and their potential sources of nutrients.

Cleaning can involve the use of detergents to dissolve and remove dirt, dust and debris from surfaces. However, physical methods such as dry brushing, sweeping, high pressure washing or steam cleaning can also be effective alternatives, depending on the type of contamination and the surface being cleaned. It is important that high pressure washing is only carried out in a location or manner that ensures that the aerosols generated do not spread contamination to other parts of the facility. By eliminating dirt and organic matter, cleaning reduces the number of microbes present, but by itself cleaning does not ensure that the surfaces are free of pathogenic bacteria. Cleaning should be followed by an effective sanitising step.

To ensure effective cleaning, several factors should be considered:

- type of detergent – selecting the appropriate detergent for specific contaminants
- type of surface to be cleaned – ensuring compatibility between detergent and surface material
- method of detergent application to optimise coverage and effectiveness – ensuring detergent is applied from the base upwards to achieve complete surface coverage
- quality of water used – evaluating the effectiveness of the detergent in the available water and determining if amendments are required to alter the hardness or pH of the water
- water velocity and flow – to ensure that all surfaces to be clean are exposed to the desired degree of mechanical action (turbulent flow or direct impingement) and do not contaminate other surfaces through splashing.

## 10.3.2 Sanitising

The objective of sanitising is to eliminate any pathogenic microorganisms that remain on the surface following the cleaning process.

The following active constituents are commonly used in sanitisers:

- chlorine/chloro-bromo products
- iodine
- quaternary ammonium compounds (QACs)
- peroxyacetic acid
- acid anionics
- carboxylic acids.

**Cleaning and sanitising procedures are designed to eliminate physical, chemical (including allergen) and microbiological hazards.**

## 10.3.3 Key factors for effective sanitisation

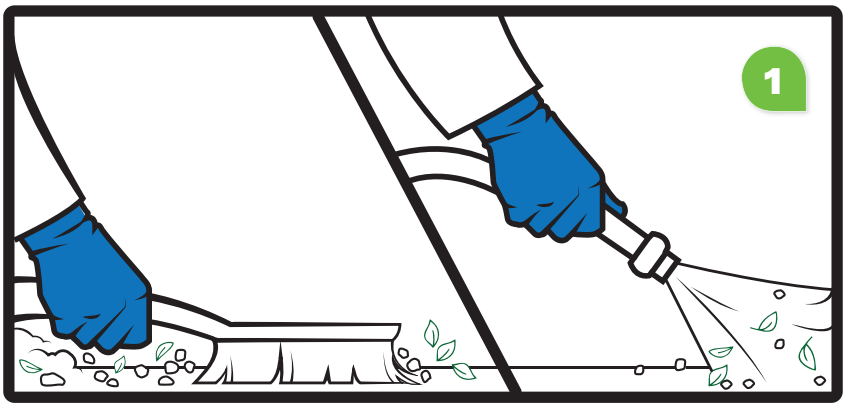
To maximise the effectiveness of sanitisation, the following factors should be considered:

- surfaces should be physically cleaned before sanitising, as sanitisation is only effective on surfaces that have already been cleaned
- direct contact between the sanitiser and the surface is essential, ensure complete and even coverage
- maintain the temperature within the range specified by the manufacturer for optimum performance
- follow the manufacturer's instructions regarding concentration and contact time to ensure adequate dosage and sufficient exposure time for effective results
- consider the pH and water properties
- the quantity and types of microorganisms can influence sanitiser selection, use products suited to the targeted organisms.

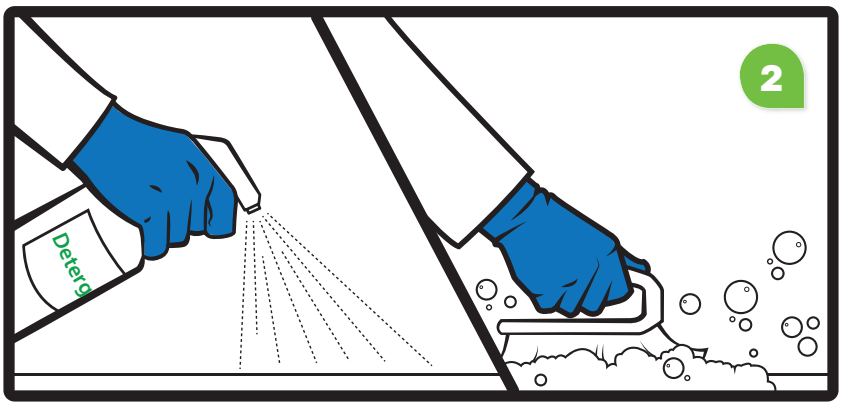

**Figure C10.1 | Key factors for effective sanitisation.**

## 10.3.4 Selecting and using cleaning and sanitising agents

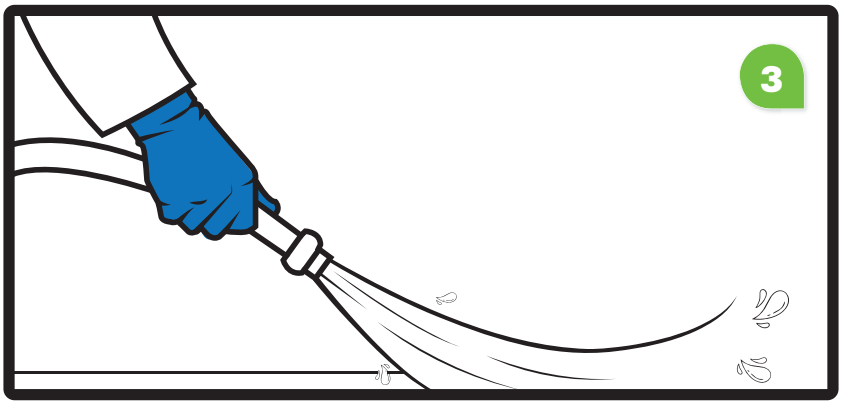
Both detergent and sanitiser selection should align with their intended use and all chemicals should be approved for food-contact surfaces. A rinsing step is usually required between the detergent and sanitiser step. Even when using approved products, precautions should be taken to prevent detergent or sanitiser residues on packed produce. For example, while QACs are permitted in food preparation areas, some markets impose zero tolerance for QAC residues on fresh produce. Appropriate storage, correct application and compliance with manufacturer guidelines are essential.



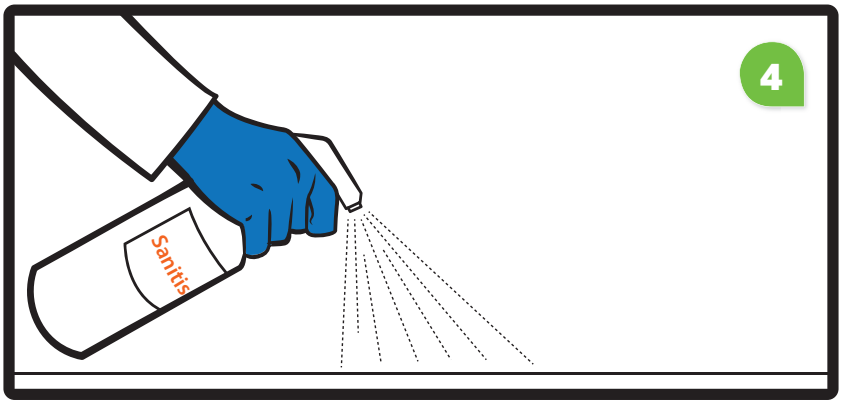

Remove dirt and debris.




Apply appropriate detergent, then scrub thoroughly.




Rinse the surface thoroughly with clean water.




Apply adequate coverage of a sanitiser approved for use on food contact surfaces.

**Figure C10:2 |** Good practice cleaning and sanitising procedure.

### 10.3.5 Cleaning and sanitising frequency

The frequency of cleaning and sanitising should be determined for each piece of equipment. Good practices include:

- ensuring all equipment is thoroughly cleaned and sanitised before the start of the season or when changing farms or produce
- implementing regular cleaning and sanitising schedules throughout the season, tailored to specific equipment needs
- using water analysis and surface swab tests (or ATP) to assess microbial presence and adjust cleaning frequencies accordingly.

By adhering to these guidelines, cleaning and sanitising processes can effectively reduce contamination risks and ensure food safety throughout the production cycle.

## 10.4 Physical contamination

The risk of physical contamination can be minimised through proactive measures, such as covering facility lights to prevent breakage and ensuring equipment is properly maintained.

If physical contamination occurs (e.g. glass breakage, a broken knife blade) operations in the affected area are halted immediately. Any potentially contaminated produce and packaging are identified and safely disposed of. The affected area and equipment are then be thoroughly cleaned to remove all traces of foreign objects.

All foreign objects should be carefully collected and where possible, reassembled to confirm that the entire broken item has been accounted for. Breakage kits (which are required under certain quality assurance food safety and customer standards) can assist in this process by ensuring appropriate recovery and documentation. The incident is recorded and an authorised manager should verify that the area has been cleaned to an acceptable standard and cleared before operations resume.

## 10.5 Management of hand tools

Hand tools used by team members such as knives, secateurs and temperature probes should be properly managed. This includes ensuring they are clearly identifiable, regularly maintained, thoroughly cleaned, sanitised and calibrated where necessary to ensure accuracy and effectiveness.

Knives should have solid, non-breakable blades (e.g. not breakable-blade utility knives) and should only be issued to team members by an authorised manager.

In high-risk situations, knives should be individually numbered and their issuance details, including date and time, recorded in a dedicated logbook. After use, all knives should be returned to the appropriate manager, inspected for damage, cleaned and securely stored. Any lost or damaged knives must be promptly reported, documented and appropriate corrective actions implemented in accordance with internal procedures. Their condition, return date and time should be accurately logged for accountability.