

Workflow: Packhouse Management

Toolkit 4.3

Packhouse Sanitation

target audience

Packhouse managers, and supervisors.

what it is

Packhouse sanitation is the cleaning and sanitation procedure which ensures that the presence and risk of pathogens which may affect the quality, safety and shelf-life of fruit are kept to a minimum.

Sanitation is part of the larger quality assurance process, which also includes receiving, sorting, equipment cleaning, fruit treatment, and storing.

why it is important

Sanitising procedures are very important because pathogens such as fungal spores, which are the most common cause of infection, must be kept to a minimum. The spore load must be kept as low as possible to prevent fruit becoming contaminated in the packhouse and even after it has been treated. Fungal spores are mostly associated with mould, such as green mould, blue mould, and sour rot. If packhouse sanitizing, as well as the procedures that support the reduction of pathogens, is not managed properly, packhouse conditions are ideal for the spread of fungal infections because they are enclosed spaces, with slightly higher ambient temperatures and higher humidity, and with de-greening rooms having even more ideal conditions for the spread of fungal infections.

Assuring fruit quality, safety, and maximum shelf-life is a priority across the whole value chain.

success factors

- **Packhouse design** – The design of your facility, the manner in which fruit arrives, is tipped into the drench, and is then processed can reduce the spore load. The ability to sanitise bins regularly, pre-storage protocols, and suitable facilities if fruit has to queue when it arrives from the orchard, ventilation, and extractor canopies and fans, can all mitigate this risk.
- **Pre-sorting** – Pre-sorting is a key success factor. Ideally this already starts in the orchard with good picking practices and possibly even in orchard sorting, but the packhouse process must include:

- The removal of any decayed and infected fruit (green bombs), ideally prior to entering the wash system. Allowing infected fruit to enter wash system increases the risk of contaminating the water and the equipment (brushes, belts etc.), and increases operating cost.
 - The removal of damaged and injured fruit, because spores are unable to breach a healthy rind, but their spread is facilitated by vulnerable fruit with injuries.
 - This practice is dealt with in greater detail in [Toolkit 4.4 – Receiving](#).
- **Corrective action**– If contaminated fruit is missed during pre-sorting and is identified on the grading line, the fruit must be removed, and the equipment and sanitise the line as soon as possible. You should have SOPs that set out the process clearly and enables immediate situational action. Dealing with exceptional events requires problem solving, which can fall into two categories
- Situational problem solving that the immediate team and team leader on the line can solve ([Toolkit 12.1 – Managing Problem Situations](#)).
 - Solving systemic problems and trends which require a more in-depth operational review, if late identifying of contaminated fruit happens frequently ([Toolkit 12.2 – Structured Problem Solving](#)).
- **Removing contaminated and damaged fruit** – Damaged and infected fruit may not remain in the packhouse and must be removed immediately and handled properly:
- All such fruit, along with any fruit that has fallen on the floor or has been discarded for any other reason, must be removed from the packhouse as soon as possible.
 - Damaged and contaminated fruit must be destroyed well away from the packhouse using a process that ensures that such fruit is not kept close to the packhouse or in a manner that will increase the spore count in the packhouse.
- **Separating export and local fruit**– Ideally export and local fruit should be stored separately, and particularly fruit destined for the export market should be processed as quickly as possible to avoid storage or waiting (dwell times) at ambient or even heightened temperatures and adverse climatic conditions. Ideally, export fruit should be cooled on site, or sent to cooling facilities, and must enter the cold chain as soon as possible.
- **Equipment and workspace sanitation** – An essential action in packhouse sanitation is keeping the workspaces and equipment in the packhouse clean and sanitary. You cannot sanitise a dirty surface, so this is a two-step process – wash, and then sanitise. There are three important things here: the sanitising agents that are used, the method of application, and the frequency of application.
- **Correct sanitising agent, method, and frequency** – The three most important factors are:
- The correct sanitising agent – There are many available products that can be used as sanitising agents in packhouses. It is important that the product chosen is used correctly according to the manufacturer’s specifications, that the product is effective against spores, and that the product does not leave a residue that is restricted by the target market.
 - Verify the quality, reliability, efficacy of the product you intend using.
 - Use the CRI’s recommendations which ensure that:
 - The product has the right active ingredients
 - The product is registered by the South African Registrar and approved by CRI

- The product is effective
- The product complies with the specific requirements and specifications of the target market
- The product is food grade, and
- The product is not overly corrosive and will not cause damage to equipment or surfaces.
- Ensure that concentrations and dosages are correct, and that the water quality does not compromise the efficacy of the sanitising agent, e.g., pH as a factor in the efficacy of chlorine.
- Ensure that fruit is properly dry before entering fungicidal baths, since chlorine breaks down Imazalil, one of the most important postharvest fungicides, and it will compromise the efficacy of the fungicide treatment if still present.
- The correct method – Ensure that clear SOPs are in place and are implemented for the cleaning of equipment and the processing lines.
- The correct frequency – Ensure that a schedule for cleaning and sanitising is in place. The process costs time and money and you must balance the cost and benefits of cleaning and sanitising as part of the maintenance and quality assurance programme but neglecting best practice can incur very high costs and losses.
- Other cleaning requirements – following the specific cleaning instructions and schedules of sophisticated equipment, such as optical readers, to the letter. And ensure that your upstream (e.g., incoming bins) and downstream equipment (pallets, forklifts, 5S of your transport) meets hygiene standards.
- **Emergency cleaning** – Protocols must be in place for emergency cleaning operations. If decayed fruit is found anywhere in the packhouse, the immediate area must be cleaned and sanitised without delay to ensure that spores are eliminated. There may also be accidents, such as chemical spills, that require emergency cleaning
- **Personal hygiene** – Ensure that the staff, the work clothes, hands, headgear (hair nets or coverings) are clean. PPE must be worn as specified and take extra care that visitors or contractors entering the facility are managed, guided, and equipped correctly.
- **Recordkeeping** – Meticulous record keeping is mandatory and serves several purposes:
 - Ensuring that compliance to materials, chemicals, dosages and concentrations, and scheduled can be proved.
 - Maintaining accreditations and satisfying audits.
 - Reacting to disputes that may arise with clients.
 - Ensuring that you can provide accurate and timely feedback up the processing line, including to the orchard and picking teams, to prevent recurrence of poor practice.

execution steps

Covered in the success factors.

assessment questions

Please Note: There is no minimum / maximum number of questions you can add.

1.	Does the design of your packhouse minimise the accumulation and spreading of spores?
2.	Is your pre-sorting process effective?
3.	Do you have established and effective SOPs defining corrective action and managing contaminated fruit?
4.	Do you have effective workspace and equipment cleaning SOPs and schedules that ensure that only clean equipment is sanitised?
5.	Do separate fruit destined for local markets from that destined for export as early in the process as possible?
6.	Do you use only the correct chemicals and their correct application as recommended by the CRI?
7.	Do you keep meticulous records of all cleaning, both for the process and the cleaning and sanitising products?
8.	Do you have structured problem-solving routines in place at the pack line level to ensure that problems, whether situational or systemic, are properly analysed and solved?

resources

1.	Pallet fungal growth (CRI Postharvest Workshop, Session 3 / Presentation 21)
2.	Pallet fungal growth (CRI Postharvest Workshop, Session 3 / Presentation 21)
3.	CRI Water Sanitation (CRI Postharvest Treatment Factsheets)
4.	Citrus Packhouse Module 3 – Packhouse Sanitation (Citrus Academy)
5.	Citrus Packhouses 3 – Packhouse Sanitation (Citrus Academy)