CHAPTER 8
Managing Chemicals

Overview

To protect crops, maintain hygiene and control pests, a range of agrichemicals (including cleaning, sanitising and pest control chemicals) are used during production, harvesting, packing and storage of fresh produce. Good chemical management practices are essential for ensuring food safety, environmental sustainability and regulatory compliance.

To minimise risks, all pesticides, cleaners, sanitisers and other chemicals should be applied according to the label's instructions and relevant regulations, ensuring compliance with Maximum Residue Limits (MRLs) and safe handling practices. Adequate storage, labelling and disposal are also critical to prevent contamination, chemical spills and environmental hazards.

This section outlines good practices for the safe and responsible use of chemicals, including regulatory requirements, application guidelines and risk management strategies.

8.1 Chemical use in production and post-harvest handling

Chemicals may be used on or around fresh produce during:

- production, harvest, packing and storage
- cleaning and sanitation of processing facilities and equipment
- pest control in production and storage areas.

Agrichemicals such as pesticides, fungicides, herbicides, finishing sprays and bud set sprays may be applied pre-harvest. Additionally, fumigants, liquid fungicides and insecticides may be applied post-harvest to control pests and diseases.

Water used for washing fresh produce often contains sanitisers to inactivate microorganisms and prevent cross-contamination.

8.2 Regulations on chemical residues

The list of approved agrichemicals and sanitisers and their maximum residue limits (MRLs) are set by:

- Australian Pesticides and Veterinary Medicines Authority (APVMA) in Australia
- Ministry for Primary Industries Agricultural Compounds and Veterinary Medicines Group (MPI ACVM Group) in New Zealand.

These regulations are published in the Food Standards Code. In New Zealand, MRLs are set via the *Maximum residue levels for agricultural compounds notice* issued under the Food Act 2014. Since MRLs and approved chemicals vary internationally, exporters are required to confirm compliance with importing country regulations.

If an MRL is not specified for an agrichemical or sanitiser, it is generally accepted in Australia that no detectable residue is permitted on the produce. In New Zealand where there is no MRL specified, a default MRL of 0.1mg/kg applies. In some instances in New Zealand, the limit is set as the limit of analytical quantification (e.g. 0.01 mg/kg) meaning use of the substance on that produce is not permitted and any residue detection is considered a breach.

The ways in which fresh produce can contain pesticides which exceed MRLs or become contaminated with unapproved chemicals are outlined in Table C8:1.

Table C8:1 | Ways fresh produce can exceed MRLs or become contaminated with unapproved chemicals.

Cause	Potential sources of contamination
Incorrect use of an approved agrichemical	Not reading or understanding label instructions. Incorrect application and /or application rate. Expired products. Incorrect mixing (e.g. too high concentration). Failure to observe withholding periods. Use of uncalibrated dispensing/application equipment.
Cross-contamination	Spray drift from neighbouring crops. Persistent agrichemicals in soil from previous applications. Residue in picking bins or crates. Unclean equipment. Using postharvest treatments not approved for the specific use.
Accidental exposure	Spray drift from industrial sites. Use of unapproved pest control chemicals. Chemical spills (e.g. fuel, oil, sanitisers) near produce or packaging. Use of non-compliant waxes (e.g. morpholine- based waxes) which are banned in the EU.

8.3 Good practice for chemical management

Good practices for chemical management in fresh produce production and post-harvest handling are outlined in detail in Table C8:2.

Table C8:2 | Summary of good practices for chemical management.

Management area	Good practices
Purchasing and procurement	Chemicals should be sourced from suppliers approved by the national regulator (e.g. Agsafe in Australia or MPI in New Zealand). Chemicals must be provided in original, intact containers, with legible labelling that clearly identifies the product and its intended use. Second-hand agrichemicals should not be purchased for food crop use. Deteriorating chemical labels should be replaced immediately with a legible copy to prevent misidentification. Chemicals with deteriorated or missing labels should not be purchased or used. Material Safety Data Sheets (MSDS) / Safety Data Sheet (SDS) are legally required to be readily available to all team members using the chemicals and easily accessible in case of an emergency.

Management area	Good practices
Storage of chemicals	Chemical storage areas should: • be located and designed to prevent contamination of fresh produce, water sources, equipment and packaging materials • be designed to contain leaks and spills (e.g. bunded areas) • be structurally sound, ventilated, well-lit and protected from direct sunlight and weather exposure to maintain chemical stability • contain an appropriate spill kit for immediate response to leaks or accidental exposure • be secured with restricted access for authorised and trained team members only and designed to prevent chemicals being misused • not used for storing non-compatible materials such as fuels, fertilisers or flammable substances. Adequate chemical storage protocols include: • chemicals being stored in designated areas, separated by category (e.g. insecticides, fungicides, sanitisers, herbicides) to avoid cross-contamination • chemicals remaining in their original containers, unless transferred to an approved storage container (e.g. Dangerous Goods-certified containers) with an attached copy of the original label and batch number • annual checks being conducted to identify and segregate expired or deregistered chemicals for disposal. Records being maintained on disposal activities, including: • date of inspection • names and quantities of chemicals being identified for disposal • methods of disposal (e.g. registered collection agency or approved off-farm disposal area) • unusable chemicals and empty containers are required to be disposed of legally, using registered collection agencies (e.g. DrumMuster and ChemClear in Australia or Agrecovery in New Zealand).

Image C8:1 | Chemicals should not be left on the ground. They should be stored securely to prevent spills or contamination.

Image C8:2 | Chemicals should not be transferred into containers that lack adequate labelling.

Management area	Good practices
Training and competency	To ensure the safe handling, application and disposal of chemicals in accordance with regulations, supervisors and team members handling chemicals are required to complete recognised training such as: • ChemCert in Australia • Growsafe in New Zealand
Chemical use	All chemicals are required to be applied in strict accordance with: • regulatory and customer requirements • label directions • off-label permits issued in Australia by APVMA or local State and Territory requirements. In New Zealand by MPI Agricultural compounds and Veterinary Medicines (MPI ACVM) or New Zealand Environmental Protection Agency (NZEPA). Copies of current chemical labels and off-label permits are required to be retained, permits can be accessed via the APVMA website. Pre-harvest pesticides are required to follow withholding periods (WHPs), which range from one day to several months. Post-harvest pesticides are required to be approved and applied according to label instructions. Before use, each new chemical container should be checked for label updates to ensure compliance.
Chemical application and equipment calibration	Personal Protective Equipment (PPE) is required to be provided, when required. Chemical application equipment should be well maintained to ensure correct dosing and MRL compliance it should be calibrated regularly, at least annually or per manufacturer recommendations or regulatory requirements. Calibration should be carried out following the manufacturer's instructions or an approved calibration method, by trained team members. Calibration should be rechecked immediately after replacing spray nozzles to ensure accurate dosing. Records should be kept for all calibration activities, including: • date and team members responsible for calibration • description of the calibration method used • results of the calibration test.
Mixing and handling of chemicals	Chemical mixing areas should be located away from fresh produce and water sources to prevent contamination. For measuring volumes and weights, calibrated equipment is required to be used. Leftover chemical solutions should be disposed of according to label directions, or in a way that minimises the risk of contaminating produce.

Management area	Good practices
Record keeping and documentation	To ensure traceability and compliance, detailed records of all chemical treatments should be maintained, including: • crop and treatment location (site address) • date and time of treatment • target pest or purpose of treatment • product name and active ingredient • batch number and expiry date • rate and quantity applied • equipment and application method used • withholding period (WHP), if applicable • operator's name and certification details • weather conditions at the time of application (e.g. humidity, temperature, wind direction and speed).
Testing, certification and compliance	Packed produce should undergo random sampling and testing, at minimum once per year, to ensure that chemical treatments comply with Maximum Residue Limits (MRLs). Testing programmes should be designed to consider seasonal differences in the use of chemicals. Chemical residue testing should include: • a multi-screen test covering commonly used pesticides and agrichemicals to ensure that it covers all chemicals that the grower uses. Analysis by a laboratory accredited by National Association of Testing Authorities Australia (NATA Australia) or International Accreditation New Zealand (IANZ New Zealand) to International Organisation for standardisation (ISO)/ International Electrotechnical Commission (IEC) ISO/IEC 17025 standards • in New Zealand, the laboratory is required to be approved by the Ministry for Primary Industries (MPI) for residue analysis • results should be documented to verify compliance with Food Standards Australia New Zealand (FSANZ) MRLs and in NZ the MRL Food Act notice, customer-specific requirements, importing country regulations.
Standards	NZS 8409:2021 Management of Agrichemicals provides practical and specific guidance on the safe, responsible and effective management of agrichemicals, including plant protection products (such as herbicides, insecticides, fungicides), veterinary medicines, fumigants used in rural situations and agricultural use.

Image C8:3 | Chemicals should be stored within the original containers, adequately labelled and kept in a designated storage area.

Image C8:4 | The chemical store should be structurally sound, secure, adequately lit, well ventilated, constructed to protect chemicals from direct sunlight and weather exposure.

Image C8:5 | The chemical store should be equipped with a spill kit to contain and manage chemical spills

8.4 Surface coatings

Surface coatings, such as waxes, may be applied to fresh produce to reduce moisture loss and enhance appearance. However, these coatings should:

- be approved for use in the destination market (e.g. morpholine-based waxes, which are commonly used are prohibited in the European Union)
- be applied strictly according to regulatory requirements to prevent contamination and ensure compliance with food safety standards
- comply with FSANZ allergen labelling requirements (refer Chapter 16)
- follow good practice procedures for purchase, storage, application and disposal.

Image C8:6 | Waxes should be appropriate for the destination market.

8.5 Cleaning, sanitising and pest control chemicals

Cleaning, sanitising and pest control chemicals are essential for maintaining hygienic processing environments, preventing microbial contamination and ensuring food safety. To minimise risks:

- all cleaning, sanitising and pest control chemicals are required to be approved for their intended purpose and used strictly according to the manufacturer's instructions
- storage and application should prevent contamination of produce, vehicles, equipment, containers and packaging materials
- secure, vented storage areas should be designated for cleaning and pest control chemicals to:
  - » prevent cross-contamination with fresh produce, food-contact surfaces and raw materials
  - » ensure chemicals are kept separate from production, handling and storage areas
  - » comply with regulatory requirements for storage.

Image C8:7 | Up-to-date safety data sheets (SDS) are maintained and readily accessible for reference.

Image C8:8 | Bait stations are securely placed to prevent tampering and accidental cross-contamination.

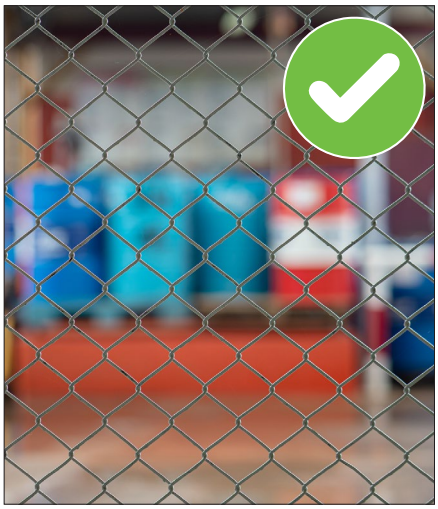

Image C8:9 | Chemicals are stored in locked, restricted-access areas to prevent contamination and unauthorised use.

Resources

Food Standards Australia New Zealand (FSANZ) (2024). *Australia New Zealand Food Standards Code – Schedule 20 – Maximum residue limits*.

International Organization for Standardization (ISO) (2017). *ISO/IEC 17025:2017 – General requirements for the competence of testing and calibration laboratories*. Geneva: ISO.

Ministry for Primary Industries (MPI) (2025). *Maximum residue levels for agricultural compounds: Food notice – 31 July 2025*.