

Source: Modified Extract from NSW Food Authority

## Cleaning and sanitising fresh produce

Raw fruits and vegetables may be contaminated with microorganisms, including pathogenic E.coli, Salmonella and Listeria monocytogenes. Washing raw produce with chlorine has been shown to reduce the number of microorganisms. If facilities prepare their own salads, it is recommended that washing and sanitising salad vegetables is an important part of an overall strategy to reduce the risk of microorganisms. It is recommended that all fruits and vegetables be washed in clean water then sanitised by soaking in **100 ppm (free) chlorine for 5 minutes OR in an appropriate validated equivalent commercial chemical preparation.**

Sodium hypochlorite (or commonly known as bleach) is a chlorine based chemical that is a permitted washing agent for food manufacture. Residues at amounts up to 1 mg/kg of the final product (Food Standards Code (FSC) 1.3.3) are permitted on the food. All facilities are slightly different and therefore this system should be trialled first. Alternatively, facilities could choose from a number of commercially available products that are permitted for washing fresh produce. Facilities will need to demonstrate that the products that they are using are equivalent in effect to 100ppm (free) chlorine soak for 5 minutes, and that the sanitiser they are using is suitable for use with food. When making up the sanitiser solution it is essential that quantities be measured out accurately. **In addition, appropriate chemical training for operators preparing the sanitising wash is also important and must also be demonstrated.**

- **Undamaged clean, fresh produce:** It is important to purchase clean, undamaged, fresh produce. Damaged produce can allow pathogens to enter the tissues and chlorine may not reach the pathogens. Chlorine rapidly loses its effectiveness on contact with dirt, organic matter and when exposed to air, light or metals. Therefore, make sure all soil is removed before soaking in the chlorine sanitising solution and periodically check the level of sanitiser if you are washing a lot of vegetables.
- **Wash water temperature:** The temperature of the wash water and the chlorine sanitising solution is also important. The wash and sanitising water temperature should be slightly warmer (about 5 - 10 degrees) than the produce to prevent water being sucked inside the fruit or vegetable. If the wash water is cooler than the vegetables, water can be absorbed into the tissues along with any bacteria present.

- **Addition of wetting agent:** Sometimes microorganisms sit in the nooks and crannies of the vegetables and don't get exposed to the sanitising wash treatment. You can increase the effectiveness of your chlorine sanitising solution if you add a wetting agent (surfactant). This step is optional but it will help the chlorine to get into these small spaces. Sodium lauryl sulphate is an example of a generally permitted processing aid FSC 1.3.3 (3) which is an effective wetting agent.
- **Contact time:** For the chlorine to work effectively, it needs to be in contact with the food surface for sufficient time to be able to kill bacteria. This is known as contact time and it is very important to allow the produce to soak in the Bleach solution.

To maximise the effect of chlorine sanitiser solution it is important to closely follow the procedures set out below.

## Application

1. Make sure your produce is free of dirt, undamaged and pre-cooled in a refrigerator.
2. Pre-wash in water (at least 10°C warmer than the temperature of the produce) to remove excess soil and dirt. You could wash produce that has visible dirt in water containing sodium bicarbonate (or any other approved mild alkali cleaning agent).
3. Making the Bleach-water sanitiser solution:
  - **Make sure you follow your occupational health and safety requirements for handling and preparing chlorine solutions,**
  - Use ONLY food grade chlorine (**sodium hypochlorite, NaOCl**), it must be labelled as food grade,
  - Use a single, designated sink for washing fruits and vegetables, mark a fill line in the sink for the correct water level. Fill with water up to the correct level and then add the Bleach. You should make only enough for one batch and use immediately. Ideally you should purchase test strips to check the level of chlorine and record the date, time and chlorine concentration in a special book every time you make up a Bleach sanitiser solution. Monitor this level regularly if washing a large quantity of produce,
  - Add the (optional) wetting agent (eg. sodium lauryl sulfate),

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## Application (continued)

- Measure out the Bleach, use the table below to achieve the volumes below for 100 ppm concentration of Bleach solution
4. Add washed produce and agitate to ensure that all surfaces are wet and there are no bubbles.
  5. Soak time 5 minutes or as directed by the manufacturer
  6. Do not rinse (if the final level of chlorine residue in the final product complies with the FSC 1.3.3)
  7. Dilute and dispose of the Bleach solution in accordance with your sewerage authority requirements
  8. Prepare and use the next batch of Bleach solution only when needed, do not store.
  9. If you are using a commercial product make sure you carefully follow the manufacturer's instructions for quantities, contact time and water temperature.

Table 7: Agar Bleach with 5% available (free) chlorine can be diluted using the table below to achieve a 100 ppm concentration of available chlorine

Volume of water	Plus Agar Bleach (5% av chlorine)	Wetting agent (optional)
1 litre	2ml	1ml
5 litres	10ml	3ml
10 litres	20ml	7ml
50 litres	100ml	35ml

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