

Discussion Document Update: Pathogens in Fresh Fruit and Vegetables in New Zealand

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Scientific Interpretative Summary

This SIS is prepared by New Zealand Food Safety (NZFS) risk assessors to provide context to the following report for NZFS risk managers and external readers.

Discussion document: Foodborne pathogens in fruit and vegetables, update. July 2015

This document is an update of the 2008 discussion document on pathogens in produce. It reports a review of information published since 2008 and reassesses the human health risks in New Zealand associated with foodborne pathogens in fresh, ready-to-eat (RTE) whole and fresh-cut vegetables and fruits (including fresh herbs), raw frozen berries, fresh juices and sprouted seeds (sprouts).

As in 2008, it is likely that outbreaks associated with produce occur more frequently than the available data suggest because identifying the vehicle is challenging (traceback, analytical methods, short shelf life of foods). Case- control studies do not indicate an elevated risk from fresh fruit and vegetables.

The most important remaining data gaps are:

- Dynamics of internalised pathogens in vegetables and their viability from harvest to consumption,
- Prevalence and concentration of enteropathogenic *Yersinia*, *Aeromonas* spp., Norovirus, Hepatitis A and E viruses, Rotavirus, and protozoan parasites in fresh produce and water,
- Kinetics of sanitisers against the most common foodborne pathogens in produce.

Five microbiological surveys completed in New Zealand since 2008 indicate that only a limited number of pathogenic microorganisms were detected on fresh fruits and vegetables and only at low concentrations: *Salmonella* spp. on leafy greens and sprouts, norovirus GII on RTE leafy salad, *Listeria monocytogenes* on fresh-cut fruit salads, sprouts and RTE coleslaw.

Experiments and outbreaks show that the main risk factors of microbial contamination are contact with animal and/or human faeces, either directly or indirectly (e.g. via soil, water, inadequately treated compost), fresh produce workers (harvesters, food handlers), equipment and surfaces. Data showing that hydroponically grown produce internalise more pathogens and the occurrence of the 2016 Havelock North *Campylobacter* outbreak suggest that water could be an important source of contamination. Measures implemented by growers and food handlers to prevent faecal contamination and the use of contaminated water will reduce the risk of contamination by pathogenic microorganisms.

Pathogenic microorganisms could survive on produce when exposed to normal field conditions, but desiccation, UV radiation, or microbial competition will contribute to their death and cooler temperatures will prevent or slow down their growth.

Some pathogenic microorganisms can become internalised and consequently will be better protected from sanitisers. Similarly, bacterial pathogens can survive in the viable but non-culturable (VBNC) state on fresh produce. However there is little evidence that VBNC organisms can cause human illness.

Since 2008, three outbreaks have been associated with fresh produce based on epidemiological information but with no microbiological evidence (salmonellosis/watermelon, norovirus/fresh fruit salad, yersiniosis/carrots and/or lettuces).

This report clarifies previous issues and identifies the most critical combinations for RTE fresh produce available in New Zealand and pathogens of concern, which are leafy green

vegetables (lettuce, spinach, cabbage, etc.), sprouts, fresh-cut fruit salads, berries, watermelons, carrots, tomatoes and fresh herbs contaminated with *Salmonella* spp., Norovirus, STEC, *Yersinia* spp., Hepatitis A virus and *L. monocytogenes*. *Aeromonas* spp., Rotavirus, and protozoan parasites (*Cryptosporidium* spp., *Toxoplasma gondii*) can be potentially important pathogens too.

Information regarding the microbiological safety of fresh juices produced in New Zealand is scarce, and survival or slow growth of pathogenic microorganisms in fresh juices, especially at room temperature, should be investigated.

Sprout contamination occurrence is a combination of seed contamination, bacterial growth favoured by sprout germination conditions and survival on sprouts stored at cooler temperatures.

Although they are often grown in soils amended with organic wastes, there is no evidence that organically produced fruits and vegetables are any more contaminated by pathogenic microorganisms than those conventionally produced. A review of organic assurance programmes found that these did not provide much support for growers to manage food safety risks.

Under the Food Act 2014, horticultural producers and manufacturers of fresh RTE salads are subject to one of three risk-based control measures, depending on the activities they undertake. There are mandatory microbiological standards for *Salmonella* spp. on sprouts, and *L. monocytogenes* on RTE foods such as fresh-cut and packaged fruit and vegetables. Acidic dressings make a less favourable environment for bacterial growth in salads. However, specific ingredients such as raw nuts can introduce microorganisms, particularly *Salmonella* spp, and the presence of animal proteins can promote pathogen survival and growth.