

ACT Health Protection Service

# Microbiological Quality of Freshly Squeezed Juice



July – September 2012

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## Background/Objective

The fresh squeezed juice survey was conducted to provide information on the microbiological quality of fresh squeezed juice sold in the Australian Capital Territory (ACT). This was the first ACT survey of fresh squeezed juice carried out by ACT Health Protection Service.

Fresh squeezed juice can be defined as “juice prepared in front of the purchaser for immediate consumption.” (Australia New Zealand Food Authority 2001)

The number of retailers selling fresh squeezed juice has increased in the ACT and includes green grocers and juice bars. In 1999 a food poisoning outbreak in South Australia was caused by *Salmonella* Typhimurium from unpasteurised orange juice. In other countries, the majority of food-borne outbreaks that are linked to juice have been due to *E.coli* or *Salmonella* (Australia New Zealand Food Authority 2001).

This survey will aim to look for the presence of *E. coli* and *Salmonella* species in a range of freshly squeezed juices from across the ACT.

## Standards

The Food Standards Australia New Zealand Ready to Eat Guidelines (Guideline) identifies four categories of microbiological quality ranging from satisfactory to potentially hazardous. Table 1 is an extract from the Guideline. This table not only reflects both the high level of microbiological quality that is achievable for ready to eat foods in Australia and New Zealand but also indicates the level of contamination that is considered to be a significant risk to public health.

Table 1

Test	Microbiological Quality (colony forming units per gram (CFU/g))			
	Satisfactory	Marginal	Unsatisfactory	Potentially Hazardous
<b>Indicators</b>				
<i>Escherichia coli</i> ( <i>E. coli</i> )	<3	3-100	>100	**
<b>Pathogens</b>				
<i>Salmonella</i> spp.	not detected in 25g			detected

\*\*Pathogenic strains of *E. coli* should be absent.

## Survey

This survey was conducted between July 2012 and September of 2012. Sixty five samples were collected and tested from ten different retail outlets. The survey collected multiple samples from single outlets and in general retailers were sampled only once. The samples were randomly collected by Public Health Officers and processed by the Health Protection Service, ACT Government Analytical Laboratory. All of the samples were tested for the hygiene indicator *E. coli* and the pathogen *Salmonella*.

Where the HPS identifies non compliance issues in food businesses, corrective actions are addressed through a graduated and proportionate response. Unsatisfactory results are re-sampled and marginal results may be re-sampled but this is dependent on resources as these foods are still considered compliant.

## Microbiological Method of Analysis

- *Escherichia coli* ISO: 16649 – 2 (modified).
- *Salmonella* species using AS: 5013.10–2004 (modified).

The sample preparation for *Escherichia coli* consisted of:

- 25g of sample being homogenised with 225mL of 0.1% peptone diluent; and
- subsequent serial dilutions were prepared for use in enumeration.

***E. coli* enumeration:** Pour plates of 1ml of  $10^{-1}$  dilution were prepared in triplicate and incubated at 37°C/4 h followed by 44°C/20 h. Confirmed *E. coli* colonies appear blue/green after incubation.

***Salmonella* detection:** 25g of sample was weighed out aseptically and homogenised with 225mL buffered peptone water (non-selective enrichment) and incubated at 37°C/16-20h. Aliquots were then transferred into Brain Heart Infusion broth (BHI) and incubated for 4h. DNA was extracted from 200uL of enriched BHI. This was screened for the presence of salmonella using a BAX System Salmonella PCR Assay. No confirmation testing was performed as there were no samples that screened positive.

## Results and Discussion

### *E.coli*

The presence of *E. coli* in food can indicate poor hygiene and sanitation in the premises or by the operators. A satisfactory level of *E.coli* is <3 cfu/g. Levels greater than 100 cfu/g are unsatisfactory.

Sixty five samples were tested for *E.coli*. The *E. coli* results for five samples were not reported due to laboratory equipment failure. From the sixty that were successfully tested all reported satisfactory results.

### *Salmonella* species

Freshly squeezed juice should be free of *Salmonella* spp. as consumption of food containing this pathogen may result in foodborne illness. No *Salmonella* species were detected in all of the sixty five samples tested.

## Conclusion

The microbiological quality of freshly squeezed juice in the ACT is very good. Raw results of analysis are attached at Appendix A. All juices tested complied with the Food Standards Australia New Zealand Guidelines for the Microbiological Examination of Ready to Eat Foods. The results indicate that the sampled food business used good quality produce and safe food handling practices.

## Bibliography

1. Guidelines for the microbiological examination of ready-to-eat foods FSANZ Dec 2001.
2. Australia New Zealand Food Authority (2001) Final assessment report (Inquiry –s.17) Application A411 Pasteurisation of orange juice & labelling of unpasteurised juice. Retrieved September 8, 2013, from <http://www.foodstandards.gov.au/code/applications/documents/A411%20Inq%20Report1.pdf>

## Appendix A

Sample Description	E.coli	Salmonella	Assessment
Apple juice	< 3	Absent	Satisfactory
Orange juice	< 3	Absent	Satisfactory
Orange / mango juice	< 3	Absent	Satisfactory
Watermelon juice	< 3	Absent	Satisfactory
Carrot juice	< 3	Absent	Satisfactory
Orange juice	< 3	Absent	Satisfactory
Apple juice	< 3	Absent	Satisfactory
Carrot juice	< 3	Absent	Satisfactory
Watermelon juice	< 3	Absent	Satisfactory
Celery juice	< 3	Absent	Satisfactory
Orange juice	< 3	Absent	Satisfactory
Pineapple juice	< 3	Absent	Satisfactory
Watermelon juice	< 3	Absent	Satisfactory
Carrot juice	< 3	Absent	Satisfactory
Apple juice	< 3	Absent	Satisfactory
Orange juice	< 3	Absent	Satisfactory
Tropical juice	< 3	Absent	Satisfactory
Pineapple / orange juice	< 3	Absent	Satisfactory
Watermelon juice	< 3	Absent	Satisfactory
Carrot, apple and ginger juice	< 3	Absent	Satisfactory
Orange juice	< 3	Absent	Satisfactory
Apple / grape juice	< 3	Absent	Satisfactory
Apple/orange juice	< 3	Absent	Satisfactory
Tropical juice	< 3	Absent	Satisfactory
Rockmelon juice	< 3	Absent	Satisfactory
Apple juice	< 3	Absent	Satisfactory
Orange , watermelon and carrot juice	< 3	Absent	Satisfactory
Carrot , celery, watermelon and beetroot juice	< 3	Absent	Satisfactory
Pineapple, watermelon and rockmelon juice	< 3	Absent	Satisfactory
Orange, kiwifruit and strawberry juice	< 3	Absent	Satisfactory
Orange, carrot, apple, celery and beetroot juice	Not reported	Absent	Satisfactory
Strawberry, apple, orange and pineapple juice	Not reported	Absent	Satisfactory
Pineapple and orange juice	Not reported	Absent	Satisfactory
Apple and grape juice	Not reported	Absent	Satisfactory
Watermelon and orange juice	Not reported	Absent	Satisfactory
Rockmelon juice	<3	Absent	Satisfactory
Beetroot juice	<3	Absent	Satisfactory
Carrot juice	<3	Absent	Satisfactory
Pineapple juice	<3	Absent	Satisfactory
Watermelon juice	<3	Absent	Satisfactory
Orange and pineapple juice	<3	Absent	Satisfactory
Watermelon juice	<3	Absent	Satisfactory
Watermelon, orange and apple juice	<3	Absent	Satisfactory

Celery, carrot and apple juice	<3	Absent	Satisfactory
Rockmelon and apple juice	<3	Absent	Satisfactory
Carrot, celery, apple and ginger juice	<3	Absent	Satisfactory
Watermelon, orange, pineapple and apple juice	<3	Absent	Satisfactory
Watermelon juice	<3	Absent	Satisfactory
Pear juice	<3	Absent	Satisfactory
Pineapple juice	<3	Absent	Satisfactory
Orange and raspberry juice	<3	Absent	Satisfactory
Orange and passionfruit juice	<3	Absent	Satisfactory
Orange and mango juice	<3	Absent	Satisfactory
Orange and pineapple juice	<3	Absent	Satisfactory
Watermelon and pineapple juice	<3	Absent	Satisfactory
Pineapple juice	<3	Absent	Satisfactory
Orange juice	<3	Absent	Satisfactory
Banana and orange juice	<3	Absent	Satisfactory
Watermelon juice	<3	Absent	Satisfactory
Carrot juice	<3	Absent	Satisfactory
Orange juice	<3	Absent	Satisfactory
Orange and mango juice	<3	Absent	Satisfactory
Watermelon juice	<3	Absent	Satisfactory
Rockmelon , pear and grape juice	<3	Absent	Satisfactory
Apple, pear and strawberry juice.	<3	Absent	Satisfactory