NSW Food Authority

safer food, clearer choices

Report on the microbiological quality of sprouts

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Update on the implementation and evaluation of the NSW Plant Products Food Safety Scheme

What's been happening and where are we at in 2008?

- **2005** – The NSW Food Authority introduced the NSW Plant Products Food Safety Scheme. This requires businesses that produce high-priority plant products, including seed sprouts, to implement HACCP based food safety programs.

  A pre-regulation baseline evaluation was also conducted. This included a survey on the microbiological quality and safety of sprouts.

- **2006** – Routine HACCP audits commenced.
- **2007** – Requirements for sprout producers were updated in the Plant Products Food Safety Manual (the Manual). Additional process control measures were included.
- **2008** – *A follow up survey to examine the microbiological quality of sprouts was undertaken.*

Why evaluate?

- **To determine if the microbiological quality of sprouts has improved** after sprout producers have implemented mandatory HACCP programs and implemented the updated requirements outlined in the Manual.
- **To monitor the prevalence of pathogens in sprouts.** Recently sprouts have been linked to food-borne illness in Australia. In the past two years, two product recalls were carried out nationally due to the presence of *Salmonella* and/or *Listeria monocytogenes* in alfalfa and variety sprouts. Poor raw material quality (contaminated seed) is thought to be the likely source of pathogens in the final sprouted product.
- **To gather baseline data on the prevalence of verocytotoxic *E. coli* (VTEC) in sprouts.** In Australia, there have been no food-borne illness outbreaks caused by *E. coli* O157:H7 or other VTEC linked to sprouts. However, during a National Survey of Microbiology Quality of Raw and Ready-to-Eat Fresh Produce in 2006, one broccoli sprout sample (5.6%) from NSW was positive for VTEC.

How was the evaluation conducted?

- **122 sprout samples were tested over a three month period** after a weighted statistically valid survey plan was determined using prevalence data from 2006 and industry production volumes from each business. Samples included alfalfa, mung bean and 'others' such as radish, onion and broccoli. The sprout growers surveyed represented 99.9% of all sprouts produced in NSW.
- **Samples were analysed for Enterobacteriaceae, *Escherichia coli*, VTEC, *Listeria monocytogenes*, *Bacillus cereus* and *Salmonella***. Results were compared to "Guidelines for the microbiological examination of ready-to-eat foods" (FSANZ, 2001).
  - An *E.coli* count of less than 3 CFU/g is classified satisfactory, between 3 CFU/g and 100 CFU/g marginal and over 100 CFU/g unsatisfactory.
  - A *B. cereus* count of less than 100 CFU/g is classified satisfactory, between 100 and 1,000 CFU/g marginal, 1000 and 10,000 CFU/g unsatisfactory and over 10,000 CFU/g potentially hazardous.
  - Any sample testing positive for *L. monocytogenes*, *Salmonella* or VTEC is classified potentially hazardous.

 # A marginal rating is microbiologically acceptable. It means the product is at the upper range of normal microbiological levels for this type of product and presents no food safety concern.

What were the results?

- **99.2% of samples classified microbiologically acceptable** (Table 1).

Table 1: 2008 Survey Results

Category	Microbiologically acceptable		Microbiologically unacceptable	Potentially Hazardous	Total
	Satisfactory	Marginal	Unsatisfactory	Potentially Hazardous	
Alfalfa	51 (98.1%)	1 (1.9%)	0 (0.0%)	0 (0.0%)	52
Mung Bean	52 (98.1%)	1 (1.9%)	0 (0.0%)	0 (0.0%)	53
Others	14 (82.4%)	2 (11.8%)	1 (5.9%)	0 (0.0%)	17
Total	117 (95.9%)	4 (3.3%)	1 (0.82%)	0 (0.0%)	122

- **No *E.coli* (including VTEC), *Salmonella* or *L. monocytogenes* were detected in any samples**. Listeria was detected in one sample, however, as this was a not a pathogenic strain this sample was classified as acceptable.
- ***B. cereus* was detected at unsatisfactory levels in one sample (5500 CFU/g)** and at the limit of detection (100 CFU/g), classified marginal, in four samples.

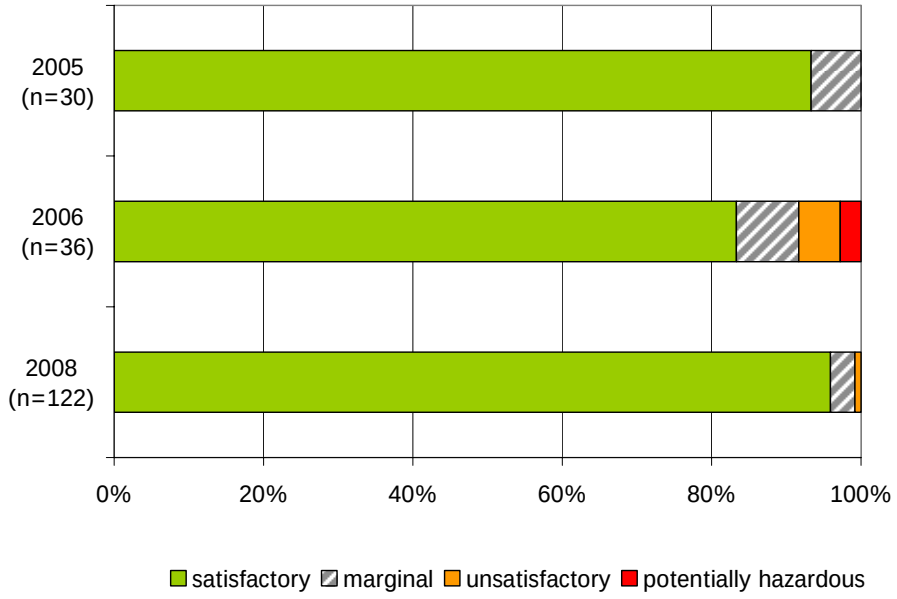
What is the significance of these results?

There is a marked improvement in the microbiologically quality for indicators of faecal hygiene from 2005 to 2008.

- **2008 results indicate that the microbiological quality of sprouts has improved.** Results from the surveys conducted in 2005, 2006 and 2008 are presented in Figure 1. Each year the following tests were conducted:

  2005 – *L. monocytogenes*, *Salmonella* and *E.coli*;
  2006 – *L. monocytogenes*, *Salmonella*, *E.coli* and VTEC; and
  2008 – *L. monocytogenes*, *Salmonella, E.coli,* VTEC and *B. cereus*.

Figure 1: Results from the Sprouts Surveys conducted in 2005, 2006 & 2008



2005 – Two samples were marginal due to *E.coli*.

2006 – One sample tested positive for VTEC and was therefore rated potentially hazardous; and

– Two samples were rated unsatisfactory and three were rated marginal due to *E.coli*.

2008 – Four times the amount of samples was surveyed compared to 2005 and 2006;

– No *E.coli* was detected;

– No VTEC was detected; and

– All samples that were rated marginal and unsatisfactory were due to *B. cereus*.

Note: 2005 and 2006 surveys did not test for *B. cereus*.

In conclusion

- **Revised requirements for sprouters have had a positive impact on sprout safety** (amended Plant Products Manual Oct 07).
- **No *E. coli* was detected in 2008 but the *B. cereus* results indicate that sprouters should continue to carefully monitor seed supply, seed washing and sanitising**. The presence of *B. cereus* also highlights the importance of temperature control of these products. Producers should ensure that sprouts are packed, stored and transported under temperature control.
- **The Authority will continue to monitor *B. cereus* as part of the routine product monitoring program.** Only one outbreak has been associated with *B.cereus* and sprouts. It occurred in 1976 and a home sprouter kit was involved. Outbreaks of *B. cereus* are most often associated with products that have very low levels of competing vegetative bacteria. Our survey results indicate that sprouts contain high levels of competing *Enterobacteriaceae*. Often levels of greater than 1,000,000 CFU/g were enumerated in each sample.
- **One 2008 sample tested positive for *Listeria*.** Sprouters should not become complacent with finding the presence of *Listeria* species other than *L. monocytogenes.* Such detection serves as an indication of an increased likelihood of finding *L. monocytogenes* in the processing environment. Sprouters should therefore, review cleaning and sanitation practices if *Listeria* is detected.

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