

### Food Safety: the essential ingredient

## Mycotoxins explained

The US Institute of Food Technologists has recently issued a Scientific Status Summary that gives an overview of the issue of mycotoxins in the international food industry (Murphy *et al.*, 2006).

Mycotoxins are toxic chemical products formed by mould species including *Penicillium*, *Aspergillus* and *Fusarium*. These moulds can readily colonise food crops such as cereal grains, nuts and fruits, either in the field or post harvest. Consumption of foods produced from these commodities poses a potential risk to human health because the toxins are resistant to various food processes, including heat treatment. Mycotoxins rarely cause acute illness in developed countries, but long term consumption of low levels has been linked to disease. The mycotoxins of concern to the international food industry are:

Mycotoxin	Of main concern in	Potential health effect
Patulin	Fruit juices, particularly apple	Genetic mutations
Ochratoxin A	Cereals, wine, coffee	Kidney disease
Zearalenone	Cereals	Endocrine system disruption
Aflatoxins	Peanuts, tree nuts and maize	Liver cancer
Trichothecenes	Cereals	Acute vomiting/diarrhoea (high dose required)
Fumonisin	Maize	Kidney and liver disease

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As harvest conditions in Australia are predominantly warm and dry, the threat of mycotoxin production in cereals is much lower here than in most other regions. Contamination of Australian peanut crops by aflatoxins is an ongoing issue however, particularly when plants become drought stressed in seasons when there is low rainfall preceding harvest.

Despite reports of mycotoxin linked disease occurring overseas, there is no evidence that mycotoxins pose a particular health problem in Australia (Pitt and Tomaska, 2001; Pitt and Tomaska, 2002). Mycotoxins still pose a concern to Australian commodity exporters because they need to be aware of the requirements of importing countries which may differ from those in Australia. The European Union (EU) has set limits on the amounts of specific mycotoxins permissible in various foods and has stringent import testing programs in place. For example, the levels of Ochratoxin A currently allowed in foods imported into the EU can be found in the Official Journal of the European Union (EU, 2005).

Scientists at Food Science Australia have been conducting research into mycotoxins for the Australian food industry over many years. Their research has shown that competitive exclusion biocontrol by non-toxin producing *Aspergillus* species can be used to inhibit the growth of toxin producing species on peanut plants (Pitt and Hocking, 2006). Another study, conducted by a Cooperative Research Centre for Viticulture sponsored PhD student, found that Australian wines contained levels of Ochratoxin A well below limits set by the EU. Current research at Food Science Australia (funded by the Australian Food Safety Centre of Excellence), is assisting food processors with management of mycotoxin-producing *Fusarium* species.

## Improvements to ComBase

In September 2006, significant improvements were made to the ComBase predictive microbiology database, specifically in the search and output features. ComBase is a tool that can describe how microorganisms respond to different environments, including how levels of microorganisms (spoilage and pathogenic) can change over the course of time. The consortium responsible for the database consists of the UK's Institute of Food Research and Food Standards Agency, the US Agricultural Research Service and the Australian Food Safety Centre of Excellence. The aims of the consortium are to improve efficiency in locating specific microbiological information, provide a quick way to compare data from different laboratories and to reduce duplication when conducting microbiological research. Using an internet interface, the user identifies criteria in which they are interested, such as type of microorganism, type of food, storage temperature and food specific criteria such as pH and water activity. The database then generates either microbial growth or inactivation curves, specific for the criteria input. ComBase can be accessed at: <http://www.combase.cc>

## Australian Food Industry & Codex

The August 2006 edition of *Food Australia* featured an article that discussed recent Australian industry involvement with the Codex Alimentarius Commission (Codex) and how this has the potential to significantly help our export markets (Bittisnich and Gorst, 2006).

Codex was created in 1963 by the United Nation's Food and Agriculture Organisation (FAO) and the World Health Organisation (WHO) to develop food standards, guidelines and related texts under the Joint FAO/WHO Food Standards Programme. Codex's main aims are to protect the health of consumers, ensure fair trade practices and promote coordination of all food standards work undertaken by international organisations. Codex has numerous committees and task forces that develop standards and other documentation for specific areas of the food industry. Examples of committees are Food Hygiene, Food Labelling and Food Additives and Contaminants.

Many sectors of the Australian food industry participate in Codex Committees and Task Forces and this representation can significantly help Australia's export industry. One example of Australia's positive involvement with Codex is within the olive oil industry. At the 2003 Codex Committee on Fats and Oils (CCFO) meeting, the Australian delegation opposed the proposal to set the maximum level of linolenic acid allowed in olive oil at 1 percent. A high level of linolenic acid in olive oil is usually an indication of product adulteration. The Australian delegation argued that the acceptability limit should be increased as the level of this acid in pure Australian olive oil could be as high as 1.5 percent. Australia and other countries with naturally high levels of some compounds found in olive oil will have their export market restricted if Codex does not allow greater flexibility in compositional limits. A final decision on the acceptable limit of linolenic acid listed in the Codex standard will be made by the CCFO in 2007.

Codex Australia (located within the Australian Government Department of Agriculture, Fisheries and Forestry) liaises with the Codex Alimentarius Commission. More information about the role of Codex Australia, including reports on recent Codex meetings can be found at: <http://www.codexaustralia.gov.au>

## Campylobacter – an ongoing issue

*Campylobacter* infection is the most common cause of acute gastroenteritis in Australia. Since *Food Safety & Hygiene's* 2003 update on the problem of foodborne illness associated with *Campylobacter*, the situation in Australia has not improved. The number of notifications of campylobacteriosis ranged between 15,000 to 16,000 for the years 2001–2005 (Communicable Diseases Australia, 2006). These figures do not include NSW where campylobacteriosis is not reportable.

As campylobacteriosis generally causes a mild to moderate illness, medical practitioners are often not involved, resulting in an estimated 10 to 100 times lower notification rate compared to true incidence. Although the illness rarely results in death, a small proportion of those infected develop serious complications, predominantly Guillain-Barré syndrome (Hall and Kirk, 2005). Campylobacteriosis is thus a significant public health issue and is currently a priority for food safety managers in developed countries.

Determining the mode of transmission of *Campylobacter* is difficult as cases are reported sporadically and few are defined as an outbreak. It is estimated that 75 percent of cases of campylobacteriosis in Australia are foodborne and implicated foods include unpasteurised milk, non-chlorinated water and undercooked chicken. Food production animals such as cattle, sheep, pigs and poultry are a reservoir of pathogenic strains of *Campylobacter*. The bacterium is carried in the intestines of healthy stock and it can be transferred to milk during collection and animal carcasses during slaughter. *Campylobacter* survival along the food chain subsequently depends on the product. For example, it is inactivated in milk by pasteurisation, it can survive on moist surfaces of chicken carcasses, but is inhibited by the drier conditions on red meat carcasses.

In Australia, the poultry industry places a strong emphasis on food safety programs as poultry products have been implicated in outbreaks of campylobacteriosis. Food Standards Australia New Zealand is developing a Primary Production and Processing Standard for Poultry Meat in Australia to further protect consumers from foodborne illnesses associated with the consumption of poultry. In December 2005, a Draft Assessment Report for the Standard was published (Food Standards Australia New Zealand, 2005). It stated that the most important on-farm risk factors for *Campylobacter* contamination of poultry are biosecurity, for example transmission from one farm to another by contaminated crates, and age of the birds. At the consumer end of the food chain, the report indicated that the probability of campylobacteriosis was influenced by the level and prevalence of *Campylobacter* in raw poultry at the end of processing, cross-contamination during preparation of ready-to-eat foods, such as salads, and adequacy of cooking.

Responsibility for minimising *Campylobacter* levels and prevalence in raw poultry products lies right along the production and processing chain. Monitoring and verification programs need to be established to validate any control steps implemented. Consumer education programs also play an important role in minimising the risk of *Campylobacter* infection and emphasis must be placed on correct handling of raw poultry, including the need to cook it thoroughly.

# OzFoodNet – foodborne illness in Australia 2005

OzFoodNet recently published its report on foodborne disease in Australia for 2005 in *Communicable Diseases Intelligence* (OzFoodNet, 2006). This was the network's fifth annual report since its establishment in 2000. During 2005, OzFoodNet recorded 25,779 cases of seven potential foodborne diseases that are routinely reported to State and Territory health departments. Compared to previous years, there were increases in reported cases of Shiga Toxin producing *Escherichia coli* infections, haemolytic uraemic syndrome, shigellosis, campylobacteriosis and salmonellosis, while there were fewer cases of listeriosis. State and Territory health departments, in collaboration with OzFoodNet epidemiologists, conducted several investigations into increases or clusters of these diseases to monitor changes in their epidemiology and to identify potential outbreaks.

Outbreaks of foodborne illness are important as they represent a reliable source of information on food safety failures. In Australia in 2005, 102 foodborne disease outbreaks were identified affecting 1,975 people with 166 requiring hospital treatment and resulting in four deaths. The annual incidence of foodborne disease outbreaks has been stable over the last five years. As in previous years, foods prepared in restaurants caused most of the identified outbreaks and the most common agent was *Salmonella* Typhimurium. There are many causes of foodborne disease outbreaks, but some common themes occur year after year. Dishes made with fish, poultry, mixed meat dishes and eggs were the most common food vehicles identified in outbreak investigations. There were several large (more than 50 people affected) outbreaks in 2005 due to contaminated foods, including those caused by bakery products, raw egg dishes, dips, alfalfa sprouts and sandwiches.

Foodborne disease affects 5.4 million Australians annually and costs an estimated \$1.2 billion (Hall and Kirk, 2005). However, only a small proportion of illness is associated with identified outbreaks. The level of foodborne disease in Australia is similar to many other industrialised countries. Given the dramatic increases in outbreaks associated with raw products such as spinach, onions, and lettuce in the United States of America, it is vital that Australia continues its efforts to prevent contamination along the food chain from the farm to the customer.

This article was contributed by OzFoodNet. For more information contact: **Martyn Kirk**, Coordinating Epidemiologist, OzFoodNet Tel: +61 2 6289 9010, Email: [martyn.kirk@health.gov.au](mailto:martyn.kirk@health.gov.au)

# Australian Food Regulators' News

## Launch of Food Standards Australia New Zealand's science strategy

The Food Standards Australia New Zealand (FSANZ) 2006–2009 Science Strategy was launched in September 2006. Dr Marion Healy (FSANZ Chief Scientist) said that the willingness of stakeholders to utilise scientific research when developing regulatory measures is one of the reasons why Australia and New Zealand have the safest food supplies in the world. FSANZ recognises that changes in the types of foods consumed and evolving consumer expectations, require scientific focus in new areas and the ability to communicate research outcomes to a broad audience. The Science Strategy describes how FSANZ intends to use its scientific resources to maintain the safety of our food supply in changing times. It is available on the FSANZ website at: [http://www.foodstandards.gov.au/\\_srcfiles/Science\\_%20Strategy\\_final.pdf](http://www.foodstandards.gov.au/_srcfiles/Science_%20Strategy_final.pdf)

## New South Wales Food Authority partnering with local councils

The October 2006 edition of *Food Australia* reported that the NSW State Government has allocated \$1.6 million in 2006–2007 for a new initiative that will improve food safety coordination between local councils and the NSW Food Authority. The role of the 152 NSW councils in food safety regulation has previously been poorly defined, leading to inefficiency. The new partnership is based on a model that ensures all NSW councils have a specific food regulatory role that matches their capacity and resources. Consumer food safety will be boosted as authorities will now be able to respond more rapidly to emergencies such as food recalls.

## Food Authorities sign Memorandum of Understanding

The New Zealand Food Safety Authority (NZFSA) and the New South Wales Food Authority have signed a Memorandum of Understanding (MoU) that formalises their already close working relationship. In a statement released in September 2006, the NSW Primary Industries Minister, Ian Macdonald, said the MoU was an important step towards improving cooperation between the two agencies on a broad range of food safety and regulatory issues. NSW Food Authority Director-General, George Davey, commented that the agencies deal with a lot of common issues and the MoU would allow them to support each other during serious food emergencies. Areas of cooperation outlined in the MoU include policy development, standards and systems, incident response, food science, communications and compliance enforcement.

### Reference list

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# Australian Food Safety Centre of Excellence – Fourth Annual Industry Forum

**BRISBANE - Wednesday 15 November, 2006**

Brisbane Technology Park (West auditorium)  
cnr Logan and Miles Platting Roads, Eight Mile Plains

**MELBOURNE - Thursday 16 November, 2006**

Food Science Australia  
671 Sneydes Rd, Werribee

**ARRIVAL AND REGISTRATION FROM 1PM – talks start 1.30 pm sharp**

**Welcome**

*Chris Hudson, Australian Food Safety Centre of Excellence*

**The future of a national food strategy**

*Russel Rankin, National Food Industry Strategy*

**Microbiology in AQIS – monitoring safety of imported and exported foods**

*Paul Vanderlinde, Australian Quarantine and Inspection Service*

**Food biosecurity and ComBase updates improving usability for industry**

*Mark Tamplin, Australian Food Safety Centre of Excellence*

**AFTERNOON TEA**

**Food safety and the emerging new food products and food technologies – State support opportunities**

*John Hine, Qld Govt State Development*

**Emerging allergens – it's not just the big eight**

*Lyn Davies, Australian Food Safety Centre of Excellence Allergen Bureau*

**Troubled waters – the dark side of water minimisation**

*Ed Stuttard, EML Consulting*

**Knowledge management systems – information for action**

*Alison Small, Australian Food Safety Centre of Excellence*

**Welcome**

*Chris Hudson, Australian Food Safety Centre of Excellence*

**The future of a national food strategy**

*Susan Nelle, National Food Industry Strategy*

**Food biosecurity and ComBase updates improve its usability for industry**

*Mark Tamplin, Australian Food Safety Centre of Excellence*

**Emerging allergens – it's not just the big eight**

*Lyn Davies, Australian Food Safety Centre of Excellence Allergen Bureau*

**AFTERNOON TEA**

**Afternoon theme – Safe New Foods**

**Re-establishing the boundaries in food processing**

*Darian Warne, DWC FoodTech*

**A holistic view of applying hurdles for safe and stable foods**

*Belinda Chapman, Food Science Australia*

*Cathy Moir, Australian Food Safety Centre of Excellence*

**Assessing whether new foods and food additives are safe – when is too much unsafe?**

*Steve Crossley, Food Standards Australia New Zealand*

**Finish by 5.30pm followed by complimentary LIGHT REFRESHMENTS**

**Cost:** There is no charge for the Food Safety Centre Forum, but **registration is essential** for catering purposes.

**Bookings** and program details for Brisbane and Melbourne at: [www.foodsafetycentre.com.au/forum2006.htm](http://www.foodsafetycentre.com.au/forum2006.htm)

**OR** Fill in your details at right and fax to **02 9490 8499**

**Enquiries** to Cathy Moir

Ph: **02 9490 8579** Email: [forum2005@foodsafetycentre.com.au](mailto:forum2005@foodsafetycentre.com.au)

Attendance at the Australian Food Safety Centre of Excellence Industry Forum is free, but registration is required for catering purposes. The **Melbourne Industry Forum will be run concurrently with the Food Solutions Expo** at Food Science Australia, Werribee – a mix of exhibition, presentations and tours/demos at the Food Science Australia facilities at Werribee conducted throughout the day. **Food Safety Centre Industry Forum** attendees planning to **attend the Food Solutions Expo** during the morning **must register** and **pay the Expo registration fee**. More information on the Food Solutions Expo and the registration form is available at [www.airah.org.au/fse2006](http://www.airah.org.au/fse2006).

**BOOKING SLIP:**

Name: .....

Company/Mail Address: .....

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Phone: .....

Email: .....

Please tick location:  Brisbane Wed, 15 Nov  
 Melbourne Thurs, 16 Nov

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**FOOD SCIENCE AUSTRALIA**

A joint venture of CSIRO & the Victorian Government

**Australian Government**  
**Department of Agriculture, Fisheries and Forestry**