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Australian Food Safety Centre of Excellence

Food Safety: the essential ingredient

Food allergen management

A more detailed version of this article can be accessed through the Australian Food Safety Centre of Excellence website: **www.foodsafetycentre.com.au/anaphylaxis.htm.**

Allergen management has become a major focus for the food industry since the introduction in December 2002 of the mandatory declaration of certain substances in food under standard 1.2.3 Mandatory Warning and Advisory Statements and Declarations in the Australia New Zealand Food Standards Code.

Managing the risks associated with the presence of allergens in ingredients and products is one of the significant food safety challenges currently facing food manufacturers at all levels of the supply chain. We have factories producing an ever expanding range of products on shared equipment and the need to provide consistent and accurate information on these products to allergic consumers is now recognised.

Allergen related recalls of food products continue to be a problem – undeclared allergens has resulted in 24 recalls in the period May 2004 – June 2005 (**www.foodstandards.gov.au**). Food manufacturers must understand the management of substances in food that may lead to allergic or intolerance reactions in consumers.

Food allergies are abnormal responses of the immune system to foods which can, in some consumers, lead to potentially life threatening, consequences (*Food Safety & Hygiene*, November 2001). True food allergies are caused by a reaction to proteins in the food. Estimates of the prevalence of food allergies vary, but most researchers believe their incidence is increasing. The Australian Food and Grocery Council (AFGC) in their Food Industry Guide to Allergen Management and Labelling (2002) quote an incidence in Australia of 1–2 percent of the general population with the rate rising to 5–8 percent in children, although most children will outgrow their reaction by the time they have reached 5–7 years of age. For more information see:
www.allergenbureau.net/resources/Allergen_Management_and_Labelling.pdf

Food intolerances are generally caused by certain genetic disorders and include, for example, coeliac disease, which is intolerance to gluten contained in cereal grains such as wheat, rye, barley, triticale and oats. In contrast, food intolerances are generally not life threatening but affect the quality of life for those who suffer from them.

The authors of the 2001 US Institute of Food Technologists Scientific Status Summary on food allergies have now fleshed out their recommendations for allergen management in Food Technology **59** 2 2005 40. These recommendations are based on a series of their own previous publications (*Food Allergy and Intolerance* in 2000 and 2001).

What's inside

Most of the issues raised are covered in the AFGC Guide to Allergen Management but the authors, both from the Food Allergy Research and Resource Program at the University of Nebraska, give special emphasis to certain points. They note that while the minimum eliciting doses for allergens are not precisely known, evidence indicates that amounts as low as 1–3 mg of peanut, milk and egg can elicit mild allergic reactions in the most sensitive individuals. This highlights the challenge faced by manufacturers in developing effective allergen management programs.

The reviewers conclude their article by saying that the implementation of an effective allergen management program requires considerable effort and total company commitment. They believe the most important advice they can offer to manufacturers is to validate the effectiveness of allergen control programs using test kits. These are now available for the most common of the food allergies.

To emphasise how much care is necessary to avoid cross contamination, the reviewers cite two cases of peanut contamination investigated by their own laboratory – both related to previous contamination of shared transport mechanisms (railcars and jute bags). They also refer to an article (Yunginger *et al., Journal of the American Medical Association* **260** 1988 1450–1452) on the re-use of frying oil for a number of different products with particular reference to practices in restaurants that have resulted in at least one fatal incident of food-induced anaphylaxis.

Amongst several strong recommendations, these workers listed the need for restaurants to provide timely and accurate information concerning the ingredients in all menu items prepared in-house. This has been reinforced recently during Food Allergy Awareness Week coordinated by Anaphylaxis Australia Inc. The theme was Eating Out with Food Allergy – We can't cure food allergy; we need to learn to live with it (**www.allergyfacts.org.au/2005/PDF/Media_Release_FAAW2005.doc**). During this week food service staff and consumers were offered advice on managing food allergies.

Latest research is focusing on improving understanding of the problems in both lower threshold limits and methods of analysis.

Australian Food Safety Centre of Excellence

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Australian Food Safety Centre of Excellence - NEWS

Food allergen resources for Australia and New Zealand

In February 2004, the Australian Food and Grocery Council (AFGC), the peak body representing food manufacturers in Australia, the Australian Food Safety Centre of Excellence and the Australian Institute of Food Science and Technology hosted a two-day seminar and workshop to facilitate industry discussion on allergen issues facing the food industry.

Participants represented a range of stakeholders from Australia and overseas including Sue Hefle and Steve Taylor from the Food Allergy Research and Resource Program in the USA.

In March 2004, the AFGC Allergen Forum was established by industry member companies. The creation of the Allergen Forum has enabled industry issues and concerns regarding allergen management to be given focus and priority. It will also facilitate a consistent approach to allergen management and regulation across all food categories and within the food supply chain.

Since the establishment of the Allergen Forum, members have been working to develop a number of projects:

- Food Allergen Resource Bureau
- Benchmarking
- Testing and Thresholds
- Risk Assessment
- Uniform Supplier Questionnaire
- Labelling
- AFGC Allergen Guide Update and Review.

Working briefs have been developed for each project and teams have been established to progress them. The projects span both Australia and New Zealand to ensure a consistent trans-Tasman approach to these and other allergen management initiatives. More information on each project and details of any workshops are available from the Food Allergen Resource Bureau website.

The Food Allergen Resource Bureau was officially launched by The Hon Christopher Pyne (Parliamentary Secretary to the Minister for Health and Ageing) in Sydney on 6 April. The Bureau provides a centralised collection of information about food allergens relevant to the Australian and New Zealand food industry.

The Food Safety Centre of Excellence oversees the Allergen Resource Bureau, which is operated on a membership basis. Foundation members include Kelloggs, George Weston Foods, Danisco, Masterfoods, National Foods, Parmalat, Heinz, Elisa Systems, AgriQuality, Cerebos, Goodman Fielder, Unilever, Arnotts, Golden Circle, Simplot, Kraft, Peanut Company of Australia, Nestle and Kerry Ingredients.

The first issue of Allergens Bureau e-News is available now:
www.allergenbureau.net/guestsOnly/whatsNew.htm
(guest login required).

Contact:
Dr Lyn Davies – Manager, Food Allergen Resource Bureau for further information. Free call: 1800 263 829
info@allergenbureau.net or www.allergenbureau.net

Microbiological safety of green olives

The olive is the major fermented vegetable in western countries with the Mediterranean area being the major producer. The crop is becoming increasingly important in Australia both for fermented table products and oil production.

Traditionally, the production of green table olives (Spanish style) is a natural lactic acid fermentation that relies on lactic acid producing microorganisms on the raw material. Fermented green olives have an extended shelf life dependent on a number of factors including pH, titratable acidity, water activity, salt concentration and in some cases a terminal pasteurisation. The Codex Alimentarius contains a detailed standard for table olives which includes interdependent levels for minimum sodium chloride content and maximum pH (Codex Standard 66 Table Olives, available from:
www.codexalimentarius.net/web/standard_list.do)

Two recent reports act as a reminder that care must be taken in the production of this fermented product to ensure its safety:

- One report is of botulism attributed to consumption of poorly processed green olives in Italy.
- The other report discusses the potential for survival of *Listeria monocytogenes* in commercially prepared green olives.

Botulism from green olives

European workers report on an incident of sixteen suspected cases of botulism reported to health authorities by hospitals in three adjoining regions of central and northern Italy (*Emerging Infectious Diseases* **11** 4 2005 1088). All patients had eaten at the same restaurant in the town of Molise in February, 2004. Fifteen were admitted to hospital and some to intensive care. None required ventilatory support and no deaths occurred.

Epidemiological and laboratory investigation confirmed *Clostridium botulinum* type B as the causative organism. None of the food items served on the days when diners became ill was available for sampling. However epidemiological analysis of the foods diners had consumed indicated that only risk associated with eating green olives was significant. A jar of olives prepared at the same time as those eaten on the implicated days had a pH of 6.2, well above the level of pH 4.6 normally required to prevent growth of *C. botulinum*. No salinity testing was performed.

Interviews with the restaurant proprietors indicated that the suspect olives were prepared on site. The olives were soaked in salt water for approximately 35 days. The olives were then decanted into jars and the salt water replaced with fresh water. Neither the amount of salt used in the brine nor the pH were standardised during preparation.

Production processes for fermented green olives range from traditional methods to large-scale controlled processes. There is nothing wrong with the use of traditional methods as long as manufacturers are aware of any hazards associated with the product and can manage them effectively. It is essential that sufficient acid is produced to ensure that pathogenic bacteria do not grow. The product

Australian Food Safety Centre of Excellence research and training scholarships

As part of the Food Safety Centre's commitment to training and developing highly skilled food safety professionals, the Centre continues to offer a range of scholarships for full-time, part-time or external students, including Postgraduate scholarships and Honours scholarships. The Centre also provides funds to support internships and conducts courses, workshops and training programs in food safety science.

Research areas include adaptation and resistance to stress of foodborne microbial pathogens; ecology, physiology and functional genomics of foodborne microbial pathogens; food allergens; chemical contaminants; predictive modelling and risk assessment.

Further information: **www.foodsafetycentre.com.au/education.htm**

has a good public health record but commercial manufacturers must be able to monitor and adjust the pH, total acidity and salt concentration during the lactic acid fermentation period and should ensure that the procedure they are using meets the Codex requirements. For those who wish to produce their own fermented olives at home, consultation with a reputable authority may be necessary as many domestic recipes are scant on detail.

Listeria presence and survival on green olives

Bacteria growing, or at least surviving, under environmental conditions once considered adequate to kill them quickly have sometimes been identified as the cause of foodborne illness. For example, *Salmonella* species and toxigenic *Escherichia coli* have been associated with illness following consumption of low pH fruit products. *Listeria monocytogenes*, an important foodborne pathogen, can grow under environmental conditions often considered sufficient to control foodborne pathogens – pH <4.6, in the presence of 10 percent salt, and temperatures <4°C.

No documented outbreaks of listeriosis have been attributed to consumption of olives but Italian researchers have recently shown that *L. monocytogenes* can survive and grow in green table olives produced under experimental conditions and may be present in commercially prepared green olives at least in that country (*Journal of Food Protection* **67** 10 2004 2189–2194).

These researchers prepared green olives by the standard fermentation method using a 2 percent sodium hydroxide solution to reduce bitterness followed by washing in water and brining in an 8 percent sodium chloride solution. The brined olives were inoculated with two strains of *Lactobacillus* – one of which had been isolated from naturally fermented green olives.

A second experiment involved what the researchers term the biological method where washed olives were brined initially in 5 percent sodium chloride solution which was gradually increased to 7 percent over a two-month period. After the initial three days in brine, experimental samples were inoculated with the selected *Lactobacillus* strain(s).

In addition, ten samples of thermally treated green table olives in cans made by different producers were purchased and analysed.

L. monocytogenes was isolated from all trial samples older than two months and from one of the ten thermally treated samples.

With one exception, the olive samples were pH <4.5 with one being as low as pH 3.76. Again with the one exception, titratable acidity (lactic) ranged from 0.2 percent to 0.45 percent. Sodium chloride concentrations in the brine varied from 6.2 percent to 7.5 percent.

The authors conclude that *L. monocytogenes* naturally present on green olives can survive in the fermented product despite its low pH, water activity and high salt concentration. They recommend that an appropriate heat treatment be applied to ensure a reduction in *L. monocytogenes*.

Impact of meat and poultry safety regulation in the US

In the previous issue of *Food Safety & Hygiene*, we cited a review by Australian workers which showed that, on the basis of data available to them, food safety regulatory changes in Australia had not led to any apparent reduction in case rates of salmonellosis. The reviewers studied the periods 1993/1994 before new regulations affecting the meat and poultry industries were introduced and 2000/2001, five years after the regulations had been introduced.

In the United States, the United States Department of Agriculture (USDA) through its Food Safety and Inspection Service (FSIS) in 1996 promulgated its Pathogen Reduction: Hazard Analysis and Critical Control Point (HACCP) Systems regulations. These regulations have been modified from time to time since then with particular emphasis on reducing the incidence of *Escherichia coli* 0157:H7 in ground beef.

Previously, the USDA and the Centres for Disease Control and Prevention (CDC) differed as to whether the foodborne illness statistics gathered by the CDC showed genuine and sustained reductions in foodborne illness (*Food Safety and Hygiene*, May 2001). Data is now being published which both US federal bodies believe indicates that the combined food safety efforts of government and industry are paying dividends.

FSIS workers report on the incidence of *E. coli* O157:H7 in some ground beef samples. Of the 26,521 samples tested from 2000 through to 2003, 189 (0.71 percent) tested positive. Year to year comparisons identified a 50 percent reduction in the rate of positive samples on a seasonally adjusted basis from 2002 to 2003 (*Journal of Food Protection* **68** 3 2005 462–468).

This decrease was the only significant year to year change in the rate of *E. coli* O157:H7 positive samples but was consistent in samples obtained both from FSIS inspected establishments and retail outlets. The reviewers believe that this decrease can be attributed to specific regulatory action by FSIS and subsequent actions implemented by industry. It remains to be seen if this decrease represents the beginning of a sustained trend.

CDC has now released preliminary FoodNet* data on the incidence of infection with pathogens transmitted commonly through food for the year 2004 and compared it with baseline data from 1996–1998.

In 2004, FoodNet cases were part of 239 nationally reported foodborne disease outbreaks (*Morbidity and Mortality Weekly* **54** 14 2005 352–356). The most common causative organisms reported were Norovirus (57 percent) and *Salmonella* (18 percent).

When figures for 1996–1998 and 2004 are compared, there were significant declines in illnesses caused by *E. coli* O157:H7 (42 percent), *Listeria monocytogenes* (40 percent), *Campylobacter* (31 percent) and *Yersinia* (45 percent). *Salmonella* incidence decreased overall by 8 percent but of the five most common serotypes only the incidence of *S. Typhimurium* decreased significantly.

continued overleaf

The report notes that the observed declines in incidence have occurred concurrently with several important food safety initiatives and food education efforts. It also notes that the decline in *Salmonella* incidence was modest compared with other foodborne bacterial pathogens highlighting the need for greater efforts to understand the complex epidemiology of *Salmonella* and to identify effective pathogen reduction strategies.

It will be interesting to observe if these declines are maintained in the US and to see if sufficient data is collected in Australia to measure the effect of changes instituted by government and industry in this country.

As discussed in our March bulletin, it appears that these improvements noted in the US are not mirrored in Australia. Continued and improved surveillance will assist in monitoring the Australian situation.

* The Foodborne Diseases Active Surveillance Network (FoodNet) of CDC's Emerging Infections Program collects data from 10 US states on diseases caused by enteric pathogens commonly transmitted through food.

Foodborne disease outbreaks across Australia, January – March 2005

OzFoodNet is a national network of epidemiologists working with State and Territory governments and other organisations to investigate foodborne disease in Australia. During 2005, OzFoodNet strengthened surveillance of these very common diseases.

Summer is the most common time of year for foodborne diseases. During the first three months of 2005, OzFoodNet sites reported 31 outbreaks of illness that were due to contaminated food, compared with 24 outbreaks for the same time in the previous year. *Salmonella* Typhimurium caused seven of these outbreaks, while ciguatoxin was responsible for three outbreaks and *Campylobacter* for two. Of the remaining outbreaks, one each was caused by *Clostridium perfringens*, *Salmonella* Enteritidis 26 var, *Salmonella* Hessarek, *Salmonella* Saint-Paul, and suspected histamine poisoning.

In one outbreak in an aged care facility there were multiple serotypes of *Salmonella* isolated from patients including Chester, Muenchen and Subspecies 3b. *Salmonella* Subspecies 3b was also isolated from water samples from a rainwater tank at the facility. Tanks may be unsuitable as a source of drinking water for institutions and may be a more common cause of disease than previously recognised. An aetiological agent was not identified for 42 percent (13/31) of the outbreaks.

Outbreaks were associated with meals prepared in restaurants (10), food prepared in private residences (7), aged-care facilities (5) and food prepared by commercial caterers (4). The largest was an outbreak of *Salmonella* Typhimurium 197 at a Turkish restaurant in Victoria. S. Typhimurium 197 was isolated from dips served at the restaurant. At the same time, New South Wales reported an increase of *Salmonella* Typhimurium 197 cases among people of Middle Eastern ethnicity, although no connection between the two outbreaks could be made.

There were five outbreaks associated with dishes containing eggs during the first quarter – two of these outbreaks were related to hollandaise sauce prepared in restaurants in different States. These outbreaks highlight the importance of restaurants using pasteurised egg in sauces and desserts. One of the egg associated outbreaks was an outbreak of *Salmonella* Enteritidis in an aged care facility. Australia does not have *Salmonella* Enteritidis endemic in egg laying flocks, so it is vital that public health agencies investigate infected patients, as they may represent sentinels for new emerging sources of this pathogen.

This article was contributed by OzFoodNet. For more information see the OzFoodNet reports in the latest issue of *Communicable Diseases Intelligence*:
www.health.gov.au/internet/wcms/Publishing.nsf/Content/cda-pubs-cdipubs.htm

or contact:
Martyn Kirk, Coordinating Epidemiologist, OzFoodNet,
Tel: +61 2 6289 9010, martyn.kirk@health.gov.au

Food Safety & Hygiene is prepared by
Keith Richardson, Catherine Moir and
Rachel Jackson

Australian Food Safety
Centre of Excellence
PO Box 52, North Ryde NSW 1670
Telephone +61 2 9490 8397
Fax +61 2 9490 8499
Web http://www.foodsafetycentre.com.au

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