

Food Safety: the essential ingredient

Enterobacter sakazakii

Although recently brought to the attention of manufacturers and the public through a number of outbreaks and public recalls, *Enterobacter sakazakii* was first associated with neonatal deaths in 1958. It was then known as yellow pigmented *Enterobacter cloacae* and was designated a new species in 1980.

In February this year, a Joint Food and Agriculture Organization/World Health Organization (FAO/WHO) Workshop was held on *E. sakazakii* and other microorganisms in powdered infant formula. The FAO and WHO have released an advance report from the workshop; a summary of which appears on the Food Safety Centre's website (www.foodsafetycentre.com.au/issues). This report contains a number of risk reduction strategies for formula fed infants and has a high degree of commonality with an earlier published risk profile of *E. sakazakii* by UK workers (*Trends in Food Science and Technology* 14 2003 443).

The principle measures are:

- reduce initial levels of the organism in raw materials on receipt;
- reduce levels during heat treatment of raw milk, related ingredients and reconstituted powdered infant formula prior to use;
- prevent an increase in levels by avoiding post-processing contamination;
- apply microbiological criteria. In order to implement effective microbiological criteria, it will be necessary to validate the recommended and newly developed detection methods; and
- provide appropriate information and preparation instructions.

The same group of UK workers have now published further information on the growth, thermotolerance and biofilm formation of *E. sakazakii* grown in infant formula milk (Iversen *et al.*, *Letters in Applied Microbiology* 38 2004 378). In these studies, *E. sakazakii* grew between 6°C and 45°C in all media tested with one strain being able to grow at 47°C but only in infant formula milk.

The thermotolerance of the organism was similar to other Enterobacteriaceae such as *Salmonella* in rehydrated milk powder. Therefore the standard high-temperature short-time pasteurisation process of 15 seconds at 72°C will inactivate the organism. Any contamination of infant formula milk powder will therefore probably be due to failure in hygiene standards after pasteurisation. [Edelson-Mammel and Buchanan (cited in FAO/WHO Workshop, 2004) have

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also shown long term survival of (>1½-years) *E. sakazakii* in powdered infant formula.]

Iversen *et al.* (2004) also showed that, when grown in infant formula milk, *E. sakazakii* formed a biofilm on surfaces including latex, silicon and to a lesser extent, stainless steel. These materials are commonly used for infant feeding equipment and in preparation areas.

The authors recommend that all bottles and utensils should be cleaned thoroughly as soon as possible after use to deter *E. sakazakii* biofilm formation which could become a source of infection.

Persistence of Norovirus

Food Safety & Hygiene, February 2001, contained an article on airborne transmission of a Norwalk like virus now known as Norovirus. In the incident described there, the function room of a large hotel was the site of an outbreak of the viral infection following a vomiting episode during a meal by one diner.

The same group of workers in the UK have now reported on a school outbreak of Norovirus which provides further evidence that aerosolisation of virus particles can lead to direct infection.

In this incident from a school enrolment of 4–11 year olds of 492, 186 pupils had some absence from school with gastrointestinal symptoms. Five members of staff were also ill. The onset of vomiting by infected children was often sudden with a number vomiting within classrooms. The areas visibly contaminated were cleaned immediately. Vomiting occurred in some but not all classrooms.

An initial environmental cleaning operation took place in the school 13 and 14 days after the first cases occurred. A quaternary ammonium compound was used for this cleaning despite advice about its potential lack of efficacy. This proved to be the case and cleaning took place again on days 19 and

continued overleaf

20 with chlorine based products being used. The school closed from days 18 to 21 inclusive and after the second cleaning and closure, no further school absences occurred.

Noroviruses continue to trouble the cruise ship industry. In our previous issue (*Food Safety & Hygiene*, February 2004), we noted a Norovirus outbreak on a cruise ship which returned to Sydney on 27 December, 2003. The same vessel returned to Sydney from a Pacific island cruise on 9 May, 2004 after 140 passengers became ill suffering attacks of nausea, vomiting and diarrhoea during the cruise.

The ship was allowed to leave port the same night carrying a new load of passengers after a team of cleaners, supervised by health officials, scrubbed down the ship. The initial source of the virus was not identified but the cruise company denied responsibility (*ProMED mail*, 11 May, 2004).

A third outbreak of viral gastrointestinal illness, in the same vessel, has now been reported in the daily press. In the latest incident, reported on 21 May, 56 people including 24 crew, exhibited symptoms typical of Norovirus infection although the cruise company claimed only some of the latest cases were caused by the virus.

Norovirus and other members of the same family appear to be highly resistant to common chemical sanitizers. We discussed in *Food Safety & Hygiene*, May 2002, results obtained by US workers who reported experiments using feline calicivirus (FCV) as a model to determine the efficacy of disinfectants against Norovirus.

There are no laboratory methods for the propagation of Norovirus whereas FCV, which is closely related to Norovirus, grows rapidly in cell cultures and produces characteristic effects in infected cells.

In view of the frequency with which Norovirus is implicated in outbreaks, it is worthwhile reminding readers' about this US study which appeared in *Journal of Food Protection* **64** 2001 1430, the results of which can be found in the May 2002 issue of *Food Safety & Hygiene* or on our website www.foodsafetycentre.com.au/fsh/.

OzFoodNet – collaborating nationally to investigate foodborne diseases

OzFoodNet began its work in 2000 as an Australian Government initiative. Since then, this national network has worked closely with State, Territory governments and other organisations to investigate foodborne disease in Australia. OzFoodNet has contributed towards a stronger evidence base for food safety policy, and better understanding of practices resulting in foodborne illness.

The OzFoodNet headquarters group is based in the Department of Health and Ageing in Canberra. OzFoodNet Site epidemiologists are placed in State and Territory health departments around Australia.

As part of the 2004–05 Budget, the Australian Government allocated a further \$4 million over four years for OzFoodNet's activities. This will allow OzFoodNet to continue its work in finding and tracking outbreaks of foodborne illness, and helping to ensure the safety of Australia's food supply.



Australian Food Safety
Centre of Excellence

Food Safety: the essential ingredient

Australian Food Safety Centre of Excellence - NEWS

Pathogen Combat:

International project on the control and prevention of emerging and future pathogens at cellular and molecular level throughout the food chain. The Food Safety Centre will contribute to this project with expertise in modelling microbial population behaviour.

Allergens:

European Union announced funding of the proposed Framework Program 6 Europeprevail integrated project that aims to develop consensus positions on food allergy management. The Food Safety Centre is a participant in the project, enabling the Australian industry to have a voice in developments and remain informed of outputs and outcomes.

Allergen Working Group Industry Update:

These updates will be held in:

Sydney: Tuesday, August 17 2004; 1:00 - 5:00 p.m.

Melbourne: Thursday, August 19 2004; 1:00 - 5:00 p.m.

Please call us or see 'What's On' at our website for further information.

The Food Safety Toolkit™:

Demonstration copy and order form available from the Food Safety Centre or from our website. The Food Processing module is **now** available. The Retail and Hospitality is due for release in August.

New to our website:

Issues updates and factsheets

www.foodsafetycentre.com.au

Centre science snippets – food safety objectives

The General Agreement on Tariffs and Trade (GATT) “allows governments to act on trade in order to protect human, animal or plant life or health”. Specifically, the Sanitary and Phytosanitary Measures Agreement (SPS) on food safety and animal and plant health standards sets out the basic rules. It allows countries to set their own standards but only to the extent necessary to protect human, animal or plant life or health. They should not unjustifiably be used to discriminate against countries. The criteria used to determine whether a food should be considered safe should be clearly conveyed to the exporting country and should be scientifically justifiable.

Each Member (country) can determine the “appropriate level of protection” and traditionally, this has been defined in terms of having a chemical or microbial risk “as low as reasonably achievable”. This has caused great difficulties for a number of reasons, including that the idea of what is considered “reasonable” differs from country to country as acceptable risk is culturally defined.

The International Commission on Microbiological Specifications for Foods has proposed a preventative scheme for managing microbial risks in foods that introduces the concept of a food safety objective (FSO). The approach incorporates existing Food and Agriculture Organization / World Health Organization and Codex Alimentarius documentation on General Principles of Food Safety Management. At the 36th meeting of the Codex Committee on Food Hygiene (in March/April, 2004) definitions of food safety objectives, performance objectives and performance criteria were agreed and these were sent to the Codex Committee on General Principles for endorsement and subsequent adoption by the Codex Alimentarius Commission.

The advantage of the FSO concept is that it translates public health risk into a definable goal: a specified maximum frequency and/or concentration of a [microbiological] hazard in a food at the time of consumption, which is deemed to provide an appropriate level of protection. The approach enables the food industry to meet a

specific goal by the application of the principles of Good Hygienic Practice, Hazard Analysis Critical Control Point (HACCP) systems, performance criteria, process/product criteria and/or acceptance criteria. It provides a scientific basis that allows industry to select and implement measures that control the hazard of concern in a specific food or food operation, and enables regulators to better develop and implement inspection procedures to assess the adequacy of control measures implemented by industry, and to quantify the equivalence of inspection procedures in different countries. Thus, the practical value of using the FSO concept is that it offers flexibility of operation: it does not prescribe how an operation achieves compliance, it defines the goal.

Establishing a FSO resides within the domain of food regulators and for a specific hazard requires a linkage between quantitative risk assessment and exposure assessment of a pathogen to likely public health outcomes. It is an area where much underpinning science is required. The Australian Food Safety Centre of Excellence Science Program is undertaking some case studies on the use of FSOs to establish control measures and food standards. These are: *Risk management strategies for Escherichia coli, with particular reference to uncooked fermented meats* and *Risk Management strategies for Listeria monocytogenes in seafood*.

A key objective is to examine the implications of adoption of FSOs for industry, regulators, enforcement agencies and public health authorities. These examples will draw on and aim to meet the guidelines being advanced by FSANZ, the World Trade Organization, the International Dairy Federation and the Codex Alimentarius Commission where it is proposed that different control measures can be compared by relating their performance in terms of achieving a FSO.

Keep an eye out for the results of these studies on the Centre's website and in a future bulletin.

(Adapted from www.wto.org and an article prepared for *Foodbiz*, a publication of the National Food Industry Strategy).

Norovirus and oysters

Since November 2003, there were four outbreaks of gastroenteritis associated with individually quick frozen oysters from Japan. Two of these outbreaks occurred in the Northern Territory, and one each in Western Australia and Queensland. The cause of the outbreaks was Norovirus, which is a common cause of gastroenteritis. Raw oysters have often been a food vehicle for this virus, which usually causes nausea, vomiting and diarrhoea about 24–48 hours after exposure. While epidemiological evidence strongly implicated oyster consumption as the cause of these outbreaks, microbiological testing of oysters was negative. Testing foods for viruses is technically very difficult.

Investigation of the outbreaks found that the frozen oysters imported from Japan were prepared and served in different ways. In three of the outbreaks the oysters were eaten raw. In two instances oysters were served in ‘oyster shooters’, which is a cocktail including the raw meat. One large outbreak occurred at a restaurant despite the kitchen staff grilling oysters for several minutes. This highlights the fact that light cooking will not render oysters safe.

Foodborne outbreaks, January – March 2004

There are usually about 90 outbreaks of foodborne disease each year in Australia. In the period from January to March 2004, OzFoodNet sites reported 24 foodborne outbreaks which affected a total of 280 people, including 23 who were hospitalised. Settings for these outbreaks included

restaurants, homes, catering and a correctional facility. Apart from the imported frozen oysters, the foods implicated in these outbreaks included beef curry, duck eggs, sushi, fish, cream cakes, prawns and cold meats. This demonstrates the wide variety of causes of foodborne illness.

Strengthening surveillance in Australia

Outbreaks often cross State and Territory borders. OzFoodNet has an important role in co-ordinating response efforts in co-operation with other government agencies. To strengthen these arrangements, the Australian Government recently engaged a consortium to assess Australia's capacity to manage national outbreaks of foodborne disease. The consortium headed by Biotext and the National Centre for Epidemiology and Population Health met with stakeholders and held a national meeting to discuss strengths and weaknesses of the current system. The overall findings of the consortium highlighted the complexity of the system and the important role that OzFoodNet has played in co-ordinating multi-state investigations.

Australia's consumers will continue to benefit from OzFoodNet's activities. The network has been able to detect and monitor various foodborne illnesses in Australia, and has thrown light on particular foods and settings associated with outbreaks and sporadic illness. With further Australian Government funding for the next four years, OzFoodNet will also be able to provide support to Australia's access to important food markets overseas.

Integration of the NSW food safety system

The integration of the NSW food safety system described in the June 2003 issue of *Food Safety & Hygiene* has now been formalised with the creation of the NSW Food Authority. The Authority, which merges Safe Food NSW with the food regulatory functions and resources of NSW Health, becomes the responsibility of the Minister for Agriculture and Fisheries.

It is a through chain authority and is now responsible for food regulation from harvest to the point-of-sale.

A major recommendation of the review which led to the integration of the State Authorities was that the responsibility of local government for food regulation should be clearly defined and appropriately resourced. While formal arrangements existed in some other States which defined the role of local government in food regulation, including enforcement, this has not been the case in NSW.

In November 2003, the Food Board of NSW Health released a 'directions paper' titled *Toward a Strong Food Regulation Partnership*. This paper was prepared by the Public Health Strategic Liaison Group, a forum between local government bodies and health service agencies in NSW. The paper acknowledges the historical role of local government in food regulation enforcement. It notes that the ongoing work of local councils is needed to ensure food regulations are comprehensively enforced, are consistently applied, and that adequate resourcing for these activities must be provided in one way or another.

The paper then explores ways in which local and State governments may work together effectively.

Possible co-ordination frameworks

There is a wide range of possible models to co-ordinate food law enforcement activities and these will have to be analysed to select the best one to accommodate the situation in NSW.

In the UK there is a very formal framework and agreement. The Food Standards Agency, a British Government body, has statutory power to require local authorities to meet its expectations. Amongst other powers, the Agency monitors the performance of local enforcement authorities and can audit the food enforcement services of local authorities. However, the Agency offers support to local government to help it meet these requirements by way of providing information, briefings, tools and training.

The Queensland Government, through its Department of Health and the Local Government Association, are signatories to a voluntary agreement, *A Public Health Partnership Protocol*. There is no formal co-ordination or

evaluation of local government food regulation but local governments enforce Food Safety Standards 3.2.2 and 3.2.3, as well as registering or licensing food businesses. Councils charge for this service and for compliance inspections.

All local councils in Victoria are enforcement authorities under the State's Food Act. They are required to register and inspect all food premises annually. The Food Act divides Victorian food businesses into two classes based on risk. High risk businesses are subject to third party audit while low risk businesses are audited by council officers. There is no statutory requirement for councils to report to the State Government on their enforcement activities. Councils levy registration fees.

In South Australia, local councils enforce the safety and suitability aspects of the Food Standards Code. The Department of Human Services guides local councils in the exercise of their food regulation enforcement by way of seminars, circulars and fact sheets. The Department collects food enforcement data and tables an Annual Report to Parliament. Councils levy inspection fees.

In Western Australia there is no formal co-ordination, monitoring or evaluation of local government food regulation enforcement. In practice, the Department of Health is the enforcement agency for dairy, meat, shellfish and the hospital sector with local government covering the remainder of the industry in the retail and food service sector. Councils may charge licence fees.

The Department of Health and Human Services in Tasmania advises and assists local government in their enforcement activities. Data on local government activities is reported on an annual basis. Food premises are registered and food businesses are licensed.

Key issues

The 'directions paper' highlights a number of key issues which will have to be addressed as the consultation process in NSW proceeds. Included in these are:

- Should risk based classifications of food industry sectors guide the division of statutory responsibilities for enforcement between local government and State Government?
- Should all local councils take responsibility for food safety requirements in low risk food businesses?
- What principles should guide the choice of a mechanism for local councils to recover costs?
- How will the bodies involved in food regulation demonstrate accountability for these activities?

Interested parties should contact the NSW Food Authority for further information. Responses to the directions paper are not called for at this time.

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