Australia's Imported Food Program – a valuable source of information on micro-organisms in foods

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Abstract

Foods imported into Australia are subject to laboratory testing for microbiological and chemical hazards under the Imported Food Program (IFP) for the purposes of protecting public health and safety. The program, operating under the Imported Food Control Act 1992, is jointly administered by the Australian Quarantine Inspection Service (AQIS) and the Australia New Zealand Food Authority (ANZFA). Foods that fail under the IFP are subsequently subjected to appropriate treatment to rectify the problem, or are destroyed or re-exported. This article presents a limited analysis of IFP test results on selected foods imported between 1995 and 1999. As corrective action is taken immediately on the basis of failing test results, regular analysis of collated data is not considered a priority. Nonetheless these data potentially represent an important source of information on the nature of food microorganisms detected in imported foods. For example, IFP data could be used to focus local and state-based food surveillance efforts, provide information to importers, to inform national initiatives such as OzFoodNet, and to better target investigative and preventative efforts concerning foodborne illness. *Commun Dis Intell* 2002;26:28-32.

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Introduction

The Imported Food Program (IFP) was established in 1990. The Program arose due to several serious incidents of food poisoning overseas during the 1980s[1,2] and its aim was to ensure the safety of food imported into Australia. The national program initially concentrated on foods considered a high public health risk. In 1992, through the *Imported Food Control* Act, the IFP was given specific legislative backing and expanded to cover all imported foods and beverages. The IFP ensures that food entering Australia complies with Australian food law. ANZFA undertakes scientifically based risk assessments for the program while AQIS conducts the operational aspects of the program.

Within IFP, foods are classified as Risk or Surveillance category foods. Risk category foods are initially determined and periodically reviewed by ANZFA on the basis of scientific risk assessments. Current Risk food groups and the full list of tests carried out are listed in the Table. These are foods which are considered to pose an inherent or historical high risk to public health, based on the likelihood of them being contaminated with harmful bacteria. Surveillance category foods are divided into two categories: Active and Random. Foods in the Active surveillance category are considered to pose a moderate public health risk, and for which more information is needed to make a definite categorisation. Foods in the Random Surveillance category are considered to pose a low level of risk to health and safety.

The Australian Customs Service (ACS) refers 100 per cent of Risk foods to AQIS for inspection on entry into Australia. Tests on Risk foods are specific to the food and testing rates depend on the compliance history of the producer. The first five shipments of a Risk food sourced from a particular producer are initially inspected. After five consecutively cleared shipments, the inspection intensity drops to the next level which is one in four shipments.

Following 20 cleared inspections, the inspection level drops to one in 20 shipments. Any failure at any stage results in elevation to a 100 per cent inspection rate until five consecutive shipments are cleared. Risk category foods are not released onto the market until test results are known.

Foods in the Active Surveillance category are inspected at the rate of 10 per cent by the supplying country. Foods in the Random Surveillance category are inspected at a rate of 5 per cent of shipments based on the volume entering by the respective tariff code.

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New products which have not been previously imported into Australia must first be assessed to ensure that they meet quarantine requirements. For example, unprocessed foods such as some raw meats are presently not allowed into Australia due to quarantine laws. Provided a food meets Australia's quarantine requirements, a risk assessment is then undertaken by ANZFA which concentrates on the public health and safety aspects of the food. Due to the recent problems with bovine spongiform encephalopathy (BSE) and the risk of acquiring variant Creutzfeldt-Jakob disease from the consumption of beef products, all beef products are now classified as Risk category foods. Importing countries are now assessed by ANZFA as to their level of BSE risk. Depending on the risk category that a country is allocated, various levels of certification are required to satisfy the Australian authorities that products are derived from animals not exposed to BSE risk.

All inspection and testing of foods under the IFP is carried out by AQIS. On entry into Australia, ACS refers all foods at the relevant rates of inspection, to AQIS. An AQIS officer then attends the premises of the importer and carries out an inspection. This involves examining packaging for defects or indications of contamination, and for appropriate labelling. The AQIS officer may also take samples of the foods for analytical testing if appropriate.

National standards stipulating allowable levels of microorganisms in foods are set out in the Australian Food Standards Code.[3] The levels are determined through risk assessment methodology which is consistent with established international practices such as those established by the International Commission on Microbiological Specifications for Foods (ICMSF), and the Codex Alimentarius Commission.[4]

The aim of this analysis was to assess whether IFP data can contribute to public health policy and be used in a broader and more strategic manner to help inform efforts in the control of and policy on foodborne illness. At present these data are accessible only by AQIS and used almost exclusively for operational purposes.

Methods

Microbiological data for Risk foods were obtained from the AQIS database as Microsoft Excel files. Data fields included date of entry, producer, country of origin, quantity, test type, test result (pass/fail) and details of organisms detected. Data were transferred to Microsoft Access and analysed by calculating rates of failures by organism and food type. Results were transferred to Microsoft Excel for production of graphs.

Results

Overall failure rates

Of the 17,685 microbiological tests performed on Risk foods for the five-year period 1995 to 1999, there were 486 failures (2.7%). Yearly failure rates ranged from 2.3 to 4.0 per cent.

Failure rates (failed tests/total tests 100) over the five-year period were calculated for Risk foods (Table 1). Of all Risk foods, smoked vacuum-packed fish had the highest failure rate of 8.6 per cent for *Listeria* contamination.

Failures for contamination with *Listeria*, *Salmonella* and *E. coli*

Foods tested for *Listeria* include smoked vacuum-packed fish, soft cheeses, chicken and mussels (Table). The percentage of total *Listeria* failures increased sharply until 1998 and then declined in 1999 (Figure 1). When examined separately, the results for soft cheeses and smoked fish are similar, in that there is an upward trend for failures until 1998 (results not shown).

Salmonella testing is carried out on spices, seafood items, pork, chicken and coconut (Table). No failures have been recorded in chicken or pork. A wide range of *Salmonella* serotypes were isolated from these foods including *S.* Weltevreden, *S.* Muenchen, *S.* Typhimurium, *S.* Mbandaka, *S.* Stanley and *S.* Hvittingfoss. The overall failure rate for *Salmonella* can be seen in Figure 1.

Foods tested for *E. coli* contamination include seafood, chicken and pork (Table). All failures for *E. coli* occurred in seafood (Figure 1). Limits for *E. coli* differ slightly for different foods.

For all 3 organisms the number of tests carried out each year remained fairly constant.

Standard plate count failures

Standard plate counts are carried out on seafood, pork and chicken. All failures were from seafood (Figure 2). Allowable levels differ slightly for different groups of foods (Table), however generally the SPC must be $< 10^5$/g.

Table. Failures by food type, 1995 to 1999

Risk food type	Test	Allowable limit	Overall failure rate %	Total number of tests
Smoked Fish	*Listeria monocytogenes*	Nil detect	8.6	388
Peanuts	Aflatoxins	15 µg/kg	7.1	1,438
Paprika	*Salmonella*	Nil detect	4.5	369
Marinara mix	*E. coli* Standard plate count Domoic acid *Salmonella* PSP	10/g 5 x 10^5 20 mg/kg Nil detect 0.8 mg/kg	3.7	283
Molluscs	*E. coli* Standard plate count Domoic acid *V. cholerae* PSP	2.5/g 10^5/g 20 mg/kg Nil detect 0.8 mg/kg	2.5	2,440
Crustaceans (cooked and chilled)	*E. coli* Standard plate count SET *Salmonella* Standard plate count	10/g 10^6/g Nil detect Nil detect 10^5/g	2.0	5,187
Pepper	*Salmonella*	Nil detect	1.6	1,584
Soft cheeses	*Listeria monocytogenes*	Nil detect	1.1	1,440
Selected Fish	Mercury	0.5 mg/kg	1.0	2,185
Coconut	*Salmonella*	Nil detect	0.8	524
Tuna	Histamines	200 mg/kg	0.4	1,162
Pork (cooked and chilled)	*E. coli* Standard plate count *Salmonella* CPS Standard plate count	10/g 10^6/g Nil detect 100/g 10^5/g	0.0	29
Chicken (cooked and chilled)	*Listeria monocytogenes* *E. coli* Standard plate count *Salmonella* CPS *E. coli* Standard plate count	Nil detect 10/g 10^6/g Nil detect 100/g 9/g 10^5/g	0.0 0.0	22
Cinnamon	*Salmonella*	Nil detect	0.0	10

SET = Staphylococcal enterotoxin
CS = commercial sterility
PSP = paralytic shellfish poisoning
CPS = Coagulase positive *Staphylococcus*

Figure 1: Percentage failures for *Listeria*, *Salmonella*, and *E. coli* contamination, 1995 to 1999

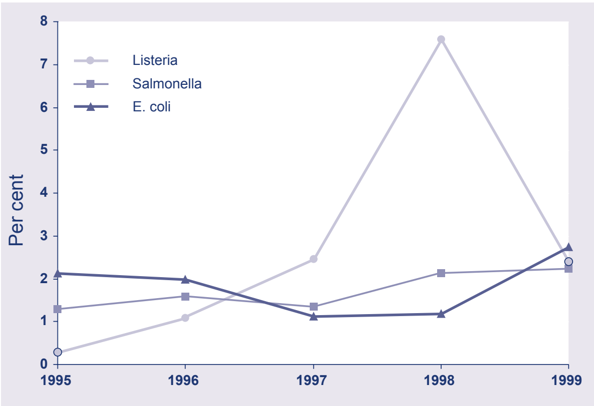
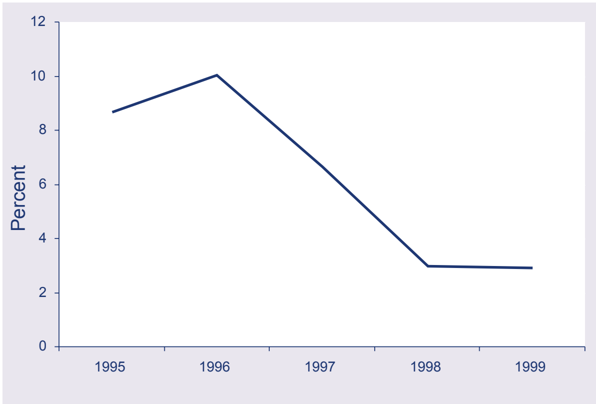


Figure 2. Percentage failed tests for high standard plate counts, 1995 to 1999



Numbers in parentheses represent number of tests performed

SPC = Standard Plate Count

Discussion

The IFP conducts the only ongoing systematic surveillance of imported foods for microbiological hazards in Australia. Collated data from the program could be utilised better to assist research into foodborne microorganisms and facilitate the identification of potential links between food items and illness due to specific human pathogens.

Routine analysis and interpretation of such data would provide important information for food importers and public health agencies to assist efforts towards the control of and policy development regarding foodborne illness. For example *Listeria* and *E. coli* contamination, as well as high standard plate counts may indicate poor production processes. For this reason awareness of trends such as the increase in *Listeria* failures from 1995 to 1998 is useful and could lead to actions to help improve the overall quality of food entering Australia.

The IFP database could also be used more effectively to assist some epidemiological foodborne diseases investigations. If, for example, clusters of disease due to unusual *Salmonella* serotypes are diagnosed with no apparent source, the IFP test results may be scanned to determine whether there have been previous associations between the particular pathogen and imported food types.

There were two notable multi-State outbreaks of diseases during 2001 solely attributed to imported food items.[5] One of these outbreaks was caused by halva, a sweet manufactured from sesame seeds which was contaminated with *Salmonella*. As a result of this outbreak, this product was elevated to Risk category for 3 months and 100 per cent was tested for *Salmonella* contamination. Following this time, during which there were no failures, it will be recommended that halva and other sesame seed products be tested for *Salmonella* under the Random surveillance category. The other outbreak was from peanuts contaminated with *Salmonella*. Peanuts are not currently tested for *Salmonella* at the Risk level of inspection. Part of the difficulty with linking failures in Risk category foods to particular outbreaks relates to the operation of the program and the recall system. Risk foods are not normally released until test results are known, resulting in foods which have failed for *Salmonella* contamination, for example, not reaching the marketplace. Of course this will only apply where the food has been tested.

Since 1995 there have also been 16 food recalls prompted by a failed test under the IFP. Such recalls are precautionary in nature, aiming to prevent the risk of illness occurring. As already mentioned, foods may also been elevated to Risk status as a result of them being linked to illness, as occurred for imported halva.

There are many limitations in trying to better utilise these data. These include the difficulty of determining exact denominators, in terms of volumes of different foods entering Australia. The number of tests is used here as a proxy, however this means that foods with low failure rates will be tested less and will consequently be under-represented in the results. Other limitations include the data quality which is variable, as data, particularly in terms of entry, occurs at many sites around Australia and the process is not harmonised. Timeliness is a particular issue of this system, and in some cases test results may not be entered into the database for several months after testing of the food.

The IFP surveillance, in conjunction with other food monitoring and intelligence needs to be more effectively utilised to allow the possible elucidation of links between food and disease and eventually lead to remedial action in food production processes. In summary, as well as being used to monitor individual shipments of imported food, these data represent an additional and valuable resource for public health agencies to aid in the investigation, prevention and control of foodborne illness.

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