Australian Government
Rural Industries Research and Development Corporation

Food Safety Standards and Labelling for Native Plant Foods

By John Faragher, Michelle Parsons and Robert Premier

February 2008
RIRDC Publication number 08/020
RIRDC Project No DAV-211A

ISBN 1 74151 609 9
ISSN 1440-6845

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Researcher Contact Details

Researcher Contact Details:
Dr Robert Premier
Department of Primary Industries Victoria, Knoxfield
Private Bag 15
Ferntree Gully DC Vic 3156
Phone: 03 9210 9222
Fax: 03 9800 3521
Email: Robert.Premier@dpi.vic.gov.au

In submitting this report, the researcher has agreed to RIRDC publishing this material in its edited form.

RIRDC Contact Details

Rural Industries Research and Development Corporation
Level 2, 15 National Circuit
BARTON ACT 2600
PO Box 4776
KINGSTON ACT 2604

Phone: 02 6271 4100
Fax: 02 6271 4199
Email: rirdc@rirdc.gov.au
Web: http://www.rirdc.gov.au

Published in February 2008 by Canprint

Foreword

The native food industry in Australia is developing slowly into a specific and valuable industry that has the potential to make a substantial contribution to the economy in areas of Australia that are economically disadvantaged. Bush tucker is moving from something of a novelty to a serious contender for domestic and export markets. In order to make this shift the industry has to address a number of issues; two of these being food safety and labelling.

Food safety is important, as it is a basic requirement and demanded by consumers in both local and international markets. Labelling is important, as appropriate labelling will identify these unique Australian products in the eyes of consumers. By addressing these two issues the Australian bush foods industry will benefit considerably in the transition phase from novelty value to mainstream products.

The Rural Industries Research and Development Corporation and the Victorian Department of Primary Industry have invested in this project in order to assist the Australian bush foods industry to develop further into a mainstream industry. The assistance delivered through this project has included literature and training to assist the industry to meet the requirements of the new food safety legislation, a general prerequisite for all food products. Also, this project has provided assistance to industry on labelling requirements and on opportunities to use labelling to convey the authenticity and value of their product.

This project was funded from RIRDC Core Funds which are provided by the Australian Government.

This report, an addition to RIRDC's diverse range of over 1700 research publications, forms part of our New Plant Products R&D program, which aims to facilitate the development of new industries based on plants or plant products which have commercial potential in Australia.

Most of our publications are available for viewing, downloading or purchasing online through our website:

- downloads at www.rirdc.gov.au/fullreports/index.html
- purchases at www.rirdc.gov.au/eshop

Peter O'Brien
Managing Director

Acknowledgments

We thank RIRDC and the Department of Primary Industries (DPI) Victoria for funding the project.

Barry Dignam did an excellent job advising us on training issues and assessing the competency of industry members who attended training workshops. Bruce Tomkins and Peter Carr of DPI Knoxfield provided technical advice and encouragement.

Industry members provided advice and encouragement, particularly Gil and Meredith Freeman, Sibylla Hess-Buschmann, Libby Anthony and Dianne Haywood. In addition industry members provided cash contributions to cover training costs. Yvonne Latham (CSIRO Land and Water, Mount Gambier) and Sarah Eccles (Koorie Business Network, Department of Innovation Industry and Regional Development, Victoria) were excellent collaborators. Max Bourke AM of RIRDC, Janette McDonald (QDPI), Nola Caffin (UQ), and Maarten Ryder (CSIRO) provided advice and encouragement. Food Standards Australia and New Zealand (FSANZ) and Food Safety Victoria provided technical advice. Tony Slater of DPI Knoxfield conducted an analysis of opportunities for DPI Victoria to work with the native food industries and provided advice to this project. Lyndal Peterson, the Environmental Health Coordinator at the South Gippsland Shire Council, kindly spoke with the participants of the Leongatha course. The Queensland Bushfood Association, the Northern Territory Horticulture Association and Desleigh Dunnett of Charles Darwin University, Darwin, made our final seminars and workshops in those areas possible.

Contents

Abbreviations

FSANZ	Food Standards Australia and New Zealand
RIRDC	Rural Industries Research and Development Corporation
DPI Victoria	Department of Primary Industries Victoria
APVMA	Australian Pesticides and Veterinary Medicine Authority
HACCP	Hazard Analysis Critical Control Point
EHO	Environmental Health Officer
USDA	United States Department of Agriculture
AFFA	Agriculture, Forestry, Fishery Australia
MRL	Maximum Residue Limit
QDPI	Queensland Department of Primary Industries
UQ	University of Queensland
OHS	Occupational Health and Safety

Executive Summary

What the report is about
The report identifies food safety issues that the native plant food industry needs to be aware of and address, including biological issues, legislative requirements and buyers' requirements. It provides practical advice on meeting these requirements, including food safety guidelines and a model food safety program that can be used to manage food safety risks in individual businesses. The legislative requirements for labelling and the opportunity to use labelling to promote the value of products are discussed.

Who the report is targeted at
The report is relevant to all people who harvest, grow, process and market native plant foods. It should also be useful to people working in industry development, extension and research and development in the native food industry and to those working with other, similar crops.

Background
Food safety is of increasing importance to industries like native plant foods, as consumers, buyers and governments demand increased assurance that food is safe. The greatest industry need is for information, advice and assistance to meet the food safety requirements of buyers and legislation, without it costing too much or taking too much time. There are also ever changing legislative requirements for labelling. In addition, consumers and journalists are questioning what "bush foods" are and how they can know that products are authentic. Labelling can be used to promote the authenticity and value of the product. Good management of food safety and labelling are part of any developing industry's efforts to assure buyers of quality and to capture sales.

Aims/Objectives
- To assist the industry to meet the requirements of the new food safety legislation, and those of their buyers, and to benefit as a result
- To provide advice to industry on labelling requirements and on opportunities to use labelling to convey the authenticity and value of their product.

Methods used
The main methods of the project have been to:
- Identify industry needs by talking with industry members and leaders
- Identify and describe the legislative requirements for food safety and labelling
- Identify and describe buyers' requirements for food safety and labelling
- Develop practical information to help industry address these requirements
- Present talks, information sessions, and workshops
- Provide written notes and articles
- Produce and distribute training materials
- Conduct accredited training workshops around Australia
- Produce and distribute food safety guidelines and model food safety program
- Answer inquiries.

Results/Key findings

Food Safety

Food safety is important because food poisoning can cause illness and death. It is also bad for business; new industries need good publicity not bad. A food supplier is legally required to supply safe food and there is a range of state laws that govern safe handling of food. Most importantly, buyers demand safe food and are increasingly demanding that food suppliers are registered as a food business and have a food safety program.

The main safety risks are contamination with microbes that cause human diseases, chemicals such as agricultural and cleaning chemicals and physical items such as glass, stones and band-aids. In addition, some plants contain dangerous natural compounds that make them poisonous (e.g. green potatoes and some fungi).

Some native plants are poisonous e.g. fruit of some *Solanum* species and bracken fern tips and at least two *Acacia* species. Some require processing or cooking to be safe (e.g. some nuts). Others are tolerated in small amounts but cause adverse reactions in large amounts (e.g. unripe fruits). It is important to know the identity of plants that are to be used as food and that the plant is safe. Some plants are prohibited for food use by the Food Standards Australia and New Zealand (FSANZ) Standard 1.4.4, including some *Solanum* species (nightshade, kangaroo apple) and *Pteridium* (bracken fern). Some buyers, both overseas and in Australia, may require evidence of the safety of unknown foods. The native foods industry and RIRDC are working with FSANZ and international bodies to make formal assessments of the safety of a range of native plant foods.

Practical aspects of food safety are managed by the local council's Environmental Health Officers, who see that food businesses abide by that state's food laws. State food laws are based on the national Food Standards Code, produced by FSANZ. This Code includes general food standards that all suppliers of food, including primary producers, must meet (e.g. chemical residues and labelling), food safety standards and, in future, primary production standards. The food safety standards must be met by all registered food businesses. These standards include the design and materials of premises, water supply, cleaning, waste disposal, personal hygiene, keeping food cold, skills and knowledge of staff, the presence of a food safety supervisor and the use of food safety programs.

It is critical that individual businesses determine whether they need to be registered as a food business and hence meet the food safety standards. Primary producers must register as a food business if they sell direct to the public, transform (process) food, pack or treat food for others, or use food that has been bought in (to re-sell or to make other food products). Selling direct to the public includes markets, roadside stalls and bartering. Transforming, or processing, includes making juice, jams and pickles. It does not include washing, peeling, cutting, freezing, grinding or milling. States vary in their definitions of food businesses and primary producers, so it's important to talk to your local council, or state food safety authority (Health Department), about what they require.

Future primary production standards (for food safety) will require growers and wild harvesters to meet a range of formal standards. Food safety programs are detailed written programs that a business can use to manage its food safety risks. The only state that currently requires all food businesses to have a food safety program is Victoria. Other states require them for high-risk businesses e.g. caterers.

Buyers are increasingly demanding evidence that food safety and quality management systems are used in food production before they will buy. They may require registration as a food business, evidence of a food safety program being used, or membership of a commercial food safety and/or quality assurance scheme. (e.g. Fresh Care, SQF, FoodSafe).

Labelling
Some foods are required to be labelled with many details including: name, lot, supplier details, ingredients, best before date, percentage composition, nutrition information panel and country of origin. However some things are exempt from these labelling requirements including: a food not in a package (but see exception below); food made and packed on the premises from which it sold; whole or cut fresh fruit and vegetables (but see exception below); and food delivered packaged and ready for consumption at the express order of the purchaser. Now, unpackaged fresh and processed fruit and vegetables must say which country they come from. Some products do not require nutrition information panels including: packages smaller than 100 square cm in area; fruit or vegetables that comprise a single ingredient; a herb, spice, or herbal infusion; and food additives.

Labelling is also a powerful marketing tool. Marketing experts recommend that the native plant food industry have recognisable brands that guarantee to deliver high quality food. These could be regional brands, they could be brands of a collective marketing group and the use of the brands could be restricted to those who comply with a certain code of practice. Labels could indicate that the product meets a certain quality standard or set of environmental management standards. Information about the contents and the way the product can be used or information on organic or GM status can be shown on labels. Beyond the basic legislative requirements labelling is a commercial issue and we believe that those who label products well will benefit.

Implications for relevant stakeholders
Food safety legislation and its management (including food labelling) is complex. As part of the project we've presented talks and written papers at two national conferences, presented six information sessions, seven workshops and conducted an accredited food safety supervisors' course. As a result ten people have qualified as food safety supervisors, at least ten businesses have developed food safety programs and another 35 people have received accredited basic food safety training.

The project also provided advice to industry on quality standards, agricultural chemicals, the Australian novel food standards and "ownership" and commercialisation of native plant materials. Some states (e.g. Victoria) have given/sold some rights to use some native plants for commercial purposes. It is critical that other people who want to use native foods for commercial purposes can obtain clear and accurate information about whether they have the legal right to use the plants for their purposes or whether that is prohibited by the commercial agreements of the state. In some states this information is not readily available.

Recommendations
1. The industry needs to continue to work on convincing buyers and authorities that most native foods are inherently safe to eat.

2. The industry should continue to adopt improved labelling practices, both to meet legislative requirements and to promote the quality, safety and authenticity of their food products.

3. Governments and industry should continue to provide advice and training on food safety, including using the material developed in this project and available in this report.

4. Industry and RIRDC should work with FSANZ to a) assess the safety of native plant foods and b) to give them formal classification as traditional foods, not novel foods, wherever this is true.

5. There is a need for industry and governments to work more closely with Indigenous people on all aspects of the development of native plant food businesses.

6. When state governments have awarded contracts for commercial exploitation of native plants, they need to make clear to industry and Indigenous people what the agreements are and how the agreements affect those people.

Introduction

Background to the project

New Food Safety Standards have been introduced by Food Standards Australia and New Zealand (FSANZ) and these are being introduced into state legislation and local council operations. The standards require people who collect, grow, sell and process plant foods to meet more stringent requirements for hygiene, facilities, risk management and training – this will take time and money.

Food safety includes chemical, microbiological and physical risks and contaminants of food. There are several food safety risks, including those associated with collecting from the bush, farming, use of animal manures, processing and extended marketing periods. In addition, there has been concern about whether there are any toxic natural chemicals present in these plants. This issue has been thoroughly investigated in a recent RIRDC report (Hegarty et al. 2001). While they identified risks, these appear to be manageable with due care.

In addition, companies in Australia and overseas that purchase native plant foods are demanding that their suppliers have formal, documented methods to manage food safety risks. These demands will become more important commercially than the legislative requirements, as has happened in other horticultural industries.

Consumers and journalists are questioning what bush/native food is and how they can know it's authentic (Malkin 2003). Labelling must meet Food Standards requirements and it can also be used to promote the authenticity, novelty and value of the product.

Our aim is to assist all sectors of the native plant food industry, including growers, pickers, marketers and processors, to adopt relevant food safety practices.

According to the RIRDC R&D plan for native foods (RIRDC 2001), the industry had a value of production of approximately $10-12 million per annum in 1995-96, with around 500 participants, "plus a very significant number of Aboriginal participants". There is increasing demand from local supermarkets and from export markets. Unfortunately the industry is small and fragmented, which may make it hard for R&D to have a wide impact. On the other hand, there are several leading companies who are successfully marketing these products. The exciting potential is that these native plant food products are high value, value-added products and there is a huge interest in new foods and ingredients worldwide. Australia has a competitive advantage because we have the plants and knowledge of how to use them.

It is hard to estimate the economic benefits of food safety systems. They are used to minimise the risk of food borne disease and poisoning outbreaks which are very costly in terms of lost sales, litigation, grief, suffering and adverse publicity. In practice, assured food safety is non-negotiable as far as food buyers and consumers are concerned. There should also be benefits of greater product quality, including less spoilage, more confident producers, marketers and consumers and greater sales. In commercial terms the greatest benefits of improved food safety practices will be the ability to meet the requirements of powerful buyers who demand evidence of formal, food safety management systems.

Objectives

The original objectives, proposed outcomes and deliverables from the project were:

Objectives:

- To assist the industry to meet the requirements of the new food safety legislation, and those of their buyers, and to benefit as a result
- To provide advice to industry on labelling requirements and on opportunities to use labelling to convey the authenticity and value of their product.

Outcomes:

- Increased confidence of producers, wholesalers, retailers and consumers in the safety of native plant food products
- Decreased risks of food poisoning, legal claims and adverse publicity
- An ability to meet the food safety standards of major purchasers
- Labelling that meets required standards and promotes the authenticity of the product
- Increased sales, expanded markets and industry growth.

Deliverables:

- An easy to use report on the requirements of food safety legislation in each state and how different members of the industry (e.g. growers, pickers, sellers and processors) can meet those requirements
- A report on labelling requirements and on opportunities to use labelling to convey authenticity, value and novelty of products
- Brochures, articles (print and Internet), talks, workshops (at least two locations per year as supported by the limited budget) and verbal and written advice.
- Recommendations of future steps to ensure food safety, such as risk assessments, model food safety plans and the use of commercial Hazard Analysis and Critical Control Points (HACCP) plans and training.

Methodology

In most cases the sources of information are listed in the Results and Discussion section, the Appendices and References. For this reason only a few particularly important methods will be described in this section.

Industry needs and project strategies

The process of identifying industry needs involved the following steps:

- Publicising the project
- Listening to industry leaders (e.g. Freeman, Hess-Buschmann, Anthony, and Robins), industry members, other researchers in this field (e.g. Latham, Ryder, McDonald, and Caffin) and people working with Indigenous groups (Earle Cleaver of DPI Victoria and Sarah Eccles of the Koorie Business Network Victoria)
- Reading widely about the industry
- Reviewing detailed information on the legislative requirements for food safety and labelling.

The project strategies to address the identified industry needs are described under Results and Discussion.

Legislative requirements

The major sources of information for identifying and describing legislative requirements have been:

- FSANZ Food Standards Code (FSANZ 2002a), user guides and fact sheets available from the Internet or from FSANZ (see Appendix 1 and References)
- State government food safety legislation from Internet sites (see Appendix 1)
- The Environmental Health Officer who spoke to the Leongatha training course.

Training materials

The training materials used at each of the workshops and courses have been different, depending on the aims and needs of the participants. The following materials have been obtained or developed:

- The Food Safety Program Template for retail and food service businesses, from Food Safety Victoria (Food Safety Victoria 2004) – this is only valid in Victoria, though it could be used as a guide for developing food safety programs elsewhere
- Food safety guidelines and food safety program for native plant foods (Appendix 2) – these should be very valuable to growers developing a food safety program for their business (electronic and paper copies of these notes have been provided to RIRDC and are available from the project leader Dr Robert Premier)
- Templates for recording food safety information
- Copies of the overheads used in talks – these vary from course to course (electronic and paper copy of the overheads used for the Food Safety Supervisors course at Leongatha have been provided to RIRDC and are available from the project leader Dr Robert Premier)
- A range of hand outs including FSANZ, Food Safety Victoria and South Australian fact sheets, Food safety guidelines for vegetables (Behrsing & Premier 2002) and On farm food safety guidelines (AFFA 2004) – these are available from Dr Robert Premier and from the sources given in the reference list
- Notes for talks in each state, addressing the individual requirements for the state.

Industry contributions and collaborations

The people who attended the Leongatha workshop paid $100 per person for the 2.5 day course (approximately $1,600). Interestingly when the course was first advertised at $200 per person there were no takers! In addition the people who attended spent between half a day and five days on the course and assessment. At the Mount Gambier workshop fees of $30 per head were paid by 16 people ($480). The Burrandies Aboriginal Corporation contributed catering worth $200 and arranged the venue free of charge. The Seymour workshop was conducted at a grower's property (Denis Jenkins).

We agreed and planned to collaborate with Janette McDonald of QDPI and Nola Caffin of UQ who have a RIRDC project on quality of native plant foods (McDonald et al., 2006). We have discussed our work with them but not done any collaborative work. The opportunity is there to conduct collaborative work in Queensland (e.g. talks, workshops and training). Yvonne Latham of CSIRO invited us to run a food safety workshop in Mount Gambier and coordinated that. Sarah Eccles of the Koorie Business Network Victoria invited us to contribute to a native food workshop in the Grampians, Victoria.

Results and Discussion

Industry needs and project strategies

Food safety

Industry needs
The most relevant industry needs we've identified in the area of food safety are the following:

1. Information
   This includes information on what the public health and business issues are, what is required by legislation and by buyers, who has to do what and how to do it. People particularly want information on low-cost methods of complying with legislation and buyers' requirements. It is important to note that buyers' requirements are becoming increasingly important and demanding.

2. Help
   People want training, particularly so that they can meet the requirements of local councils for registration as a food business. In Victoria food businesses require a trained food safety supervisor and a documented food safety program and people want assistance to achieve these two things.

3. Safety
   Are native plant foods safe? The industry needs to assure buyers that its new and unusual products are naturally safe (e.g. with no toxins). In addition, FSANZ needs to assess new foods, including native plant foods, to be sure they are safe to eat.

4. Standards
   Some industry leaders are asking what standards can be used for quality, microbiological content, food safety and agricultural chemical residues to convince buyers of the quality and safety of their product.

5. Agricultural chemicals
   There are few, if any, agricultural chemicals registered and approved for use on native plant foods, therefore if growers want to do things legally there are limited chemicals available to them. This is relevant to this project in that unacceptably high residues, or residues of unacceptable chemicals, can occur on foods as a result of growers using chemicals wrongly or using unregistered chemicals. If growers and marketers need to demonstrate that they are complying with maximum residue levels (MRLs) they are restricted, as there are very few published MRLs that can be used for native plant foods.

Industry attitudes
Sophisticated processors are aware of food safety requirements and are probably meeting them. For example, at least one processor has an internationally accepted commercial quality assurance/food safety system in place. Most others in the industry recognise the need for industry to take the initiative and to get the management of food safety right as a way of promoting and marketing their products. They have been keen to have us talk to them and they have been keen to attend courses and are prepared to pay limited course fees.

Food buyers are demanding assurance that native plant foods are safe. Large buyers are requiring that their suppliers are registered food businesses and have a food safety program in place. Leading international companies are demanding comprehensive, audited food safety management systems. In some instances local greengrocers will not buy fruit from a hobby farm unless it is registered as a food business.

Many industry people are worried by the excessive, expensive and time-consuming work needed to meet food safety, agricultural chemical, export, OHS and environmental requirements. An industry steering group has recently been established (Australian Native Food Industries Limited) and the issues of food safety, standards and FSANZ approvals are high priority issues that they are addressing.

Strategies
Strategies for each of the industry needs identified above have been as follows:

1. Information

- Provide verbal and written information through conferences, industry talks and articles, information workshops and one-to-one communication.
- Start with national conferences and work in Victoria, then work in other states with local collaborators.

2. Help

- Provide advice on where people can get relevant training and gain further information/contacts.
- Run information sessions and workshops.
- Run accredited training, including food safety supervisor training and preparation of food safety programs. This was in response to requests from the Prom Country Foods Association and Southern Bushfoods Association (see below).

3. Safety

- Provide information to industry on the safety or otherwise of native plant foods and on the implications of the FSANZ novel foods standard.
- Discuss with FSANZ ways in which we could provide them with information to enable them to assess whether native plant foods should be classified as regular, novel, restricted, or prohibited foods.

4. Standards

- Discuss issues of microbiological, safety and quality standards with industry leaders (Sibylla Hess-Buschmann and Gil Freeman).
- Discuss what standards exist and what standards are worth establishing.

5. Agricultural chemicals

- Discuss issues with industry members.
- Refer industry members to agricultural chemical specialists in state governments, to the Australian Pesticides and Veterinary Medicines Authority (APVMA) and to the herb industry's work tackling these problems.

Labelling

Industry needs
The most relevant industry needs we've identified in the area of native plant food labelling are the following:

1. To meet the legislative requirements.

2. To use labelling to successfully promote the authenticity, quality and value of their product.

Industry attitudes
Labelling of native plant foods ranges from excellent labels that meet legislative requirements and promote the product to handwritten labels that say only something like "quandong jam". Note that some products are exempt from labelling requirements (e.g. food made and packaged on the premises from which it is sold and food sold at a fund raising event).

An industry round-table group, two or three years ago, rejected a proposal for a national quality scheme and logo. Some industry members now say that there are enough people in the industry who want to proceed with such a process. This is one issue to be addressed by the new industry steering committee.

At a recent industry conference (3rd National Herb, Native Food and Essential Oil Convention held in 2003 at Lismore, New South Wales) about eight important issues to the industry were identified and one of those was "National labelling and quality assurance (QA) standards".

Strategies

1. Made information available on the legislative requirements.

2. Attempted to make people aware of the benefits of, and opportunities for, labelling that promotes their product.

Legislative requirements

Food safety

The Food Safety Standards that govern Australia have been developed by FSANZ (2002a) and each state and territory implements these standards through their legislation. Some differences exist between states and territories in their requirements. Local councils, through Environmental Health Officers, manage compliance with the standards.

FSANZ Food Standards code
The FSANZ Food Standards Code contains:

- General Food Standards
- Food Product Standards
- Food Safety Standards
- Primary Production Standards

General Food Standards
The General Food Standards apply to all food producers, suppliers, handlers and sellers including primary producers and they include:

- Food additives allowed
- Processing aids (e.g. washing agents)
- Residues (e.g. pesticides) – maximum residue levels (MRLs) are listed
- Contaminants and natural toxicants (e.g. metals, fungi, lupin alkaloids)
- Prohibited plants – according to FSANZ Standard 1.4.4 some plants are prohibited or restricted for use as foods (FSANZ 2002b). The list includes several *Solanum* species, *Cycas* and *Macrozamia* palms, bracken fern, *Alocasia macrorrhizos* (Cunjevoi) and many fungi
- Novel foods – if foods are new to the food supply in Australia, where there has been no traditional use in the broad community, FSANZ may consider the food under the novel foods standard (FSANZ Standard 1.5.1) if there are potential safety concerns (FSANZ 2002c). Under that standard, the food undergoes a risk-based safety assessment before it can be offered for retail sale or direct consumption in Australia and New Zealand. For native plant foods, FSANZ are currently undertaking background work on the products and safety issues and considering what regulatory approach they should take if any
- Microbiological standards (e.g. for bacteria) – including for seed sprouts and dried spices
- Packaging
- Labelling
- Genetically modified organisms.

Food Product Standards
The Food Product Standards define what treatments can be applied to certain foods (e.g. to dried apples).

Food Safety Standards
There are three mandatory FSANZ Food Safety Standards in Australia:
3.1.1. Interpretation and Application
3.2.2. Food Safety Practices and General Requirements
3.2.3. Food Premises and Equipment.

All food business, including some primary producers (see below), processors, wholesalers and retailers must meet these standards. The supplier of food is legally liable if the food they supply causes harm to others.

Primary producers must be registered as a food business and abide by the Food Safety Standards if they:

- Substantially transform food from its original condition – substantially transforming includes manufacturing, canning, juicing and making jams, pickles and preserves. It does not include dividing, peeling, cutting, cleaning, trimming, freezing, grinding, milling or packing. In Victoria it includes drying and roasting. In South Australia it includes only processes undertaken off-farm.
- Sell directly to the public, including roadside stalls, markets, bartering and raffling – in Queensland, according to the Queensland Food Act 2006, businesses that only sell whole fruit and vegetables, seeds, spices or dried herbs appear to be exempt from becoming licensed as a food business.
- Pack or treat food under contract (for others).
- Use food that has been bought in (to make new food products).

As states and possibly local councils differ in what they require of primary producers it is important for industry members to ask their local councils what the requirements are.

Food Safety Standard 3.2.2 – Food Safety Practices and General Requirements includes:

- Food handlers must have skills and knowledge in food safety and hygiene
- Food safety supervisors have special responsibilities and, in Victoria, there has to be a nominated food safety supervisor for each business
- Food businesses must notify the enforcement agency (local council) of its existence
- Food must be kept cold (less than 5°C) if it is likely to contain disease-causing organisms
- Food must be handled and sold quickly
- Food must be displayed, processed, packaged and transported in such a way as to avoid microbial contamination
- Processing may include a step to reduce the level of microbes in the food (e.g. cooking, washing)
- Foods must be cooled to less than 5°C after cooking.

Food Safety Standard 3.2.3 – Food Premises and Equipment includes:

- Design of floors, walls and food contact surfaces
- Water supply – must be potable (drinkable) unless it can be demonstrated that use of non-potable water will not adversely affect safety of food
- Cleaning and sanitising of surfaces and utensils
- Methods for waste, waste water and sewage disposal
- Methods to exclude dirt, pests, etc.
- Provision of hand washing facilities and toilets
- Regulations for food transport vehicles.

Businesses can meet these mandatory requirements if they have a written food safety program, or procedures, which are based on sound scientific advice and recognised by the relevant food industry. This could be a formal food safety program (see below), a proprietary/commercial food safety program, or recognised food safety guidelines for example the Guidelines for On-Farm Food Safety for Fresh Produce (AFFA 2004).

There is also a voluntary standard Food Safety Standard 3.2.1 – Food Safety Programs. This is mandatory in Victoria. Other states only require high-risk businesses (e.g. catering companies, old age homes) to have a food safety program. New South Wales requires businesses which produce fresh cuts fruit and vegetables, unpasteurised juice, seed sprouts or vegetables in oil to have a food safety program.

The aim of the Food Safety Program Standard is to assist food producers and handlers to have their own program to control the risks and hazards that can arise during production, manufacturing and handling. It's based on the HACCP approach. A food safety program:

- Systematically identifies hazards
- Identifies where and how hazards can be controlled
- Monitors the control processes
- Takes corrective action if the processes are not under control
- Is a written document
- Needs to be reviewed
- Keeps records

- Has regular auditing (or a compliance check by local government if it is not classified as a high risk business).

Advantages of having a food safety program include:

- The food business takes the initiative for meeting legislative and commercial requirements.
- All employees are familiar with food safety responsibilities and procedures to follow.
- Food Safety Standard 3.2.2 – Food Safety Practices and General Requirements is met.
- Having a plan makes it easier to convince buyers that you have a good risk management system in place and easier to adopt the Australian and international accredited food safety systems that some buyers require.
- It helps achieve quality assurance and quality products.

Food Safety Victoria provides templates for people to develop their own programs (Food Safety Victoria 2004). The New South Wales Food Authority provides a food safety program template. Horticultural organisations, such as the Melbourne Market Authority, also provide templates and training so that food handlers have the required skills and knowledge and can become registered food businesses. The authorities will accept at least some proprietary/commercial food safety and HACCP programs as meeting the requirements for a food safety program. For information on food safety programs, templates, training and commercial food safety programs see Appendix 2.

Fund raising events do not require a food safety program.

Primary production standards

Specific primary production standards for food safety are being developed by FSANZ, and in some states, and will be introduced over the coming years. They will be based on the food safety program approach outlined above.

State requirements

Different states interpret the Food Safety Standards differently and have made different legislation. Therefore it's important that industry members contact their state authorities or local council to find out what the requirements are. Internet sites for some of the state food safety authorities are listed in Appendix 1.

Ways industry can meet the legislative requirements for food safety

It is possible to implement simple and possibly inexpensive food safety management practices to get started and meet legislative requirements and then, if necessary, upgrade to meet buyers' requirements. Some steps that can be taken are outlined below.

1. Obtain information
   There is an almost overwhelming amount of information available on food safety standards, food safety programs, food safety guidelines, state legislation and local council requirements. Some of these sources of information are listed in the Appendices and References.

2. Talk to the local council
   The people who manage the compliance with food safety legislation at the coalface are the Environmental Health Officers (EHOs) of local councils. They may differ in their approach to, and in their interpretation of, state and local laws. It essential that industry members talk to their local EHO about what is required of their business.

3. Talk to buyers
   Buyers are demanding assurance that food is safe.

4. Register as a food business with local council, if necessary
   Note that this incurs a fee, which varies with the local shire and whether the business is high,

medium or low risk. A Victorian rural council considered a business that dries herbs and makes pickles to be a low risk business and charged an annual fee of $240.

5. Develop a simple food safety program
   Some state governments provide templates for food safety programs. For example, Food Safety Victoria has a template for the retail and food service industry (Food Safety Victoria 2004) can be used by native plant food producers, processors, wholesalers and retailers, but may require extra information to cover primary production. Our project has developed templates for primary production (see Appendix 2). Some industry groups have developed approved templates for food safety programs (e.g. Melbourne Market Authority). There are commercial food safety programs tailored for horticultural products (e.g. Freshcare, SQF) and there are also internationally recognised programs designed for food processing (e.g. SQF, ISO). Some major buyers have had their own food safety programs that they require their suppliers to use (e.g. Woolworths Vendor Quality Management Standard. Some details of these various food safety programs are listed in Appendix 2 and AFFA (2001).

6. Attend a simple training course
   Basic courses are run by TAFEs, community houses, local councils (e.g. FoodSafe®) and industry organisations such as the Melbourne Market Authority. Farmbiz subsidises some of this training. The Victorian Department of Primary Industries will continue to run food safety information workshops and training (basic food safety and food safety supervisor training) as part of this project (contact Dr Robert Premier for further information) and other projects.

7. Use published food safety guidelines
   Industry bodies are developing food safety guidelines, food safety program templates and training courses (AFFA 2004; Behrsing & Premier 2002; Barlass et al. 1998; Horlock et al. 2002; Food Safety Victoria 2004).

8. If necessary join a commercial scheme
   Some of these are listed in Appendix 2 and in AFFA (2001). It may be possible to arrange a group food safety scheme, where costs are shared, if people are able to work together.

How can the industry meet the requirements of FSANZ and buyers for assurance that native plants foods are naturally safe?

FSANZ needs to give positive permission for food to be considered normal food. Currently the regulatory status of native plant foods is ambiguous according to FSANZ (Healy et al. 2004). FSANZ are currently undertaking background work on the products and safety issues and considering what regulatory approach they should take if any i.e. will the foods be considered normal, novel or prohibited/restricted? They suggest that the industry identifies which foods are commercially available and provides information on the toxicity and safety of those foods. Hegarty et al. (2001) has addressed this. An industry round-table group submitted a list of approximately six foods to FSANZ in 2002 asking them to consider these foods as normal foods. As far as we know no formal decision has been made on this. The new industry steering committee is addressing this issue. Dr Ian Delaere of FSANZ also suggests that our RIRDC project could work with industry to provide FSANZ with scientific information on the safety of the foods and to provide information to the public on what is safe and what is not. Our project could do some of the scientific work for FSANZ and industry to assist the proper assessment of native plant foods. If native plant food buyers are requiring evidence of the safety of these foods and some approval by authorities such as FSANZ, it is important and urgent to get such approvals. Another approach is for the food supplier to provide analytical data to satisfy the buyer that the food is safe.

There is a huge amount of information about the safety of native plant foods available in books on the subject (e.g. Zola & Gott, 1992), research reports, museums and particularly in the knowledge of Indigenous people. RIRDC has previously funded projects to review the information available about the safety of native plant foods. The most significant is that by Hegarty et al. (2001). They concluded

that, with due care, the normal use of the commercial bush foods studied did not raise any serious concerns. They emphasised the caution needed with both current and new foods. In addition there was a project by Fulton (2000) on the safety of native mints (*Prostanthera* species) and these results are summarised in Hegarty et al. (2001).

Some possible steps forward appear to be:

- The native plant foods industry may be able to hasten a decision from FSANZ by formally applying for approval of these foods as novel foods.
- Industry and this project can provide information to assist FSANZ in their decision making.
- Industry can use the available information, from books, research and Indigenous knowledge, to convince buyers and consumers of the safety of these foods (this is basic, good marketing).
- Individual sellers and buyers can come to their own commercial agreements. This may require the expensive analyses to be done but it may be the most decisive way to convince buyers of the safety of the products.

Labelling

The following information is based on the FSANZ Food Standards Code and further information on labelling can be obtained from the FSANZ Fact Sheet, Overview of food labelling (FSANZ 2001). State legislation may vary from this and should be checked. The local Environmental Health Officer can provide advice on labelling.

The Food Standards Code (Part 1.2 Labelling and other Information Requirements) requires that some foods are labelled with the following:

- Name
- Lot
- Supplier details
- Ingredients
- Date – best before
- Directions for use – if needed for health and safety
- Nutrition information panel
- Percentage composition
- Country of origin. Unpackaged fresh and processed fruit and vegetables must now state their country of origin, including Australia. Country of origin for packaged products is being considered.

Some foods are exempt from these labelling requirements:

- Food not in a package
- Food in an inner package not designed for sale without an outer package
- Food made and packed on the premises from which it is sold
- Food packaged in the presence of the purchaser
- Whole or cut fresh fruit and vegetables (except sprouting seeds) – in packages that do not obscure the fruit or vegetable
- Food delivered packaged and ready for consumption at the express order of the purchaser
- Food sold at a fund raising event.

Some things are exempt from ingredient labelling including:

- The food is labelled with the name of the food which would otherwise be those ingredients listed in the ingredient list (e.g. “Dried quandongs” where the only ingredient is dried quandongs).

- The food is contained in a small package (a package with a surface area smaller than 100 square centimetres).

"Characterising ingredients" and their percentage of the composition must be shown on most food labels. A characterising ingredient is one that is:

- Mentioned in the name of the food (e.g. bush tomato chutney)
- Usually associated with the name of the food
- Is emphasised on the label in words, pictures or graphics.

There are exceptions to this requirement, for example "ingredients that are used in small quantities for the purpose of flavouring". In the case of lemon myrtle and mountain pepper, they are usually used in small quantities for the purpose of flavouring so would not require labelling with the % of these ingredients. For further information on this see the FSANZ Fact Sheet, Percentage labelling of characterising food ingredients and components (FSANZ 2003a).

The information required for nutrition information panels can be obtained from:

- The FSANZ Nutrition Panel calculator (though this doesn't include unusual, new foods): http://www.foodstandards.gov.au/thecode/nutritionpanelcalculator/index.cfm
- Databases such as the USDA food composition data base (though this doesn't include unusual, new foods): http://www.nal.usda.gov/fnic/foodcomp/Data/index.html
- Books such as Brand-Miller et al. (1993)
- Laboratory analysis.

Products that do not require nutrition information panels include:

- Packages smaller than 100 square centimetres in surface area
- Fruit, vegetables, meat or fish that comprise a single ingredient
- A herb, a spice, a herbal infusion
- Additives and processing aids.

Information about the basic nutritional value and specific nutrient content can be included on labels. For example the levels of specific vitamins and of antioxidants can be listed. Claims regarding the nutrient content of food, on labels and in marketing are currently allowed (FSANZ 2007). Other information about the benefits or qualities of the food can be added to labels but it is unlawful if this information is misleading or deceptive or cannot be substantiated (FSANZ 2003b).

The FSANZ policy on nutrient and health claims is summarised in a recent discussion paper, (FSANZ 2007). The following is quoted from that paper:

> At present, nutrient content claims are allowed (e.g. *'This food is high in fibre'*), as are some health maintenance claims (e.g. '*Calcium is important for healthy bones and teeth'*). However, there is a prohibition on all other types of claims (of health benefits), with the exception of claims about the benefit of maternal consumption of folate, to prevent neural tube defects in developing foetuses.

FSANZ is currently developing policy to base future standards for nutrition claims and health claims on (Healy et al. 2004). It is expected that final recommendations on health claims will be ready for Ministerial Council consideration in 2008. There are likely to be two levels of claims, low-level and high-level. Low-level claims are to do with risk reduction, for example "Calcium builds strong bones" would be such a claim. They are not to be used for serious diseases such as cancer. High level claims would say something like "These foods may reduce the risk of serious disease". High-level claims would be subject to a pre-market approval process by FSANZ. Both levels of health claim would be required to have scientific data to substantiate the claims before they would be allowed. The person responsible for this area in FSANZ is Dr Peter Abbott.

Identifying labelling opportunities

In addition to providing information, labelling is a powerful marketing tool. Marketing experts recommend that the native food industry have recognisable brands that guarantee to deliver high-quality food. These brands can be regional brands, brands of collective marketing groups, or perhaps for a particular food product (e.g. quandongs). Use of the brand can be restricted to those who comply with a certain code of practice (e.g. for safety, quality, or environmental management).

McKinna (2004) recommends that if the native food industry is to succeed it should:

- Establish an appellation-control type product description and labelling system focusing on product quality, integrity, safety and fitness of purpose, and as an umbrella for individual sector HACCP programs.
- Use the appellation-control program as a basis for industry brands, which marketers can use under licensed agreements.

For example, labels can have information on them that show:

- That the product meets certain quality, safety or environmental standards (the logos associated with these standards may be displayed)
- Interesting information about the contents, the source of the products, the way the products can be used and perhaps the way Indigenous people have used them
- Attractive expressions such as “native”, “natural”, “Indigenous”, "Hall's Gap clean cuisine", "gourmet product of Australia" or “Australian native cuisine”
- The product contains no GM ingredients
- The product is organic
- Eco-labels – these can vary from statements of belief like “this food is produced in a clean environment” to the use of labels or logos that can be used only by people who meet the standards of certain environmental management schemes.

Information about the basic nutritional value and specific nutrient content can be included on labels, as described in the preceding section. In future there may be greater opportunities to include information about the effect of the food on health maintenance and health benefits. However, the identification of these health benefits and even of the healthy components of foods can be a long task. McDonald et al. (2006) and Zhao & Agboola (2007) have investigated the content and functional properties of health-giving compounds in Australian native plant foods.

The issue of food being labelled as native plant food but containing only tiny amounts of the product was raised in a newspaper article (Malkin 2003). The implication was that consumers were being misled into thinking that the product was native plant food when maybe only a few percent of its composition was made up of native plants. The response from FSANZ at the time was that the Food Standards Code requires the product label to list the percentage composition of all the ingredients (particularly if the ingredient is listed in the name of the food on the label) so the consumer can see what they are buying and make a choice whether to buy or not. That is true, though some things don't require a label, some things don't require ingredient labelling and it is not a requirement to show the percentage composition of “ingredients that are used in small quantities for the purpose of flavouring” on labels. This latter group of ingredients must surely include the way some native foods (e.g. lemon myrtle and mountain pepper) are used. The response from the native food industry at the time was that many ingredients are used as herbs and spices and need to be used in only small amounts.

We believe that the question of how much native plant food is in the product is a business and/or commercial decision. Some marketers are putting a minimum of 20% of native plant food in their product. We believe that if products are labelled as containing native plant food, but only contain tiny amounts, it may well backfire on the producers and the industry. If consumers cannot taste the native food component (e.g. in sauces or dinner dishes) they won't pay a premium or buy the product again. Several consumers have stated this opinion over the last two years.

Project publications, talks, workshops and training

Publications from the project

Parsons, M. and Faragher, J. (2004). Food safety for the native plant food industry, 2004 training materials and course notes. Department of Primary Industries, Knoxfield, Victoria (not for publication; copy lodged with RIRDC, January 2005). There are two major components of these notes: The Victorian Food Safety Program template for retail and food service (Food Safety Victoria 2004); and the information we prepared including a template for food safety hazards during primary production and postharvest handling and food safety hazards which could be associated with natural toxins in native plant foods (see Appendix 2).

Faragher, J. (2004a). Food safety issues for the Australian native plant food and herb industries. In, Proceedings of the 3rd National Herb, Native Foods and Essential Oils Convention, Workshops and Farm Visits, RIRDC Publication No. 04/059, pp. 48-56 (http://www.rirdc.gov.au/reports/EOI/04-059.pdf).

Faragher, J. (2004b). Food safety issues for new crops. In, Proceedings of the 2nd Australian New Crops Conference, Gatton, Queensland, September, pp. 43-49

Faragher, J. (2004c). Food safety and labelling issues for native plant foods. In, Resource manual, Victorian indigenous bush foods industry development workshop, Brambuk, Halls Gap, October.

Department of Primary Industries Victoria (2004). Ensuring the quality of native plant foods. *sHORTs*, No. 14, June.

Premier, R. (2005). Food safety for native plant foods. Department of Primary Industries Victoria, Information Note AG 1220 (see Appendix 3).

Faragher, J. (2006). Native Plant Foods. *NT Horticulturalist* 21 (3), 16.

Talks

Food safety issues for the Australian native plant food and herb industries, August 2003, 3rd National Herb, Native Foods and Essential Oils Convention, Workshops and Farm Visits, Lismore. The audience was 100 industry and government people. (John Faragher).

Food safety and labelling issues for the native plant food industry, October 2003, Prom Country Foods Association, Leongatha. The audience was 15 to 20 people, mostly growers and a few people investigating the feasibility of working in the industry. (John Faragher).

Food safety issues for the native plant food industry, February 2004, Southern Bush Foods Association, Melbourne (including discussion of phytonutrients in native plant foods by Robert Premier). The audience was 10 to 15 people mostly growers and marketers. An important outcome of the meeting was a request that this project develop and deliver food safety training. (John Faragher and Robert Premier).

Food safety issues for new crops, September 2004, 2nd Australian New Crops Conference, Gatton, Queensland. The audience was approximately 100 industry, government and academic people. (John Faragher).

Food safety and labelling issues for native plant foods, October 2004, Victorian indigenous bush foods industry development workshop, Brambuk, Halls Gap. The audience was approximately 100 people from many aspects of the industry, more than half of them Indigenous people. (Michelle Parsons and John Faragher).

Food safety information talk, October 2004, Denis Jenkins' property Seymour, Victoria. The audience was 15 to 20 people including growers, a caterer, and people investigating the feasibility of working in the industry. (Michelle Parsons and John Faragher).

Food Safety talks, Jamestown, South Australia, November 2005:

- Growing bush foods – food safety issues, November 2005 at the CSIRO project cooperator's meeting, Jamestown, South Australia. The audience included 15 growers who have CSIRO trial plots on their properties, including Leroy Sims from the large fruit company Simarloo, plus 4 CSIRO staff.
- Food safety issues for bush foods, November 2005 at the CSIRO Native Foods Information Day, Jamestown South Australia. The audience included 45 people involved in the industry. Growers, marketers, researchers and members of local food groups were present in the audience.

The following seminars and talks were conducted in 2006:

1. A workshop in Brisbane hosted by the Queensland Bush Food Association (25 participants) and workshops in Gatton (5) and Cairns (20).

2. Discussions with Desleigh Dunnett of Charles Darwin University in Darwin, who teaches horticulture, including native plant foods, in indigenous communities in the NT.

3. Seminars in Darwin (10 participants) and, Alice Springs (5), hosted by the Northern Territory Horticulture Association.

Workshops

Food safety information workshop, November 23, 2004, Mount Gambier, South Australia
This workshop was run in collaboration with Yvonne Latham (CSIRO). The aim was to deliver a one-day workshop to Indigenous students, Indigenous growers and others involved in the native plant food industry in the region. The workshop was presented by Michelle Parsons, John Faragher and Robert Premier. The Burrandies Aboriginal Corporation contributed catering worth $200 and arranged the venue free of charge. Workshop fees of $30 per head were paid by 16 people.

The participants were:

- Ten students from Tauondi College Adelaide (hospitality and Indigenous culture) and their teachers Alex Rankin and David Manzella
- People from the local Burrandies Aboriginal Corporation, including CEO Greg Flint (in the event, Greg came for an hour or two, but the other people didn't come because of a death in the community and a funeral that day)
- Two native plant growers
- Two other interested people.

What did we do?

- Presented information on the importance of food safety, current legislative requirements, market requirements, the risks to food safety during production and marketing of native plant foods and how these can be controlled. The workshop manual contained copies of the overheads used in our talks and the material contained in Appendix 2 of this report.
- Conducted practical exercises to do with microbial risks of vegetables and native foods, hand washing, and educating people about food safety risks.
- Discussed the issues to do with whether native plant foods have any inherent toxicity or safety risks and the FSANZ Novel Foods standard.
- Discussed other issues of native plant food production and marketing.

Outcomes:

- All the participants expressed pleasure and satisfaction with what they had learnt on the day and were very grateful that we had travelled to Mount Gambier to present the workshop. “A fabulous course, we all enjoyed it,” one participant said.
- There was good exchange of information on native food production and marketing. For example, one of the growers works closely with the large Outback Pride business. Robert Premier has good connections to export food businesses and discussed export opportunities.
- The Burrandies growers wanted a similar workshop held there in 2005 (not conducted).

Training

People want training. This is particularly so that they can provide evidence of "skills and knowledge" to meet the requirements of local councils for registration as a food business. In Victoria food businesses require a trained food safety supervisor and a documented food safety program and people want assistance to achieve these two things. We’ve advised industry that basic food safety training is available from of wide range of providers including local councils, community houses, TAFE colleges, industry associations and organisations (e.g. Melbourne Market Authority) and possibly from state government organisations. We've also advised industry that there are templates available for food safety programs and commercial food safety programs (see Appendix 2).

Food Safety Supervisors course, Leongatha, Victoria, September 2004
This course was conducted at the request of, and in collaboration, with the Prom Country Foods Association and Southern Bush Foods Association. This was a formal accredited course. It provided the participants with the information to enable them to be assessed as meeting the requirements of a food safety supervisor in Victoria. The course and materials were aligned to the Australian National Training Authority (ANTA) competency units from the Certificate III Food Processing:

- FDFCORFSY1A - Follow work procedures to maintain food safety
- FDFCORFSY2A - Implement the food safety program and procedures

The course also enabled the participants to develop a food safety program for their business. This program was based on the template of the Victorian Food Safety Program template for retail and food service businesses (Food Safety Victoria 2004). Sections were added to do with primary production and postharvest handling of native plant foods and risks that might be associated with any natural toxins in native plant foods (Appendix 2). Food Safety Victoria advised us that this was an acceptable way to develop a food safety program for a native plant food business and that the Melbourne Market Authority’s template and training course would also be appropriate because it includes primary production. The local council's EHO of Leongatha said that the food safety program the course participants were developing was satisfactory.

The course was developed by Michelle Parsons and John Faragher with advice from Barry Dignam. It was presented by Michelle Parsons and John Faragher. At the end of the course the competence of the participants with assessed by Barry Dignam. This was a 2.5 day course with the first two days spent in workshops and the last half day spent in assessment. In addition, the participants who were assessed spent at least two days preparing a food safety program and preparing for assessment. The cost of the course was $100.

The course notes consisted of:

- The Food Safety Program Template for retail and food service businesses from Food Safety Victoria (Food Safety Victoria 2004) – this is only valid in Victoria, though it could be used as a guide for developing food safety programs elsewhere
- Food safety guidelines and food safety program for native plant foods (see Appendix 2)
- Templates for recording food safety information
- Copies of the overheads used in talks
- A range of other hand outs.

The participants were 17 people involved in growing and marketing native plant foods to varying degrees. Ten people were assessed for their competence.

What did we do?

- Conducted a pre-course questionnaire.
- Provided and discussed information on food safety, legislation, HACCP, general food safety hazards, food safety hazards to do with primary production, postharvest handling, the possibility of natural toxins in native foods, developing food safety programs, support programs (e.g. sanitation), responsibilities of food safety supervisors including training staff and the interaction between organic certification requirements and food safety requirements
- Conducted practical exercises assessing the food safety risk of different sorts of vegetables and native plant foods, bacteria on hands, hand washing.
- Developed the food safety program, including a flow chart, for each business
- Developed aspects of food safety programs in small groups – identifying food safety hazards in their businesses
- Hosted a visit and talk by the local council's Environmental Health Officer with extensive discussion
- Provided feedback on Day 2 to questions from Day 1
- Gave advice on preparing the final food safety program and preparing for assessment
- Assessed competence of participants.

Outcomes:

- Ten people accredited as a food safety supervisor (these participants were awarded a Statement of Attainment) and at least ten businesses with a food safety program.
- A further seven people received Certificates of Participation in the training course. This certificate highlights the participants' skill and knowledge of food safety requirements. The certificate listed the ANTA competencies that the training materials were aligned to. It is likely that this training will meet the local council's requirements and the Food Safety Standards requirements for "skills and knowledge" of people working in food businesses.

Following are the feedback comments given by participants:

- Homework at the end of Day 1 needed to be written out so (we) didn't get confused when got home
- Outstanding value
- Good to have PETP (OTFE, Victorian Government) support
- Great that the EHO came to speak (it made her position 'less scary')
- Bringing the EHO was very helpful
- Trainers worked well together
- Lots of papers/forms. It took a bit of sorting / filing to find the right page during sessions
- Specialist bush foods course. Well organised and researched
- As the industry grows using bush food examples would be good
- Maybe DPI can assist in suggesting competencies relevant and recommended for participants in the industry to achieve in areas of growing, transport, retailing foods, value adding by keeping in touch with the activities and aspirations for industry participants
- First class course – very relevant and useful
- Outstanding presenters and presentation

The evaluation of the assessment process produced the following comments from ten respondents:

- The information on assessment given prior to the assessment was either more than adequate or adequate.
- Support and guidance was available between completion of the workshop and assessment.
- The evidence the assessor requested was consistent with the pre-assessment briefing for nine people out of ten.
- The assessor provided adequate feedback to all participants.
- The following comments were made about the interview with the assessor: "Very helpful. Clarified many issues", " Made me feel relaxed and comfortable", "I was nervous at the start. He quickly put me at ease", and "Friendly but rigorous. To a standard to be expected."

Other issues

Standards for food safety and quality

There are some microbiological standards in the FSANZ Food Standards Code (FSANZ 2002a) and there are microbiological guidelines in the AFFA Guidelines for On-farm Food Safety (AFFA 2004).

Two commercial food safety (and quality) systems are:

- Freshcare Ltd. is the national, on-farm, food safety program for fresh produce. This is a commercial program, so it costs money to join and run it. It provides proof to buyers and authorities that you are using an accredited food safety program.
  Internet: http://www.freshcare.com.au
  Email: info@freshcare.com.au
  Phone 02 9764 3244, Fax: 02 9764 2776,
  PO Box 247 Sydney Markets NSW 2129
- SQF (Safe Quality Food)
  Internet: http://www.sqfi.com
  Australian representative: Graham McAlpine (through Curtin University)
  Phone: 08 9571 4190 or 0417 042 818
  Email: mcalpine@vianet.net.au

International food authorities include the US Food and Drug Administration and international standards include Codex and EurepGAP. The following information on Codex and EurepGAP is copied from the ASEAN postharvest network Internet site (http://www.aphnet.org/)

- Codex Alimentarius Commission: The Codex Alimentarius Commission (codex alimentarius means 'food code' in Latin) was created by FAO and WHO under the United Nations to protect the health of consumers, ensure fair food trade practices and promote coordination of all food standards work undertaken by international organisations. The quality standards produced by Codex also cover food safety. Codex has produced many quality standards for ASEAN produce. These food safety standards can be obtained from http://www.codexalimentarius.net
- EurepGAP: The term EurepGAP is derived from the "Euro-Retailer Produce Working Group" (EUREP) and "Good Agricultural Practices" (GAP). EurepGAP standards are used widely in Europe and around the world for the certification of Good Agricultural Practices. More information can be obtained from: EurepGAP (**GLOBAL**G.A.P): Good Agricultural Practices. http://www.globalgap.org

It is understandable that some industry members are interested in having quality standards, to guide members, to impress buyers and to get good-quality products. However, our experience with such standards in horticulture is that they often don't seem to work well or achieve a lot. What really matters is meeting buyers' needs, so some sort of mutually understood standards between the seller and buyer are very valuable. Some examples of such standards are:

- Vegetable product descriptors produced by DPI Victoria (O'Donnell et al. 1998)
- Flower quality descriptors produced by Standards Australia (Standards Australia 2004)

Agricultural chemicals

The issue for the native plant food industry is that agricultural chemicals need to be registered for particular crops and then maximum residue limits (MRLs) for each chemical and each crop listed and approved both in Australian standards (FSANZ 2002a) and international standards. The problem is that no one will register agricultural chemicals for minor crops. In all states, minor use permits can be approved and growers need to seek advice from state agricultural chemical authorities to learn how these can be set up. In Victoria there are special rules for off-label use of chemicals and growers need to seek advice from the state DPI agricultural chemical specialists. Nordon (2004) outlined what APVMA are doing to try to improve the situation. Some Australian MRLs are written for a group of crops, for example fruit crops or leafy vegetables and so if a native food crop falls into that category those MRLs can be used. Some marketers are able to use relevant MRL values in the country they are selling into, or relevant international (Codex) MRL values. Another issue is that Australian and overseas (Codex) standards are sometimes different.

The medicinal and culinary herb and essential oil industries are addressing these issues (Parker 2003, Scholefield 2004). The new industry steering committee is addressing these issues. There may be benefits from joining forces.

"Ownership" of native plants

Some industry members wanted clarification of the issues surrounding the Victorian government's contract with the Victorian company Amrad, which allegedly allowed them exclusive rights to use the Victorian flora. To the best of our current understanding the Amrad spin-off company Cerylid has exclusive rights to use the native flora for pharmaceuticals and for genes to generate pharmaceuticals. They have no rights over the flora for food or flowers. We do not know the duration of these agreements.

Advice from the Victorian government solicitor to DPI in 2002 indicated:

- The state of Victoria has property rights in native biological material that occurs on or in unalienated Crown land.
- The owner of freehold land owns biological material on the land (one interpretation of this is that if people have plants on private property they can do what they like with them).
- Native title claims over Crown land may well affect the ownership of biological material on that land (this is our interpretation of the solicitor's words).

In addition an expert in intellectual property in agriculture said that there may well be constitutional disagreement over who owns what rights to native plants and where.

Health and nutrition benefits of native plant foods

Robert Premier has had several discussions with industry members where everyone has agreed that many native plant foods probably have health and nutrition benefits and that a knowledge and understanding of these would be invaluable to the marketing of native plant foods.

Implications

The industry needs information, advice and help to meet legislative requirements for food safety, labelling and agricultural chemicals. They recognise that these are important issues to be addressed but point out that to do so may be expensive and time-consuming. Many native plant food businesses should be registered as food businesses, have a food safety supervisor and a food safety program.

Our project has had several important "impacts":

- We've provided information and advice on food safety through conference and industry talks, written material, advice to industry members including leaders, information workshops and accredited training courses.
- We've developed training materials that can also be used by others.
- Ten people have become formally qualified as food safety supervisors and approximately another 20 have received basic food safety training.
- Ten businesses have developed a food safety program.
- Businesses have implemented improvements to their food safety management.
- The feedback from participants in our courses and workshops, and from industry leaders, has said that what we're doing is valuable.
- We've developed food safety program templates for primary production, postharvest handling and inherent safety of native plant foods.
- We've established good collaborations with CSIRO researchers, the Victorian Koorie Business Network, the Northern Territory Horticultural Association and the Queensland Bushfood Association.
- Some of the issues we've raised, and advice we have given, is being used by the new industry steering group (Australian Native Food Industries Limited).
- We have trained and worked with Indigenous groups in Victoria, the Northern Territory and South Australia.

The issue of convincing buyers and authorities that native foods are safe to eat is critical. This project has contributed to discussion within the industry about how FSANZ considers the safety of foods that are new to the broad community. We believe it is important for the industry to continue to put considerable effort into convincing buyers and FSANZ of the safety of these foods. It may be appropriate for this project to do more in this area.

We have spent some time in talks and written articles, pointing out the opportunities for labelling that promotes the quality, safety and authenticity of native foods. McKinna (2004) has pointed out that good labelling is a critical part of good marketing. However, beyond the basic legislative requirements this is a commercial issue and we believe that those who label their products well will benefit.

Our conference talks and papers have reached national audiences. We have also discussed general and specific issues with industry members and collaborators in Queensland, New South Wales and South Australia. Our intensive discussions with industry and workshops and training courses have included Victoria, South Australia, Queensland and the Northern Territory. There is now a need to do more work in other states in collaboration with local industry members and government staff.

It is critical that those who want to use native plants for commercial purposes can obtain clear and accurate information about whether they have the legal right to use the plants for their purposes, or whether those rights have been given/sold to someone else. In Victoria, at least, this information is not readily available and we trust that this project has provided valuable information by clarifying some of these issues.

Recommendations

1. The industry needs to continue to work on convincing buyers and authorities that most native foods are inherently safe to eat.

2. The industry should continue to adopt improved labelling practices, both to meet legislative requirements and to promote the quality, safety and authenticity of their food products.

3. Governments and industry should continue to provide advice and training on food safety, including using the material developed in this project and available in this report.

   The information, training material, publications and expertise we have developed can continue to be used. The material and publications will be made available to the steering group of Australian Native Food Industries and others on request. Health benefits of native plant food research and development should be expanded. The food safety supervisor course, including the development of a food safety program, which we ran at Leongatha (Victoria), could be run in other states. While it is probably not mandatory to have food safety supervisor qualifications and a food safety program in other states, having them would enable food businesses to meet many of the food safety requirements in those states. The same training materials and methods could be used with other new and emerging food industries that RIRDC deal with.

4. Industry and RIRDC should work with FSANZ to a) assess the safety of native plant foods and b) to give them formal classification as traditional foods, not novel foods, wherever this is true.

   FSANZ has proposed that we, working collaboratively with the industry, assist them to gather scientific information on the food safety of native plant foods. This will assist them to make decisions about whether certain foods are safe for consumption and can be approved for regular sale, whether they need to be assessed in more detail, or whether they must be formally listed as novel foods under the Food Standards. The advantage of doing this is that it will speed up the process of getting native foods accepted by FSANZ as suitable for regular sale. This will be particularly important if local or overseas buyers demand some evidence of the safety of these unknown products.

   In addition, Sibylla Hess-Buschmann has proposed that this project develop microbiological standards for food safety and maybe quality for native foods. Any new standards would have to complement FSANZ standards and overseas standards such as the US FDA and Codex. Such standards could become part of FSANZ standards; they could be part of industry quality standards, or set up as Standards Australia standards. The advantages of such standards, if they are used by the industry, are that food safety and quality will increase and suppliers can show their buyers that they are meeting these standards and hence convince buyers of the quality and desirability of the product. An alternative to developing new standards is to better use existing standards and guidelines such as AFFA (2004) and commercial food safety programs.

5. There is a need for industry and governments to work more closely with Indigenous people on all aspects of the development of native plant food businesses.

6. When state governments have awarded contracts for commercial exploitation of native plants, they need to make clear to industry and Indigenous people what the agreements are and how the agreements affect those people.

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Appendices

Appendix 1. Further information

Food Standards Australia and New Zealand (FSANZ):

- Food Standards Code, Safe Food Australia user guide, fact sheets and much more.
- Food Standards Code, 2002, Internet: http://www.foodstandards.gov.au/thecode/
- Internet site: http://www.foodstandards.gov.au
- Advice Email: advice@foodstandards.gov.au
- Advice phone: 1300 652 166
- They sometimes suggest you ask your lawyer to advise you on the Food Standards Code.
- FSANZ fact sheets: http://www.foodstandards.gov.au/newsroom/factsheets/index.cfm

State Health Departments:

- Food Safety Victoria: http://www.health.vic.gov.au/foodsafety/
- Tasmania: www.dhhs.tas.gov.au/services/view.php?id=781
  Phone Freecall 1800 671 738
- NSW Food Authority: Phone: 1300 552 406 Fax: 02 9647 0026 or Email:
  contact@foodauthority.nsw.gov.au
  Internet: http://www.foodauthority.nsw.gov.au/
- Queensland Health: http://www.health.qld.gov.au/healthtopics/
  http://www.safefood.qld.gov.au/news/news.html
- South Australia: http://www.dh.sa.gov.au/pehs/food-index.htm
- Northern Territory Department of Health and Community Services: http://www.nt.gov.au/health/
- Western Australia Department of Health: http://www.health.wa.gov.au/services/detail.cfm?Unit_ID=514
  Phone: Perth 9388 4999 Fax: Perth 9388 4905
- ACT: http://www.health.act.gov.au

Training:

- NT government FoodSafe program is a training program for food handlers. For more information contact local council Environmental Health Officers or the Environmental Health program on 1800 095 646.
  Internet: http://www.nt.gov.au/health/healthdev/environ_health/environmental/foodsafe.shtml
- Local TAFE colleges, industry training boards, local councils
- National Training Information Service: http://www.ntis.gov.au/
- Melbourne Market Authority, Marketing Manager, Mary Stewart, Phone (03) 9258 6102

Other references:

- Brand-Miller, J., James, K.W. and Maggiore, P.M.A. (1993). Tables of Composition of Australian Aboriginal Foods. Aboriginal Studies Press.
- Codex Alimentarius Commission: These food safety standards can be obtained from http://www.codexalimentarius.net
- EurepGAP (**GLOBAL**G.A.P): Good Agricultural Practices. http://www.globalgap.org
- Names of Australian plants: http://www.anbg.gov.au/acra/
- Australian Native Food Industry Limited(national industry body):
  http://www.cse.csiro.au/research/nativefoods/development/board.htm
- International (Internet) Portal on Food Safety and Animal and Plant Health:
  http://www.ipfsaph.org/En/default.jsp

Appendix 2. Food safety guidelines and food safety program for native plant foods

Introduction

Food safety guidelines can be used to manage food safety risks, to help meet buyers requirements and to help meet legislative requirements.

Users can move on to more comprehensive food management systems including food safety programs and commercial quality assurance and food safety schemes.

These guidelines are made up of 4 parts:
1. Information on general food safety guidelines and food safety programs that are already available.
2. A model food safety program and guidelines for native plant food production.
3. Further information on poisonous plants
4. Microbiological risk assessment

The references quoted in this appendix are described in detail at the end of the report.

General food safety guidelines

There are many general guidelines and food safety programs for horticulture, agriculture and food businesses already existing. They cover most aspects of native plant food production.

Guidelines for on-farm food production

AFFA (2004). Guidelines for On-Farm Food Safety for Fresh Produce – 2nd edition. Agriculture, Fisheries and Forestry – Australia, Canberra. This is "a must", it is comprehensive and reasonably user-friendly. Download from the Internet at:
http://www.daff.gov.au/agriculture-food/food/publications/farm-food-safety
Copies from Richard Bennett, Email: richard.bennett@horticulture.com.au, Phone: (03) 5825 3753.

The following three guidelines provide more details on information for managing microbiological hazards in vegetables and strawberries.

- Behrsing, J. & Premier, R. (2002). Safe Vegetable Production.
- Wymond, P., Cosgrave, D. and Fraser, M. (2001). Healthy Harvest, Controlling germs during (vegetable) production.
- Horlock, F., Behrsing, J., Faragher, J. and Premier, R. (2002). Safe Production of Strawberries.

Food safety programs for on-farm food production

Food safety programs are formal documented programs a business uses to manage their food safety risks. They can be used to show buyers and local councils that food safety risks are being managed. They enable a registered food business to meet some of the requirements of the food safety standards. In Victoria they are required for all food businesses and need to be approved by the local council. NSW requires all high priority plant product businesses to be licensed with the NSW Food Authority and to have a food safety program. These businesses include: fresh cut fruit and vegetables (usually consumed raw); unpasteurised juice; seed sprouts; and vegetables in oil. In other states food safety programs are not mandatory for most businesses.

We have produced a model food safety program for native plant food production and handling. This is the next major section of this Appendix.

In Victoria the Melbourne Market Authority has an approved food safety program for on-farm production of horticultural crops which is available as part of training package. For further information contact Marketing Manager, Mary Stewart, Phone (03) 9258 6102.

In future Food Standards Australia and New Zealand (FSANZ) will make Food Safety Standards for Primary Production, including horticulture and states are likely to require that these be met.

Formal and commercial quality assurance and food safety schemes for on-farm food production

There are many schemes that can be set up to manage food quality and safety and to obtain accreditation and recognition for that. Some of the most relevant are listed below. For more details see the paper by Bennett (2005).

Freshcare Ltd., is the national, on-farm, food safety program for fresh produce. This is a commercial program, so it costs money to join and run it. It provides proof to buyers and authorities that you are using an accredited food safety program.
Internet: http://www.freshcare.com.au
Email: info@freshcare.com.au
Phone 02 9764 3244, Fax: 02 9764 2776,
PO Box 247 Sydney Markets NSW 2129

SQF (Safe Quality Food)
Internet: http://www.sqfi.com
Australian representative: Graham McAlpine (through Curtin University)
Phone: 08 9571 4190 or 0417 042 818
Email: mcalpine@vianet.net.au

Other schemes are available through various regulatory, training and private organisations and are based on:

- Hazard analysis critical control point is (HACCP)
- ISO 9000 and ISO 9000 plus HACCP, particularly for larger processors and packers. For details contact Standards Australia International Ltd
- Approved supplier programs where purchasers describe conditions that their suppliers must meet. The most well known of these is the Woolworths Quality Assurance Standard.

Guidelines for post-production food handling, processing and marketing

There are not many guidelines available because they are superseded by the many food safety program templates and commercial schemes available in the broader food industry.

The vegetable and strawberry guidelines listed above under on-farm food production go into postharvest handling and transport.
One guideline prepared for the freshcut fruit and vegetable industry is: Barlass, M., Tomkins, B., Faragher, J., Chennell, A., Premier, R. and Hickey, M. (Eds.) (1998). Food Safety Guidelines for the Australian Fresh-cut Produce Industry (2nd ed.).

Food safety programs for post-production food handling, processing and marketing

Where possible it is best to use approved state government templates for food safety programs because these are the ones that must be complied with by food businesses in those states. Alternatively accredited commercial programs can be used.

Following are sources of some state government templates for food safety programs:

- Victoria. Victorian Food Safety Program Template: Food Safety Victoria (2004). Food safety program: Generic template for food service and retail businesses.
  Hard copy available from Information Victoria Ph 1399 366 356.
  Internet version: http://www.health.vic.gov.au/foodsafety/downloads/generic_template.pdf
- NSW. NSW requires all high priority plant product businesses to be licensed with the NSW Food Authority and to have a food safety program. These products include: fresh cut fruit (usually consumed raw); fresh cut vegetables (usually consumed raw); unpasteurised juice; seed sprouts; and vegetables in oil. For information, guidelines and templates for food safety program see:
  Internet: http://www.foodauthority.nsw.gov.au/ Phone 1300 552 406**,** Fax 02 9647 0026 or
  Email: contact@foodauthority.nsw.gov.au

If in doubt about what templates are available ask the local council's Environmental Health Officer or the state Department of Health.

Formal and commercial quality assurance and food safety schemes for post-production food handling, processing and marketing

There are many schemes available in the food industry through various regulatory, training and private organisations including:

- Hazard analysis critical control point is (HACCP).
- ISO 9000 and ISO 9000 plus HACCP, particularly for larger processors and packers. For details contact Standards Australia International Ltd.
- Approved supplier programs where purchasers describe conditions that their suppliers must meet. The most well known example of this is the Woolworths Quality Assurance Standard.
- SQF (Safe Quality Food), Internet: http://www.sqfi.com Australian representative: Graeme McAlpine (through Curtin University, Phone 08 9571 4190 or 0417 042 818, Email: mcalpine@vianet.net.au

If in doubt about what schemes are available, ask the local council's Environmental Health Officer or the state Department of Health.

Model food safety program for native food plants

Following is a model food safety program and guidelines for managing food safety hazards during primary production and postharvest handling of native foods. It is written to complement and be used with the Victorian Government's Food Safety Program Template for Retail and Food Service Businesses (Food Safety Victoria 2004). The model food safety program presented here, together with the Victorian Government's template, can be used to develop a food safety program for individual businesses and to submit to local council for approval. The Victorian template is only official in Victoria, though it could be used as a guide to develop food safety programs elsewhere and for other primary industries. Other states may have their own templates and not accept either the Victorian template or the model we have produced. We suggest that you check with the local council's Environmental Health Officer about what it is needed for a Food Safety Program for your business.

The following model food safety program for native plant food production includes on-farm production and post-production and includes issues that are particularly important for native foods, e.g. natural toxicity, wild harvesting and drying.

References are made to the hazard sections, support programs and records on the Victorian Food Safety Program Template for Retail and Food Service Businesses (Food Safety Victoria, 2004) to enable the user to obtain extra information. Additional record keeping sheets (a-d) have been provided at the end of this section.

Section A. Are Native Plant ***Foods Naturally Safe or Unsafe?***

Some plants contain natural compounds or microbes that are poisonous to humans. For example some green potatoes and some fungi can be poisonous, some stored grains contain fungi that can be poisonous, rhubarb leaves contain irritating or poisonous oxalates, paw-paw skin and kiwi fruit contain protein degrading enzymes which can cause illness if taken in too large an amount. Sometimes cooking or processing can make these foods safe. There is a lot of knowledge about poisonous native plant foods, but it is not always common knowledge amongst the community. Therefore care needs to be taken to ensure the food you are growing and selling is safe.

What do I need to check?

- Check that you know the proper botanical and common names of the plants you are growing or selling.
- Check whether any part of the plant is poisonous, either raw or cooked/processed.
- Check whether the plant food is on the Food Standards ANZ (FSANZ) prohibited/restricted list (FSANZ 2002b).
- Check whether a plant food needs to be cooked/processed to be safe.
- Know how much of the food can be eaten safely at any one time.

Why do I need to check these?

- If you do not know the identity of the plant you can not find out if it is safe to eat or not. Some closely related species may be edible while others are toxic, e.g. in the Acacia (wattle) and Solanum (bush tomato, nightshade etc) genera.
- Some plants contain natural compounds, or microbes, that are poisonous to humans.
- Some plants and plant parts are prohibited or restricted for food use (FSANZ 2002b).
- If you are relying on cooking/processing to make food safe you must understand exactly how to do this to be 100% sure that the food is safe.
- Some foods can be tolerated in small doses, but not in large doses.

How do I avoid these problems?

- Learn the botanical and common names from books or experts (for example the state herbarium).
- Look up the FSANZ prohibited/ restricted plant food list (FSANZ 2002b). For example, the list includes several *Solanum* species:
- Look up lists of native foods to determine if they are poisonous, or if they need to be processed, e.g. Hegarty et al. (2001) (See table later in this Appendix).
- Find out how to process the food to make it safe. If a food needs extensive processing to make it safe it may be wiser to not use it.
- Get an analysis done for any likely poisonous compounds or microbes.

- To test produce, water or soil you can contact NATA for registered laboratories. Internet site: http://www.nata.asn.au Phone: Melbourne office (03) 9329 1633.
- If in doubt do not use it as food. Remember the supplier of food is legally liable if the food they supply causes harm to others.

What do I do if something goes wrong?

- Dispose of food if you find you have accidentally picked or processed something that might be poisonous. Dispose by composting, incinerating or using land fill if there are no toxic chemicals or infectious microorganisms present. If these are present ask your local Health Officer or state Food Safety authority for advice.
- Recall food if you find you have accidentally sold something that might be poisonous. See Support Program 7, Food recall, of the Victorian template (Food Safety Victoria 2004).

Here are extra things I do to avoid problems:

Here are extra things I would do if something goes wrong:

Here are the records you need to keep for this section:
• Record the botanical and common name of the plants you are picking, growing, processing or selling, including where you are growing them.

Section B. Native Plant Food Production – Land Selection and Preparation

What do you do prior to the plant entering the ground, i.e. selecting the land, fertilising, watering and applying weedicides and pesticides?
What do I need to check?

- Conduct a risk assessment of the previous use of the land as well as the use of neighbouring land. Determine if the land has been used for:
    - Land fill or waste
    - Animal grazing
    - Septic treatment or storage
    - Storage or composting of animal manure
    - Urban or industrial development
- That fertilisers and manures will not leave dangerous microorganisms or chemical residues, particularly if the edible produce will contact the soil.
- That pesticides and weedicides will not leave dangerous chemical residues.
- That pesticides will not drift onto your crop from neighbouring properties.
- That water to be used for irrigation does not contain dangerous chemicals or microorganisms.

Why do I need to check these things?

- Polluted water or soil, animal manures and pesticides can contaminate food crops, particularly if the edible crop comes into contact with the soil or water.
- Previous use of the land may have left dangerous chemical and microbiological residues, e.g. from waste disposal, animal grazing or excessive fertilising.
- Dangerous chemicals and microorganisms can move from a neighbouring property to yours, e.g. through septic waste or spray drift.
- Animal manures can contain microorganisms that can cause human disease, particularly if they directly contact the edible part of the crop. They may also move into the edible parts of the plant via damaged roots or leaves, or by direct contact.
- Just because manure or other products are organic does not mean they are safe.
- Fertilisers can leave heavy metal residues (e.g. cadmium) and this can be taken into the plant (e.g. by leafy vegetables).
- Water can be a source of microorganisms capable of causing food poisoning (e.g. bacteria including *E. coli*, parasites and viruses). Irrigation water can contaminate crops, particularly if applied by overhead sprinklers.

How do I avoid these problems?

- Conduct a risk assessment of the previous use of your land and neighbouring land. Get expert advice if necessary.
- Do not buy or use the land if it is contaminated and cannot be cleaned up.
- If the risk is high, have the soil or water tested for critical microorganisms (e.g. faecal coliforms, *E. coli* and *Listeria monocytogenes*) and suspected chemical contaminants (e.g. pesticides, cadmium).
- Stop the source of contamination.
- If the land has previously been used for animal grazing a one-year resting period is suggested if the crop is short term (e.g. harvested within 3 - 6 months of planting) and the food touches the soil.

Manures and Chemicals

- If there are clear risks of direct contact of animal manures with edible crops take steps to avoid contact, for example:
    - Use composted manures, preferably composted to the Australian Standard for composts (Standards Australia 1999). The aim is to compost the manure until the level of *E. coli* is less than 100 per gram (AFFA 2004).
    - Apply manures 3 to 6 months before harvesting.
    - If you buy manure, e.g. poultry manure, only use if composted or treated and always from suppliers with HACCP- based safety plans that certify the manure has less than 100 *E. coli* per gram.
- Do not use long lasting pesticides or weedicides that can remain in the soil.
- Do not use fertilisers that add cadmium to the soil if there is a risk of high levels in the product.
- It is important to keep records of what type of fertiliser/soil additives, pesticides and weedicides are used, where, and when.

Water

- If there is a significant risk of contamination from direct contact with irrigation, hydroponic or spray water, make sure that the water does not contain disease microbes (less than 1000 faecal coliforms/ 100 mL) or pesticides. See AFFA (2004) for more details.
- If water is contaminated, stop the contamination, use an alternative source, or treat the water to kill microbes (e.g. add chlorine germicide).
- To reduce the risk of pollution from outside the farm, construct physical barriers such as raised dam walls, fences, ditches and buffers (e.g. plants).
- To test the produce, water or soil you can contact NATA for registered laboratories. Internet site: http://www.nata.asn.au, Phone: Melbourne office (03) 9329 1633.

What do I do if something goes wrong?
If you suspect soil, water or food is contaminated with human disease microbes or poisonous chemicals:

- get it tested
- trace it back, looking for likely sources of contamination
- eliminate source of contamination.

Recall food if you find you have accidentally sold something that might be contaminated. See Support Program 7, Food recall, of the Victorian template (Food Safety Victoria 2004).

Suggested maximum limits for soil for growing vegetables:

- Faecal coliforms: less than 100/g,
- *E. coli* less than 100/g,
- *Listeria monocytogenes* less than 10/g

Source: Behrsing & Premier (2002).

Here are extra things I do to avoid problems:

Here are extra things I would do if something goes wrong:

Here are the records you need to keep for this section:

- Record a - Fertiliser / Soil Additives Log (below)
- Record b - Pest control (below)
- Record 1 - Approved Suppliers List of the Victorian template (Food Safety Victoria, 2004).

Section C. Growing – Plant and Food Production

What do I need to check?

- That fertilisers and manures will not leave dangerous microorganisms or chemical residues, particularly if the edible produce contacts the soil.
- That animal manures do not blow or wash onto the crop from mounds of stored manure.
- That animal droppings do not fall on, or lie under, the crop (e.g. from birds). This is especially important when fruit can fall on the ground before harvesting and where picking equipment is placed on the ground.
- That water used for irrigation does not contain dangerous chemicals or microorganisms.
- That pesticides and weedicides will not leave dangerous chemical residues.
- That pesticides do not drift onto your crop from neighbouring properties.
- That water, pollution, pesticides or weedicides from outside your farm doe not contaminate the crop.

Why do I need to check these things?

- Animal manures can contain microorganisms that could cause human disease, particularly if they directly contact the edible part of the crop. They may also move into the edible parts of the plant via damaged roots or leaves, or by direct contact.
- Just because manure or other products are organic does not mean they are safe.
- Water can be a source of microorganisms capable of causing food poisoning, e.g. bacteria including *E. coli*, parasites and viruses. Irrigation water can contaminate crops, particularly if it directly contacts the crop.
- Fertilisers, pesticides and weedicides may contaminate the crop, particularly if they are applied close to harvest and blow onto the edible part of the crop.
- Fertilisers can leave heavy metal residues (e.g. cadmium) and this can be taken into the plant (e.g. by leafy vegetables).
- Pesticides, weedicides and microorganisms can travel from neighbouring properties, e.g. septic waste, spray drift

How do I avoid these problems?

- If there are risks of direct contact of organic manures with edible crops, take steps to avoid contact, use composted manures, preferably composted to the Australian Standard for composts (Standards Australia 1999). The aim is to compost the manure until the level of *E. coli* is less than 100 per gram (AFFA 2004).
- Apply manures 3 to 6 months before harvesting. Do not place stored manure where it can blow or wash onto the crop.
- Do not run farm animals amongst the crop immediately before harvest.
- Do not use fertilisers that add cadmium to the soil if there is a risk of high levels in the product.
- If there is a significant risk of contamination from direct contact with irrigation, hydroponic or spray water, make sure that the water does not contain disease microbes (less than 1000 faecal coliforms/ 100 mL) or pesticides. See AFFA (2004).
- If water is contaminated, stop the contamination, use an alternative source, or treat the water to kill microbes (e.g. add chlorine germicide).

- Take care in water application – for above ground crops overhead irrigation has a higher risk than drip/trickle or under tree sprinklers.
- Use only registered pesticides. If none are registered for your crop ask your state agricultural chemicals adviser about minor use permits or, in Victoria, off-label use. See comments above in the Results and Discussion section under: Other issues.
- Do not use pesticides and weedicides close to harvest. Do not pick during the withholding period for the pesticide. The requirement is to have chemical residues less than the maximum residue limit in your market. See comments above in the Results and Discussion section under: Other issues.
- Check for sources of contamination from outside the farm – if necessary test soil, water, produce – stop source of contamination.
- To reduce the risk of pollution from outside the farm construct physical barriers such as raised dam walls, fences, ditches and buffers (e.g. plants).
- It is important to keep records of what type of fertilisers, manures, soil additives, pesticides and weedicides are used.
- Routinely test the food you produce if it has a moderate to high risk of contamination with chemicals or microbes.

What do I do if something goes wrong?

- If you suspect soil, water or food is contaminated with human disease microbes or poisonous chemicals:
    - get it tested;
    - trace back, looking for likely sources of contamination
    - eliminate the source of contamination.
- If necessary stop selling food till it is safe.
- Destroy contaminated food. If the product is past its use by date, rotting or damaged, or if it is contaminated with manures or non-toxic chemical, compost or incinerate it. If it is contaminated with infectious microbes or toxic chemicals, ask your local or state health authority. See Support Program 7, Food recall, of the Victorian template (Food Safety Victoria 2004).

Here are extra things I do to avoid problems:

Here are extra things I would do if something goes wrong:

Here are the records you need to keep for this section:

- Record a - Fertiliser Use (below)
- Record b - Pest control (below)

Section D. Harvesting

What do I need to check?

- Pesticides recently used.
- Worker personal hygiene.
- General hygiene - clean equipment including tools, containers and facilities
- Transport procedures from field to packing facilities. Check that transport vehicles are clean and chemicals are not being carried in the same area as the food.
- Check that there are no insects, insect eggs, animal droppings, dirt, glass, stones on the food.

Why do I need to check these things?

- Bacteria can be transferred to food from unwashed hands and clothing and from body fluids (for example through sneezing, coughing, spitting, sores, urine and faeces).
- Bacteria can be transferred to food from utensils and containers.
- Animal droppings and dirt can carry disease.
- Stones, glass and other foreign objects can injure people.
- Foods stored near some chemicals may become contaminated and unsafe.

How do I avoid these problems?

- If pesticides were recently used ensure the withholding period before harvest has passed (see label). The requirement is to have chemical residues less than the maximum residue limit in your market. See comments above in the Results and Discussion section under: Other issues.
- Train employees in basic hygiene such as hand washing procedures, personal hygiene, reporting of illness and injuries.
- Educate employees on how they can cause contamination and ways to combat it.
- Produce written documents, including instructions, signs and pictures to train employees and to remind them of personal hygiene practices.
- Worker personal hygiene. See Support Program 2, Food handling -- skills and knowledge, Support Program 3, Health of food handlers of the Victorian template (Food Safety Victoria, 2004).
- Have hand-washing facilities in the field (including hot soapy water, anti-bacterial soap, germicidal wash and paper towel).
- Clean hands and arms thoroughly with hot germicidal wash or anti-bacterial soap immediately before picking.
- Situate toilet facilities appropriately and ensure sewage cannot contaminate the crop. It is also important to keep toilets clean and equipped with soap and paper towel. Emphasise the importance of using the toilets.
- Do not allow people with infectious, catchy, sicknesses to pick.
- Provide an appropriate first aid kit and equipment to dress cuts and sores.
- Supply appropriate uniform and safety wear (for example clean, washable gloves, aprons and overalls, hair nets/caps, boots). Wear clean clothes, for example washable overalls.
- Pick into containers that are non-toxic and easy to clean. Clean them thoroughly before and after use. Use approved germicidal cleaning agent if necessary, (e.g. hypochlorite, quaternary ammonium compound, hot soapy water) and rinse with clean water. See Support Program 1, Cleaning and sanitising of the Victorian template (Food Safety Victoria, 2004).
- Use clean, sanitised and dry tools, equipment and containers. Clean them thoroughly before and after use. Use approved germicidal cleaning agent if necessary, (e.g. hypochlorite, quaternary

ammonium compound, hot soapy water). See Support Program 1, Cleaning and sanitising, Support Program 4, Equipment maintenance and calibration, of the Victorian template (Food Safety Victoria, 2004).

- Do not pick produce (e.g. fallen fruit or nuts) from the ground if manure, fertiliser, pesticides or weedicides could contaminate them.
- Do not eat or smoke while picking.
- Ensure vehicles are maintained, for example by sweeping between loads and if necessary washing/sanitising. Be conscious of previous uses of the vehicle.
- See Hazard Section 12, Transporting Food of the Victorian template (Food Safety Victoria, 2004).
- Do not use the same containers or vehicles for toxic/agricultural chemicals and food.
- Quickly transfer harvested products to a cool or cold and clean storage area.

What do I do if something goes wrong?

- Throw out food if you find out that it may be contaminated, whether by workers, manure, dirty containers, vehicles or agricultural chemicals. If the product is past its use by date, rotting or damaged, or if it is contaminated with manures or non-toxic chemical, compost or incinerate it.
- If it is contaminated with infectious microbes or toxic chemicals, ask the local or state health authority.

Here are extra things I do to avoid problems:

Here are extra things I would do if something goes wrong:

Here are the records you need to keep for this section:

- Record c – Harvest Record (below)
- Record d – Cleaning schedule (below)
- Record 5 - Equipment Calibration log of the Victorian template (Food Safety Victoria, 2004).
- A record of reported illnesses

Section E. Harvesting from the Bush

Are there any particular, extra issues to pay attention to when bush picking?

What do I need to check?

- That the plant and its name are known.
- Whether the plant or plant parts are known to be safe to eat.
- If processing/cooking is needed to make the plant safe.
- The food is not contaminated with animal droppings, insects or polluted water (for example from creeks).
- If the food is stored in the bush it will not be contaminated by animals, manure, dirt or water.

Why do I need to check these?

- If you do not know the identity of the plant you cannot find out if it is safe to eat.
- Some plants contain natural compounds, or microbes, that are poisonous to humans.
- Some plants and plant parts are prohibited or restricted for food use by FSANZ (FSANZ, 2002b).
- Animal droppings, insects, dirt and polluted water can cause sickness in people who eat the food.

How do I avoid these problems?

- Find out the botanical and common names from books or experts.
- Look up lists of native foods to determine if they are poisonous, or if they need to be processed, e.g. Hegarty et al. (2001) (See the table later in this Appendix).
- Look up the FSANZ prohibited/ restricted plant food list: Food Standard 1.4.4. “Prohibited and restricted plants and fungi" (FSANZ 2002b).
- Find out how to process the food to make it safe.
- Do not harvest food that is contaminated with animal droppings or polluted water.
- Do not harvest food contaminated with insects unless you can remove all of them after harvest.
- Store food in a place where it will not be contaminated by animals, manure, dirt or water.
- Quickly transfer harvested products to a cool, or cold, clean storage area.

What do I do if something goes wrong?

- Throw out food if you find out that it may be contaminated, whether by workers, manure, dirty containers or vehicles or agricultural chemicals. If the product is past its use-by-date, rotting or damaged, or if it is contaminated with manures or non-toxic chemicals compost or incinerate it.
- If food is contaminated with infectious microbes or toxic chemicals, ask your local or state health authority.
- Recall food if you find you have accidentally sold something that might be poisonous or contaminated. See Support Program 7, Food recall (Food Safety Victoria, 2004).

Note: Remember to check that it is legal to pick the particular plant from the bush and if you need a licence or permit. Contact your state Department of Conservation or Natural Resources or Environment Protection Authority. In Victoria it is currently called the Department of Sustainability and Environment (Phone the customer service centre 136 186)

Here are extra things I do to avoid problems:

Here are extra things I would do if something goes wrong:

Here are the records you need to keep for this section:

- Record c – Harvest Record (below)

Section F. After harvest

What do I need to check?

- Worker personal hygiene.
- General hygiene - clean equipment including tools, containers, benches and facilities. Handling facilities are free from physical contaminants (dirt, glass, stones hair) and from chemical contaminants.
- Storage conditions for harvested produce and for graded, packed and processed produce.
- Food containers are clean.
- Fresh food is kept cool (less than 5°C) where possible. Processed food must be kept below 5°C.
- If the produce has to be washed, the water must be clean.
- Postharvest chemicals – ensure they are registered as agricultural chemicals and/or food processing aids. Food processing aids are listed in the Food Standards Code (FSANZ 2000a).
- Damaged, infected, contaminated or dirty produce is not sold or processed.
- Packaging. See Hazard Section 11: Food Packaging (Food Safety Victoria, 2004).
- Food is processed and/or sold quickly.

Why do I need to check these things?

- Bacteria and unwanted chemicals can be transferred to food from unwashed hands and clothing and from body fluids.
- Dirty equipment (for example knives, benches, packing containers) can be a source of contamination.
- Storage must keep the produce clean and safe.
- After harvest microbes can grow unless the food is kept cold and marketed quickly.
- Wash water can contaminate produce if it contains dangerous chemicals or microbes.
- Packaging must be clean and keep produce clean.

How do I avoid these problems?

- Move the food to a cool and clean storage area as soon after harvest as possible. See Hazard Section 2A: Dry Storage and 2B: Cold Storage of the Victorian template (Food Safety Victoria, 2004).
- Store food in clean, cool (or cold, 5°C) area until dispatch.
- Make sure cold rooms are designed to stay cold. Regularly check that the temperature is below 5°C. See Support Program 5, Using a thermometer, of the Victorian template (Food Safety Victoria, 2004).
- Quickly sell your food!
- Routinely test food that has a moderate to high risk of contamination for microbes and/or chemicals. If produce has more than 20 cfu/g of *E. coli* then there is a problem that needs to be addressed. Investigate the source of the contamination and manage the risk (AFFA 2004).

Worker hygiene:

- Train employees in basic hygiene, such as hand washing procedures, personal hygiene and reporting illness and injuries. See Support Program 2, Food handling -- skills and knowledge, Support Program 3, Health of food handlers of the Victorian template (Food Safety Victoria, 2004).
- Produce written documents, including instructions, signs and pictures to train employees and to remind them of personal hygiene practices
- Do not allow people with infectious, catchy, sicknesses to harvest.
- Clean hands thoroughly with hot germicidal wash or anti-bacterial soap and rinse immediately before handling food.
- Have toilet and hand washing facilities near the food handling area (including hot soapy water, anti-bacterial soap, germicidal wash, paper towel).
- Provide an appropriate first aid kit and equipment to dress cuts and sores.
- Wear clean clothes in the food handling area. Supply appropriate clean uniform/clothes, e.g. washable overalls, aprons and gloves, hair nets or caps, boots. Ensure they are correctly sanitised after use.
- Do not permit eating or smoking while handling food.

General hygiene:

- Use clean, sanitised and dry tools, equipment, containers and benches. See Support Program 1, Cleaning and sanitising, Support Program 4, Equipment maintenance and calibration of the Victorian template (Food Safety Victoria, 2004).
- Clean equipment thoroughly before and after use. Use approved germicidal cleaning agent if necessary, (e.g. hypochlorite, quaternary ammonium compound, hot soapy water) and rinse with clean water.
- Do not use the same containers for chemicals and food.
- Store packing materials and containers in a dry, ventilated area preferably off the floor.
- Ensure packaging is clean, that it is not likely to cause or allow food contamination and that the food will not become contaminated during the packaging process. See Hazard Section 11, Packaging, of the Victorian template (Food Safety Victoria, 2004).
- Regularly monitor equipment, premises and storage areas to ensure they are clean and sanitised correctly.
- Sweep or hose packing sheds and ensure produce is not exposed. See Support Program 1, Cleaning and sanitising, Support Program 4, Equipment maintenance and calibration, of the Victorian template (Food Safety Victoria, 2004).
- Minimise the presence of vermin (animals) in food handling areas. Undertake control measures where necessary in a manner that will not poison or contaminate produce. Discourage domestic animals from areas where produce is packed, handled and stored. . See Support Program 6, Pest control, of the Victorian template (Food Safety Victoria, 2004).

Washing water:

- Ensure that water used for washing produce is clean and free from contaminating microbes or chemicals.
- If you have reason to suspect water might be contaminated (e.g. a dam is next to an animal feedlot), have it tested for human disease microbes and for any poisonous chemicals.
- If water is contaminated use an alternative source or treat the water to kill microbes (chlorination/ozone/UV).

- Chlorine compounds are the most commonly used sanitisers for wash water in horticulture. There are several chemicals/products approved as agricultural chemicals and food processing aids. Ensure there is always a minimum of 5 ppm free chlorine in the water. The maximum chlorine residue allowed on food after washing is 1 ppm. See Support Program 1, Cleaning and sanitising, of the Victorian template (Food Safety Victoria, 2004).
- If removing large amounts of soil or dirt, irrigation water can be used as long as it is followed immediately by another wash with municipal or sanitised water.

Postharvest chemicals:

- Ensure postharvest chemicals are registered as agricultural and/or food processing aids. Use them according to the label and ensure residues do not exceed the maximum residue limits (see Food Standards Code, FSANZ 2002a). If no chemicals are registered for your crop, ask your state agricultural chemicals adviser about minor use permits or, in Victoria, off-label use. See comments above in the Results and Discussion section under: Other issues.

- It is important to keep records of food harvested, processed, stored and sold.

What do I do if something goes wrong?

- Destroy contaminated food. If the product is past its use-by-date, rotting, damaged, or if it is contaminated with manures or non-toxic chemical, compost or incinerate it.
- If food is contaminated with infectious microbes or toxic chemicals, ask your local or state health authority.
- Find the source of contamination and stop it.
- Recall food if you find you have accidentally sold something that might be poisonous or contaminated. See Support Program 7, Food recall, of the Victorian template (Food Safety Victoria, 2004).

Note: The Australian water quality guidelines specify that water used for processing products intended for human consumption should be of similar standard to drinking (potable) water. For example zero faecal coliforms/ 100 mL or alternatively zero *E. coli*/ 100 mL, plus zero total coliforms per 100 mL. (Australian and New Zealand Environment and Conservation Council 1992).

Here are extra things I do to avoid problems:

Here are extra things I would do if something goes wrong:

Here are the records you need to keep for this section:

- Record b - Pest Control (below)
- Record c – Harvest Record (below)
- Record 3 – Storage Units Temperature Log, of the Victorian template (Food Safety Victoria, 2004).
- Record 5 - Equipment Maintenance and Calibration, of the Victorian template (Food Safety Victoria, 2004).

Section G. Drying

The following section is based on Section F, After harvest. The important new things that need to be checked are marked by an *.

Alternatively drying can be considered under Hazard Section 4, Preparation.

What do I need to check?

- Worker Personal Hygiene.
- General Hygiene - clean equipment including tools, containers, benches, drying racks and drying rooms.
- Drying facilities are free from physical contaminants (dirt, glass, stones hair), chemical contaminants and pests
- Food containers are clean.
- Damaged, infected, contaminated or dirty produce is not processed or sold.
- The product is clean and free from contamination before it is dried.
- The drying conditions don't allow harmful microbes to multiply.
- Packaging.
- Storage conditions for harvested produce and for graded, packed and processed produce.
- Food is processed and/or sold quickly.

Why do I need to check these things?

See Section F, After Harvest, for most of these things.

- If infected produced is dried, microbes can multiply to dangerous levels during drying.
- If the product is moist and warm during drying it provides ideal conditions for microbes to multiply.
- Warm drying rooms may attract pests.

How do I avoid these problems?

Worker hygiene:

- Train employees in basic hygiene, such as hand washing procedures, personal hygiene and reporting illness and injuries.
- Produce written documents, including instructions, signs and pictures to train employees and to remind them of personal hygiene practices.
- See Support Program 2, Food handling -- skills and knowledge, Support Program 3, Health of food handlers, of the Victorian template (Food Safety Victoria, 2004).
- Do not allow people with infectious, catchy, sicknesses to harvest.
- Clean hands thoroughly with hot germicidal wash or anti-bacterial soap and rinse immediately before handling food.
- Have toilet and hand washing facilities near the food handling area (including hot soapy water, anti-bacterial soap, germicidal wash, and paper towel).
- Provide an appropriate first aid kit and equipment to dress cuts and sores.
- Wear clean clothes in the food handling area. Supply appropriate clean uniform/clothes, e.g. washable overalls, aprons and gloves, hair nets or caps, boots. Ensure they are correctly sanitised after use.

- Do not permit eating or smoking while handling food.

General hygiene:

- Use clean, sanitised and dry tools, equipment, containers, benches/racks and drying equipment/rooms.
- Clean drying equipment and rooms thoroughly before and after use. Use approved germicidal cleaning agent if necessary, (e.g. hypochlorite, quaternary ammonium compound, hot soapy water) and rinse with clean water. . See Support Program 1, Cleaning and sanitising, Support Program 4, Equipment maintenance and calibration, of the Victorian template (Food Safety Victoria, 2004).
- Regularly monitor equipment, premises and storage areas to ensure they are clean and sanitised correctly.
- Minimise the presence of vermin (animals) in food handling areas. Undertake control measures where necessary in a manner that will not poison or contaminate produce. Discourage domestic animals from areas where produce is packed, handled and stored. . See Support Program 6, Pest control, of the Victorian template (Food Safety Victoria, 2004).

Drying and microbes:

- Make sure the product is clean and free from contamination before it is dried. Make sure that microbial contamination does not occur during production, e.g. from water, manure, unhygienic workers. Don't use damaged, infected, contaminated or dirty produce for drying.
- Dry product quickly, while still maintaining quality, so that microbes don't have good conditions to grow in for too long. Does this require that not too much material is put in the drying room at once? Does improved movement of air through the drying material increase speed of drying?
- Routinely test food that has a moderate to high risk of contamination for microbes and/or chemicals. If produce has more than 20 cfu/g of *E. coli* then there is a problem that needs to be addressed. Investigate the source of the contamination and manage the risk (AFFA, 2004).

Packaging:

- Store packing materials and containers in a dry, ventilated area preferably off the floor.
- Ensure packaging is clean, that it is not likely to cause or allow food contamination and that the food will not become contaminated during the packaging process.
- See Hazard Section 11: Food Packaging of the Victorian template (Food Safety Victoria, 2004).

- Quickly sell your food!

What do I do if something goes wrong?

- Destroy contaminated food. If the product is past its use-by-date, rotting or damaged, or if it is contaminated with manures or non-toxic chemical, compost or incinerate it.
- If food is contaminated with infectious microbes or toxic chemicals, ask your local or state health authority about how to dispose of it.
- Find the source of contamination and stop it.
- Recall food if you find you have accidentally sold something that might be poisonous or contaminated. See Support Program 7, Food recall, of the Victorian template (Food Safety Victoria, 2004).

Here are extra things I do to avoid problems:

Here are extra things I would do if something goes wrong:

Here are the records you need to keep for this section:

- Record b - Pest Control (below)
- Make your own drying records – product, amount of product, drying time, temperature, humidity, finishing time etc

Record Sheet a

FERTILISER / SOIL ADDITIVES LOG

This sheet can be used to record any pesticides and/or chemicals used

Date	Fertiliser/Soil Additive Used	Location of use	Quantity Used	Withholding period? Additional Information?

Record Sheet b

PEST CONTROL

This sheet can be used to record pests on-farm ie caterpillars, or pests during production ie rats

Date:……	Evidence		Pest Type	Corrective Action Taken	By who
Area Checked	YES	NO			

Record Sheet c

HARVEST RECORD

Date	Plant Harvested	Location Harvested From	Current Storage Location	Comments

Record Sheet d

CLEANING SCHEDULE

Area / Piece of Equipment	How to clean	Product to use	Frequency of Clean	Date Cleaned	By Who	Comments

Further information on poisonous plants

Probably the most valuable source of detailed information is Hegarty et al. (2001) and the sources and references quoted in that report:
Hegarty, M.P., Hegarty, E.E, and Wills, R.B.H, (2001), Food Safety of Australian Plant Bushfoods, Rural Industries R&D Corporation (RIRDC) Publication No 01/28, Canberra, 75 pp
Telephone (02) 6272 4539 or Internet: http://www.rirdc.gov.au/reports/NPP/01-28.pdf

The following table is copied from that report:

Table 2.1 Some native species with a potential for toxicity.

SPECIES	**TOXIC PARTS**	**SOME TOXIC CONSTITUENTS AND/OR INFORMATION**
Abrus precatorius (various common names)	Seeds (when chewed)	Abrin, an extremely toxic protein Fluoroacetate
Acacia georginae,	Seeds & other parts	(Oelrichs & McEwan 1961)
A quadriloculatum,	Of Seeds	No information found
Aleurites rockinghamensis (a candlenut)	Kernels	Phorbol esters?
Castanospermum australe (black bean)	Seeds	A toxic water-soluble alkaloid (castanospermine)
Cycas species (cycads)	Seeds	Azoglycosides (neurotoxic) (Beck 1992)
Dianella (some species)	Fruits	Neurotoxins in fruit
Elaeocarpus bancroftii (Johnstone R. almond)	Fruits	Flesh “not edible” but seeds eaten (Elliott & Jones 1980)
Entada phaseoloides (matchbox bean)	Seeds	Toxic if untreated, and if baked may explode (Dick 1994b)
Hicksbeachia pinnatifolia	Flesh of fruit	Outer red flesh is toxic (Thies 1976)
Lepidozamia species (cycads)	Seeds	As for *Cycas*
Macadamia and some closely related species, **except** M. *integrifolia* and *M. tetraphylla* and their commercial crosses	Seeds (“nuts)”	Cyanogens (see Dahler et al. 1985)
Macrozamia species (cycads)	Seeds	As for *Cycas*
Pteridium esculentum (bracken fern)	New fronds (“fiddleheads”)	Carcinogens; still under investigation
Rhodomyrtus macrocarpa (finder cherry)	Fruits	Can cause blindness; see Flecker 1994; Everist 1981; Low 1991; and

SPECIES	TOXIC PARTS	SOME TOXIC CONSTITUENTS AND/OR INFORMATION
		www.farrer.csu.edu.au/ASGAP/APOL7/sep97-4.html
Triunia erythocarpa, T. robusta, T. youngiana, and possibly related sub-species.	Seeds	Very strong cyanogenic
Some native members of the cucumber family (can contain variable levels of bitter, potentially toxic compounds)	Fruits	Seek further information on particular species
Some native grapes	Fruits	Needle-like crystals of some species may irritate the throat of susceptible persons (Cribb & Cribb 1974, 1990)

Two other valuable resources are:

- The FSANZ Standard 1.4.4 of prohibited and restricted plants (FSANZ 2002b).
- Fulton, A. (2000). Food Safety of three Species of Native Mint. Rural Industries R&D Corporation (RIRDC) Publication No 00/38, http://www.rirdc.gov.au/reports/NPP/00-38.pdf

There is a huge number of native plant books and reports and we will not attempt to list them here. Much of the relevant information is summarised in Hegarty et al. (2001).

Microbiological risk assessment of produce

The following shows a way of assessing the microbial risks of vegetables. We have added some suggestions of how native plant foods might be classified. You can add more suggestions!

This information is taken from Behrsing & Premier (2002) (Safe Vegetable Production, A Microbial Food Safety Guide for the Australian Vegetable Industry).

In this guide, vegetables have been organised into groups according to their relative food safety risk. The higher the risk the more likely the need for control measures and monitoring activities during production and handling.

Group A is the highest risk group. The vegetables listed are often eaten without being cooked. This means that if contaminants are present, there is not a 'kill' step to eliminate them. They are also grown close to the ground and many are leafy types with uneven, large surface areas available for microbial growth.

Group B is the intermediate risk group. Although it contains vegetables that can be eaten uncooked, they are either grown off the ground and/or are protected by a skin that more easily excludes microbial attachment and growth.

Group C is the lowest risk group. It contains vegetables that are typically cooked prior to consumption. Although this is the lowest risk group, there is still the potential for this group to cross contaminate other foods. Therefore, it is still important to use good agricultural practices in the production of Group C vegetables.

GROUP A (highest risk)	**GROUP B (intermediate risk)**	**GROUP C (lowest risk)**
Cabbage Carrot Celery Pak choi Leek Lettuce (and lettuce types) Onion (salad or spring) Parsley Spinach Native plant foods: Salad plants, cresses, river mint? Roots, bulbs, tubers eaten raw. Dried products of plants that grow in or on the ground and are not cooked.	Bean Broccoli Capsicum / chilli Cauliflower Cucumber Native plant foods: Bush tomato, native mints, mountain pepper? Native citrus, other fruits. Dried products used as spices without further cooking, e.g. lemon myrtle?	Beetroot Brussels sprout Chinese cabbage (wong bok) Eggplant Parsnip Peas (not snow pea) Pumpkin Silver beet Sweet potato Zucchini / squash Native plant foods: Wattle seeds (roasted) Macadamias (roasted) Warrigal greens Yams Quandongs

Appendix 3. Information note: Food safety for native plant foods

DPI Information Note AG 1220

Robert Premier, Knoxfield

November 2005

Food safety is important

Food poisoning makes people sick and kills people. The food supplier is legally required to supply safe food and there is a range of state laws that govern safe handling of food. Food poisoning is also bad for business and new industries need good publicity, not bad. Most importantly your buyers demand safe food. Your buyers may demand that you are registered as a food business, have a food safety program and food safety training.

Food safety legislation

The national Food Standards Code is produced by Food Standards Australia and New Zealand (FSANZ). This includes general food standards that all suppliers of food, including primary producers, must meet. Food safety standards must be met by registered food businesses. Primary production standards are also being introduced over the next few years.

State laws spell out food safety requirements for registered food businesses. Requirements for food safety practices include things such as hand washing, keeping food cold, the skills and knowledge of staff and the presence of a food safety supervisor. Requirements for food premises include the design and materials of premises, water supply, cleaning, and waste disposal. Food safety programs are the programs that each business uses to manage food safety risks. The only state that demands this for all food businesses at the moment is Victoria. Most importantly, the practical aspects of food safety are managed by the local council's Environmental Health Officers.

Do you need to register as a food business?

Primary producers must register as a food business and meet the food safety standards if they sell direct to the public, transform (process) food, pack or treat food for others, or use food that has been bought in (to re-sell or to make other food products). Selling direct to the public includes markets, roadside stalls and bartering. Transforming, or processing, includes making juice, jams and pickles and in Victoria it includes drying and roasting. It does not include peeling, cutting, freezing, grinding or milling. States vary in their interpretation of these requirements, so it's important to talk to your local council, or state food safety authority, about what they require. Most importantly, if your buyers demand that you register as a food business, it would be wise to do so.

Are native plant foods naturally safe?

Some plants are known to be naturally poisonous, e.g. green potatoes and some fungi. Some native plants are poisonous e.g. fruit of some *Solanum* and *Dianella* species, bracken fern tips and at least two *Acacia* species. Some require processing or cooking to be safe (e.g. some nuts). Others are tolerated in small amounts but cause adverse reactions in large amounts (e.g. unripe fruits). It is important to know the identity of the plants you are using as food and that the plant is safe. There is a range of books and references on the safety of native plant foods (see below). Some plants are prohibited for food use by the FSANZ Standard 1.4.4. These include some *Solanum* species (nightshade, kangaroo apple), *Pteridium* (bracken fern) and *Melia azedarach* (white cedar). If in doubt about safety don't use the plant as food!

Novel foods

Novel foods are new foods which have not been traditionally used in Australia or New Zealand and for which there is insufficient knowledge in the broad community to ensure safe use. Those foods are required to pass a food safety assessment by FSANZ. This can lead to foods being approved as regular foods, as novel foods (e.g. with special information on the label), or being prohibited. FSANZ is presently considering the safety issues involved in native plant foods and how to deal with them. There may be advantages in obtaining formal assessments and approvals if your buyers require it.

What can cause food to be unsafe?

The main safety risks are contamination with microbes that cause human diseases, chemicals such as agricultural and cleaning chemicals and physical items such as glass, stones and band-aids.

How do you keep food safe?

It is important to avoid contamination with disease microbes from infected workers, animal manure, contaminated water or soil, or unclean equipment. Good personal hygiene, cleaning and sanitising programs are essential. Registered agricultural chemicals should be used according to the label. Care should be taken to avoid contamination of food by cleaning chemicals and physical items. A simple, food safety program/plan can help the business achieve these things.

If there is any risk of food being contaminated with disease microbes, it is critical that the microbes are either killed by cooking, or inhibited from multiplying by keeping the food cold (less than 5°C). If contaminated food is left in conditions where disease microbes can multiply, for example where there is moisture from sauces and at moderate temperatures such as room temperature, then there is a high risk of food poisoning. It's also important to avoid contaminating clean food, with potentially contaminated food such as dirty herbs.

What you need to do about food safety?

- Find out as much as you can about what is required of you and what you can do. See “Further information” below.
- Talk to the local council Environmental Health Officer
- Talk to your buyers
- Register as a food business if necessary - with your local council
- Attend a training course to obtain the required skills and knowledge
- Develop a food safety program (required of food businesses in Victoria)
- Join a commercial food safety scheme if necessary
- Promote your food as safe!

Further information

Web sites

- Food Standards Australia and New Zealand (FSANZ): http://www.foodstandards.gov.au
- Food Safety Victoria: http://www.health.vic.gov.au/foodsafety/
- CSIRO's native plant food web site: http://www.cse.csiro.au/research/nativefoods/

RIRDC publications

- 2001 "Food Safety of Australian Plant Bushfoods" by M and E Hegarty and R Wills, Pub. No. 01/28 (http://www.rirdc.gov.au/reports/NPP/01-28.pdf)

Other publications

- "Food Safety Standards", Chapter 3 of the Australia NZ Food Standards Code (http://www.foodstandards.gov.au/thecode/foodstandardscode.cfm#_three)
- "Prohibited and restricted plants and fungi", FSANZ Standard 1.4.4 (http://www.foodstandards.gov.au/_srcfiles/Standard_1_4_4_Prohib_plants_v74.pdf)
- "Guidelines for On-Farm Food Safety for Fresh Produce", Agriculture Fisheries and Forestry –Australia, 2004. http://www.daff.gov.au/agriculture-food/food/publications/farm-food-safety
  Or from Horticulture Australia at: http://www.horticutlure.com.au
  Or from Richard Bennett, Email: richard.bennett@horticulture.com.au
  Phone (03) 5825 3753.
- Faragher, John, 2004 "Food safety issues for the Australian native plant food and herb industries" in RIRDC Pub. No. 04/059 2004. (http://www.rirdc.gov.au/reports/EOI/04-059.pdf
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Contact

- Your local council Environmental Health Officer
- Food Standards Australia and New Zealand (FSANZ):
  Email: advice@foodstandards.gov.au Phone: 1300 652 166
- Food Safety Victoria: Phone 1300 364 352
- Department of Primary Industries Victoria, Dr Robert Premier, Phone (03) 9210 9225, Email: Robert.Premier@dpi.vic.gov.au

Acknowledgments

John Faragher is acknowledged as the original author of this Agriculture Note.

This project is jointly funded by DPI and the Rural Industries R&D Corporation (RIRDC).