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REVIEW

Food safety and standard of Australian native plants

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Abstract

Information on the nutritive prospective of selected Australian bush plants has been described including bush tomato, Kakadu plum, wattle seed, Davidson plum, wild lime, lemon myrtle, as they are currently used as food ingredients in processed products. It was found that bioactive compounds such as vitamin C and lycopene are available in these plants; however, some work has reported evidence of toxic compounds in these plants. Recommendation to eliminate or reduce the toxicity has been made for each of the plants. Food standard practices throughout Australian native product (sauces) manufacturing have been formulated in order to make recommendation to producers and processors to enhance ingredient quality and stability as well as to provide the Australian native food industry with information on the positive nutritional benefits of these native fruits and seeds and to assist in ongoing promotional activities. This review suggests that there are two aspects to food safety issues in the use of Australian native plants. First, finding ways to eliminate toxic compounds is essential. Second, during processing of the products, the critical control points need to be carefully tested in order to protect the products from contamination.

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Introduction

The term 'Bush food' is new in a highly competitive market, with consumers generally having no confidence in consuming such products. Moreover, lack of evidence of safety may limit the market for commercial bush food products. The two main food safety issues for the industry are (a) the presence of anti-nutritive compounds in raw material (Hegarty *et al*., 2001) and (b) the potential for food poisoning outbreaks because of unsafe food handling practices during packaging storage and processing. In line with 'primary food production' of the Australia New Zealand Food Standards Code (FSANZ, 2005), the food industry must comply with food safety practices to ensure that food does not become unsafe or unsuitable.

As yet there are no food safety standards developed for native food plants or for mainstream fruits and vegetables within the Australia New Zealand Food Standards Code. However, most primary producers are required to comply with a food safety plan by the companies they supply. These plans are based on HACCP in which potential hazards are identified and monitoring and control measures are put in place to minimize these hazards (Alli, 2004).

This article reviews the potential of Australian native food plants as functional ingredient in commercially processed products in terms of bioactive and toxic compounds (crops) and food processing safety (food) in compliance with FSANZ. The general benefits are to provide the industry with data to promote native Australian ingredients in local

and export markets in a way which complies with the requirements of the Australia New Zealand Food Standards Code.

Commercially significant Australian native food plants

Bush tomatoes, raisins, sultanas (*Solanum* spp.)

The fresh fruit is about 13–15 mm round, red or brown in colour with a taste similar to dried raisin (Figure 1a). Dried fruits are usually ground into fine or coarse particles depending on the application (Salvin *et al.*, 2005). The information on post-harvest practices is not well documented. They grow well in arid regions, extending from north-eastern Western Australia through the Northern Territory and South Australia to western Queensland and north-western New South Wales. Isaacs (1991) indicated that many native species of *Solanum* are toxic, with some containing the toxic alkaloid solanine. The fruit of these species are very similar to small green tomatoes; however, only two *Solanum* are safe to eat by Australian aboriginal people: Kampurarpa, desert raisin (*Solanum centrale* or *Solanum ellipticum*) and Ngaru, desert tomato (*Solanum petrophilum*) (Isaacs, 1991). Fruits of Kampurarpa ripen during summer and Ngaru fruit starts to ripen at the middle of the year. Kampurarpa desert raisins are ground with water on a flat stone with a hard grinding stone. The brown seedy mush is then formed into a ball shape which is dried by exposing to the sun. The Ngaru are eaten raw or are sometimes dried by keeping next to the fire. To preserve them, they are strung on sticks and kept dried for long periods (Isaacs, 1991).

S centrale is commercially used. It is usually hand harvested mainly by older Aboriginal women in various areas of the Northern Territory. Therefore, availability is dependent on rains. Bush tomatoes are mainly used as an ingredient in sauces and chutneys, usually together with ordinary tomatoes.

The dried ground fruits are used as flavouring or spice in savoury dishes. Only two types of bush tomato were investigated for bioactive compounds: *S. centrale* and *Solanum chippendalei* (Brand Miller *et al.*, 1993). It was found that dried bush tomato contained 17 mg/100g (*S. centrale*) and 35 mg/100g (*S. chippendalei*) of vitamin C.

Kakadu plum, arangal, madoorr, gubinge, kabinyn, gabiny (*Terminalia* spp.)

Fruit is pale green, olive-sized, with a stone that clings to the flesh similar to mango (Figure 1b). It is usually found in

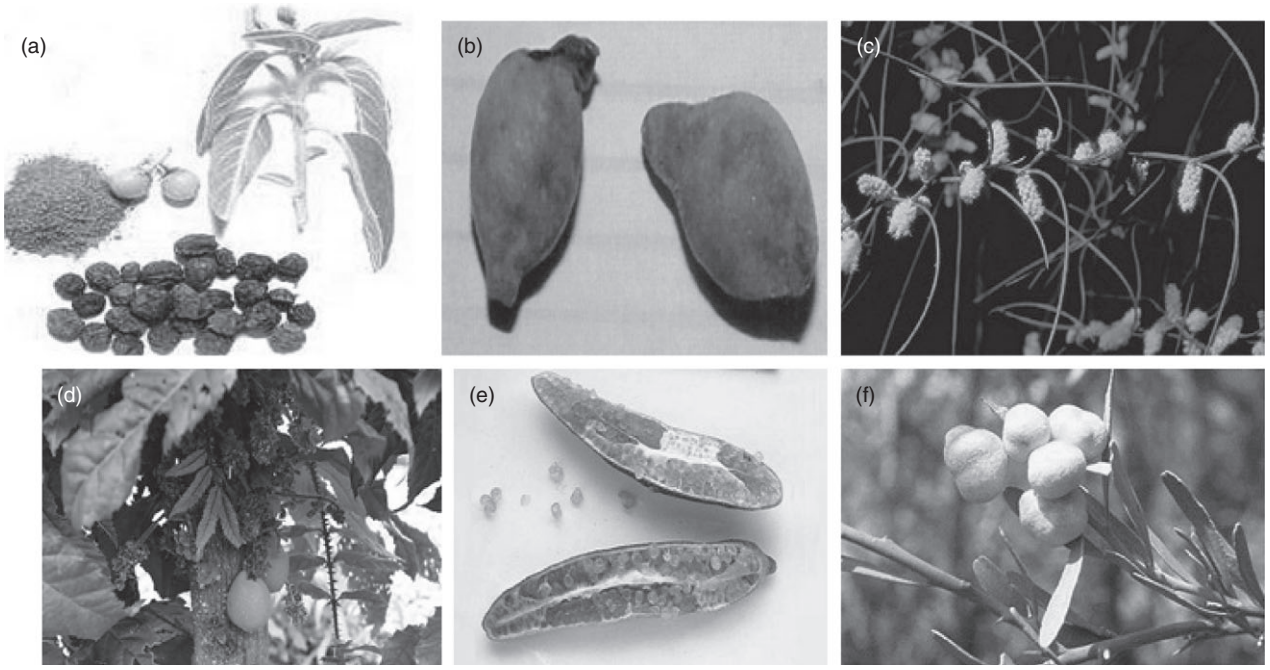

Figure 1 Australian native food plants – (a) *Solanum* spp.; (b) *Terminalia* spp.; (c) *Acacia victoriae*; (d) *Davidsonia pruriens*; (e) *Microcitrus australasica*; (f) *Microcitrus australis*.
Source: Australian Native Plant Society (ANPS).

the Northern Territory and Western Australia (Ahmed & Johnson, 2000). There are about 30 species of *Terminalia* in Australia (Hegarty *et al.*, 2001). Although most of them are safe to eat, a toxic and unpleasant compound may be found in some parts of the plant such as leaves and bark. Kakadu plum is not only eaten fresh, but its juice is also a traditional food for aboriginal people. To prepare the refreshing drink, the fresh or dried fruit is soaked in water for a couple of days. Gums formed by some species of *Terminalia* including Kakadu plum can be eaten directly, or cooked in sand or ground to a powder after soaking for edible jelly (Bunenyerra, cited in Hegarty *et al.*, 2001).

Fruits are sold frozen. The whole fruits are boiled with water to make an intermediate raw material for commercial sauces. Kakadu plum (*Terminalia* spp.) has a high vitamin C content which ranges from 1000 to 3000 mg per 100 g (Brand Miller *et al.*, 1993). Due to its high vitamin C content Kakadu plum has been recommended to have a potential as an edible fruit (Ahmed & Johnson, 2000).

Wattle seed, wattles (*Acacia victoriae*)

Acacia species are shrubs or trees (Figure 1c). The seeds of several Acacia species are used by Aborigines for food (Ahmed & Johnson, 2000). Nearly 1000 species of Acacia can be found in Australia. They grow well along the coast of the continent, from the north of Queensland to Victoria.

It contains the compound 'tannin' which has made it famous since colonial times. The aboriginal method for removing the seed coat is to parch, grind and winnow (Hegarty *et al.*, 2001). Seeds are ground to flour which is then baked as a damper. Green seeds are also eaten like peas. *Acacia victoriae* is still hand harvested. The wattle seeds are used whole as an ingredient in cakes and ice cream, or ground into a powder for pastries, breads and coffee. Although Acacia species are used for flavouring or coffee substitutes (Ahmed & Johnson, 2000), no record of its bioactive components has been found. Only dietary fibre was reported as about 44% of the edible portion (Brand Miller *et al.*, 1993).

Davidson plum (*Davidsonia pruriens*)

The ripe fruits of *Davidsonia pruriens* are purple or flesh red and have a very sour and tangy taste (Figure 1d). Producing plum-like fruit, 3–6 cm diameter (19–20 g), the small trees naturally grow in the sub-tropical rainforest of northern New South Wales and north-east Queensland (Hegarty *et al.*, 2001). Only one species was recorded as eaten by native people, *D. pruriens* (Harwrick, 1994). Low (1991) gave an example of the use of Davidson plum, that it must be stewed in sugar to be properly appreciated.

Because of its attractive purple colour, the flesh is also used as food colouring. Fruits are used to make jam, sauces and wine, and it also provides colouring and flavouring in ice creams and drinks. In 1977, Wilkins and Bohm reported rough qualitative data on flavonoids in Davidson plum (Wilkins & Bohm, 1977). It was found that epicatechin gallate and epigallocatechin gallate existed in Davidson plum, along with gallic acid and anthocyanin, making the Davidson plum an important source of bioactive compounds.

Wild limes (*Microcitrus* spp.)

Micro citrus are members of the sub-family Aurantioidea, of the family Rutaceae. The genus *Microcitrus* has just recently been named due to their very small juvenile leaves and the minute size of their flowers (Birmingham, 1998). There are five species of *Microcitrus* found in Australia. The most commonly used species are as follows.

*Finger lime (*Microcitrus australasica*)*

The shape of the fruit is cylindric-fusi form or finger shaped (Figure 1e). The skin colours of the finger lime range between crimson, blood-red, purple, black, yellow and green. The flesh also varies in colour from green to red. The natural distribution of finger lime is from the Richmond River in northern New South Wales to Mount Tamborine in Queensland. It is found growing in sub-tropical rainforests under the shade with an average height of 6 m, in a range of soil types.

*Round lime (*Microcitrus australis*)*

This bush tree bears rounded fruits that are 2.5–8 cm in diameter (Figure 1f). The rough greenish-yellow skin of the fruit is very thick (up to 7 mm). It is endemic to south-eastern Queensland from Beenleigh to Gympie, in low land sub-tropical rainforest.

*Desert lime (*Eremocitrus glauca*)*

The fruit is round to oblate in shape and approximately 2 cm in diameter, and approximately 1–3 g in weight. The skin is

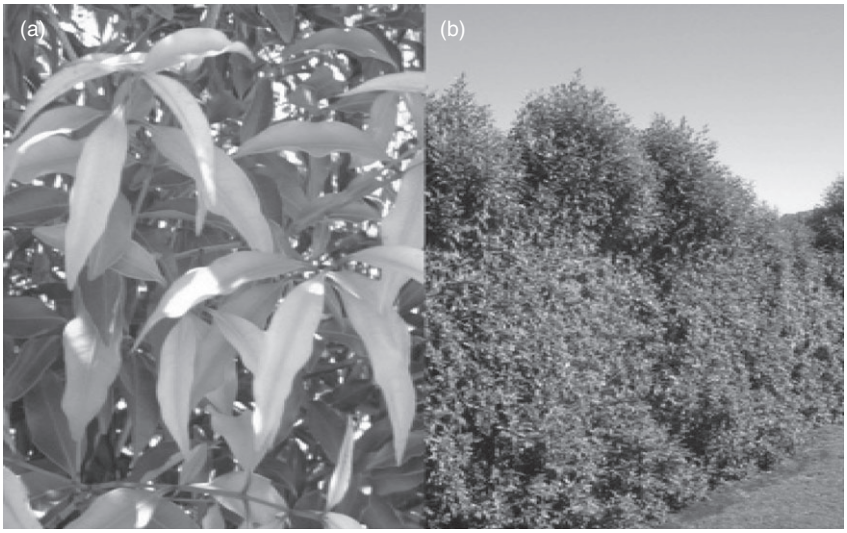

Figure 2 Lemon myrtle leaves (a) and commercial lemon myrtle farm in Queensland Australia (b).

light yellow-green on maturity and contains a large oil gland. The natural distribution of this species is the semi-arid regions of eastern Australia, from Rockhampton to Longreach in Queensland, south to Dubbo in central New South Wales and west to Quorm, in the Flinders ranges of South Australia.

Low (1991) stated that only a few records exist about how Aboriginals used these native citrus species. However, the new colonists exploited them as a drink and for use in marmalades. The fruits are dried, ground into particles and are used in the production of commercial sauces. Frozen fruits are also sold commercially.

Fresh fruits of finger lime as well as desert lime can be used as a garnish and as food processing ingredients in foods such as salad dressings, sauces, marmalades, desserts, jellies or pastries. The skin of the fruit can be extracted for essential oils (Birmingham, 1998). Only the finger lime has been tested for its vitamin C content (Brand Miller *et al.*, 1993). It was found that the finger lime has about 100 mg/100g vitamin C content.

*Lemon myrtle (*Backhousia citriodora F.Muell*)*

The green long leaves of lemon myrtle contain essential oil, mainly citral (Figure 2a). This species grows well in the rainforests of coastal Queensland from around Brisbane to Mackay. Essential oils from the leaves provide the aroma and flavour and as such the leaves are used in foods and beverages. Lemon myrtle contains 90–97% citral which is considered to have a 'sweet' citral fragrance and taste. Only limited records are available, although the pleasant aroma of the leaves would have been known to Aboriginals.

Dried leaves are ground into different particle sizes depending on their application. The leaves are used as tea and as ingredients for soap, lotion and as food ingredients to make cake, etc. The leaves are also extracted for volatile oil for flavouring and colouring. The leaves and the flowers give a strong lemon flavour. Little research has been done into the bioactive compounds (Ahmed & Johnson, 2000).

The anti-nutritive constituents were studied for each commercial native plant (Table 1). The recommendation to minimize the potentially hazardous food was made to industry or communities where the native plants have been grown (Tables 2 and 3).

Selected bush food products

The following products are produced by Robins Foods Pty. Ltd. (Robin Foods, 2006; Figure 3).

Food safety of Australian native plant foods

In addition to the need to maintain the microbiological safety of native food products, the chemical food safety of these products is of increasing importance. The traditional uses of these plants incorporated techniques to

Table 1 Nutritional studies, the anti-nutritive compounds and the recommendations to maintain nutritional activity and minimize the potentially hazardous food of commercial native plants

Name (scientific name)	Nutritional study	Anti-nutritive compounds	Recommendation to maintain nutritional activities and minimize the potentially hazardous food
Bush tomato (*Solanum* spp.)	High water-soluble vitamin and mineral; dietary fibre, low fat and calories; good source of vitamin A, C and lycopene (in general)[1]	Unspecified alkaloid has been found in fruits and leaves.[2] Alkaloid solasodine gives bitter test.	Because the concentration of poisonous alkaloid was somewhat less in ripe than green fruits, the fruits need to be harvested when ripe or become red.[2] Freeze drying prior to storage may preserve the vitamin content.
Kakadu plum (*Terminalia* spp.)	High vitamin C content and dietary fibre[1]	No evidence of toxin was found in flesh and kernels. However, the leaves are known to be quite toxic.[2]	Freeze drying prior to storage may preserve the vitamin content.
Wattles, Wattle seed (*Acacia* spp.)	High in fatty acid composition, has low glycaemic index and anti-tumour activity[2]	Contains protease inhibitor which interfere with the ability of trypsin and chymotrysin, promoting hay fever and rhinitis causing some allergic symptoms during harvest.[2]	Considerable heating is required. Wearing filter masks is recommended to prevent allergic reaction during gathering.[2]
Davidson plums (*Davidsonia* spp.)	Water-soluble vitamin and mineral, dietary fibre	Found cyanogens in leaves and steam.[2] Eating unripe fruits leads to vomiting and epigastric pain. Irritant hairs cover the fruits.	Avoid using leaves, steam and raw fruit. Rubbing off the surface or washing the fruit with running water can remove the irritant hair.[2]
Wild lime (*Citrus australis*)	Water-soluble vitamin and mineral, essential oil	No adverse effects or harmful constituents of the fruits appear to have been recorded or suspected.[2]	Freeze drying prior to storage may preserve the vitamin content.
Lemon myrtles (*Backhousia citriodora* F. Muell)	Essential oil	Citral, which might increase intra-ocular pressure and so promote glaucoma, skin irritation from essential oil.[2]	One percent citral using in foods and beverages has no adverse effect.

[1]Fauconier & McDonald (2001).
[2]Hegarty *et al.* (2001).

reduce or eliminate any naturally occurring toxins. However, with the increasing introduction of native plant foods into the mainstream food supply, there is a need to have a full understanding of the toxins that are or could be associated with native plant foods. This will allow more informed selection of plants and assist in marketing to the export market which has already been successful in terms of traditional plant-based products (Hegarty *et al.*, 2001).

Hegarty *et al.* (2001) carried out a toxicological examination of Australian bush plants and chemical analyses were carried out to determine the presence/absence and/or concentration of some compounds with known toxic properties. They described the possible causes of adverse effects from plant-derived foods:

- Chewing, eating or misuse of some part of the plant
- Allergic reactions and adverse effects from skin or eye contact, or inhalation of irritant substances
- Biological contamination (e.g. bacteria such as *Escherichia coli*, or fungal pathogens such as aflatoxin in stored seeds and flour
- Mistakes in identification, including the use of mixtures of species, some of which may have toxic properties (e.g. some *Solanum* species which closely resemble edible species)
- Chemical pollutants (e.g. pesticides, herbicides and heavy metals)

Plants are composed of two main forms of compounds. The primary compounds such as protein, carbohydrates and fat

Table 2 Food standard practices during processing of Bush tomato sauce (ketchup, chutney)

Handling of food	Food standard practices
Primary food production	
Bush tomatoes	Fruits (10 to 15 mm) turn from green to yellow when ripe. The ripe fruits are picked to minimize the poisonous alkaloid.
Harvest	Ripe fruits are crisp dried in the sun (on or off the bush) or dried on the plant to resemble a raisin. Freeze dry prior to grinding to maintain the nutritional content.
Dry, grind	Store in double layer plastic seal top to prevent oxidation reaction; exclude light and control in cool temperature during transport.
Transport	Name, address of vender, manufacturer or packer should be detailed on the containers.
Food production	
Receipt of raw materials	Take all practical measurements to ensure that the industry only accepts food that is protected from the likelihood of contamination, e.g. physical hazard: metal pieces from equipment, metallic cleaning tool which can be eliminated by using magnets or detected by metal detector, wood pieces from wood structures and wood pallets, stones which may be incorporated during harvesting (Alli, 2004).
Storage in warehouse (prior to processing)	Store under temperature control (cool temperature), ensure that the food is protected from the likelihood of contamination and under conditions which will not adversely affect the safety and suitability of the food.
Weighing of ingredients (excess bush tomato stored in cool room)	Ensure that other ingredients are safe and suitable, e.g. fresh tomatoes, dried herbs and sugar.
Mixing of all ingredients in tank (1 batch = 700 L)	The excess dried bush tomato is sealed and kept in cold room.
Boiling of ingredients for approximately 5 min	Ensure that the time for cooking is enough to achieve the microbiological safety of food. Total solid should be checked to ensure that the sauce is in standard.
Transfer to holding tank	
Holding at 95 °C for 30–40 min	Monitor colour if run is stopped and product is held for longer than this time.
Hot filling into jars or bottles at 95 °C	Temperature should be checked.
Pasteurize filled jars in tunnel using steam, 95 °C for 20 min	
Cooling in tunnel using cold water, 20 min (product cold at end of tunnel)	Ensure that the cooling process used will not adversely affect the microbiological safety of the food. To cool down the food from 60 °C to 21 °C, the process needs to be carried out within 2 hours.
Food packing	
Pack in jars or bottles	Ensure that packing material is fit for its intended use, only using material which is not likely to cause food contamination. The packing area is clean to ensure food is not contaminated during packing process.
Food transportation	
Transport by car for domestic proposes, ship or plan for exported products	Ensure that products are protected from the likelihood of contamination. The transport vehicles should be inspected before products are loaded. The inspection should cover the sanitary condition, the vehicles' accessories, e.g. floor, walls and temperature control (Alli, 2004). During delivery, the temperature should meet requirements and should be recorded. Lock-and-seal containers should be sealed through transporting.
Food recall	
The use of a code system for recalling of unsafe food	The system needs to be recorded and explained to an authorized officer.
Food disposal	
Food disposal is kept away from operating unit	

are the plant's essential structures which are involved in its translocation, storage and respiratory system. The secondary compounds have many other functions, some of which have yet to be determined. One of the functions is the protection of the plants from herbivores which are known as anti-nutritional compounds. Tannin, for example, is bitter tasting and also binds to and hinders absorption of nutritive compounds. Some of the secondary compounds are detailed next.

Table 3 Food standard practices during processing of Kakadu plum chilli sauce

Handling of food	Food standard practices
Primary food production	
Kakadu plum	
Harvest	Ripe fruits are collected and chilled as soon as possible to remove field heat. The fruits are stored in a commercial freezer at –18 °C.
Making filtrate Kakadu plum	The whole fruits (12 kg) are boiled with 150 kg of water for 30 min to discard stone and skin.
Food production	
Receipt of raw materials	Take all practical measurements to ensure that the industry only accepts food that is protected from the likelihood of contamination, e.g. physical hazard: metal pieces from equipment, metallic cleaning tool which can be eliminated by using magnets or detected by metal detector, wood pieces from wood structures and wood pallets, stones which may be incorporated during harvesting (Alli, 2004).
Storage in warehouse (prior to processing)	Store under temperature control (–18 °C), ensure that the food is protected from the likelihood of contamination and under conditions which will not adversely affect the safety and suitability of the food.
Weighing of ingredients	Ensure that other ingredients are safe and suitable, e.g. chilli, dried herbs and sugar.
Mixing of all ingredients in tank (1 batch = 700 L)	The excess filtrate is discarded.
Boiling of ingredients for approximately 5 min	Ensure that the time for cooking is enough to achieve the microbiological safety of food. Total solid is checked to ensure that the sauce (36–58 Brix) is in standard.
Transfer to holding tank	Monitor colour if run is stopped and product is held for longer than this time.
Holding at 95 °C for 30–40 min	Temperature should be checked.
Hot filling into jars or bottles at 95 °C	
Pasteurize filled jars in tunnel using steam, 95 °C for 20 min	Ensure that the cooling process used will not adversely affect the microbiological safety of the food. To cool down the food from 60 °C to 21 °C, the process needs to be carried out within 2 hours.
Cooling in tunnel using cold water, 20 min (product cold at end of tunnel)	
Food packing	
Pack in jars or bottles	Ensure that packing material is fit for its intended use; only use material which is not likely to cause food contamination. The packing area is clean to ensure food is not contaminated during packing process.
Food transportation	
Transport by car for domestic proposes, ship or plan for exported products	Ensure that products are protected from the likelihood of contamination. The transport vehicles should be inspected before products are loaded. The inspection should cover the sanitary condition, the vehicles' accessories, e.g. floor, walls and temperature control (Alli, 2004). During delivery, the temperature should meet requirements and should be recorded. Lock-and-seal containers should be sealed through transporting.
Food recall	
The use of a code system for recalling of unsafe food	The system needs to be recorded and explained to the authorized officer.
Food disposal	
Food disposal is kept away from operating unit	

Cyanogenic glucoside (cyanogens, cyanogenic glycosides)

Cyanogenic glucosides are found in wild plants which are attractive to animals and insect herbivores such as wheat, maize, oats, peanut and cassava (Hegarty *et al.*, 2001). The toxin, hydrogen cyanide, is released when the plant tissue is damaged, for example damage of the cell wall by chewing, grinding, cooking and freezing. Also, decomposition of the glucoside compounds can release



Bush tomato ketchup

Description:
• Brown-red colour
• Containing tomato chilli seeds and small flecks of herbs and onion pieces
• Free-flowing viscosity and homogenous
Ingredients:
Tomatoes, apples, cane sugar, bush tomatoes (8%), onion, vinegar, chilli, salt, garlic, mountain pepper, spices, and vegetable gum

Bush tomato chutney

Description:
• Deep red/brown colour
• Containing tomato chilli seeds
• Thick , viscous and homogenous
Ingredients:
Tomatoes, apple, cane, sugar, onion, bush tomatoes (8%), onion, vinegar, chilli, salt, spices

Wild lime, chilli ginger sauce

Description:
• Light brown/orange colour
• Containing tomato/chilli seeds, small flakes of herbs
• Free- flowing viscosity homogenous
Ingredients: Cane sugar, water, wild lime (10%), vinegar, ginger (2%), chilli (2%) salt, spices

Figure 3 Bush food products.
Source: http://www.robins.net.au

toxic gas. Humans can consume small amount of cyanic acid (30–35 mg per day), but twice this amount is lethal for a 70 kg human. The way to minimize the amount of cyanide is to damage the cell wall of the plants and release the free cyanide harmlessly to the air or leach the compounds out with water.

Compounds in essential oils

Although essential oils are important for use as flavourants and aromatics in food and beverages, perfumes, and cosmetics, only very few components are permitted as additives for use in foods in small quantities. In such cases, the restriction is usually because of the suspected association with carcinogenesis as a result of metabolic processes after absorption. Only small amounts are permitted in common food and spices (Hegarty *et al.*, 2001).

Lectins

Lectins are found in the active form in the mature seeds, tubers and sap of many common food plants, particularly the legume family. Lectins can damage the walls of red blood cells, and induce clumping. They are not very readily absorbed in the digestive tract, but can in some cases damage cell walls and interfere with nutrient uptake and growth. However, lectins are deteriorated by cooking (Hegarty *et al.*, 2001).

Oxalates

Oxalates are present in the form of soluble salts (potassium or sodium oxalate, or the insoluble from, calcium oxalate). They can be found within the cells or between the cells of rhubarb, spinach and unripe tomatoes, which contain a high level of oxalates. Calcium oxalates are excreted in urine in the form of small, insoluble calcium oxalate crystals. However, high consumption can lead to the accumulation of calcium within the urinary tract and a reduction in the availability of dietary calcium.

Trypsin inhibitors

Trypsin inhibitors are proteins that inhibit the action of the digestive enzyme trypsin, which is unable to break down and release amino acids to the body. Trypsin inhibitors can be found in legume seeds and can be inactivated by heating.

Chemical and/or mechanical and allergenic irritants

The sensitive tissues of the human body (e.g. eyes, lips, mouth and throat) may irritate when in contact with the parts of some plants. Inhalation of essential oils should be avoided by covering the nose with a mask. Skin and internal tissues can also be affected when contact is made directly with the skin.

Allergens in foods are proteins or glycoproteins, with similar molecular weights (4 or 10–40 kDa). Allergies decrease with age; however, peanut allergies are seldom outgrown.

Although information about toxicity in Australian native plants is available, information on food safety practices concerning these toxic compounds has yet to be documented and provided to food industry partners.

Conclusion

There is increasing interest in antioxidants or bioactive compounds. Additionally, consumers are interested in consuming fresh edible plants and fruits that are good sources of bioactive compounds. Native plants of Australia have been eaten by aboriginal people for many years and they play an important role in Australian cuisines. Various food industries are also interested in combining their commercial products, e.g. sauces and jams with the native plants, believing that they contain high amounts of bioactive compounds. Although some native plants have been analysed for their

bioactive compounds, some research needs to be repeated because it is too old and some plants need to be investigated because they have not been researched before.

To become finished products, native plants require a number of processing steps, i.e. post-harvest and handling, processing and storage. Each step is likely to have an effect on the bioactive components. However, little is known about how much bioactive content survives in the finished products of native food. Bush tomato is recommended to be collected ripe to minimize the effect of alkaloids. Adequate heating is to be applied to inhibit protease inhibitor in wattle and wattle seeds. Kakadu plum and Davidson plum are both known to be toxic when the stem and leaves are eaten. Freeze drying is employed to preserve nutritive compounds in native plants.

For the processing of commercial products, it is strongly recommended to follow the Australia New Zealand Food Standards Code. Fruits must be harvested at the right stage, i.e. ripe and dried fruit for bush tomato and ripe fruit for Kakadu plum, in order to minimize the toxic effect. Careful post-harvest storage and handling of each of the fruits are required in order to maintain the nutritive compounds. Correct freezing and cooling are essential in addition to the storage conditions applied. During processing, ensuring that there is no contamination from external sources is essential. Regular temperature checks are a requirement, regardless of storage conditions.

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