Frozen Culinary Herbs

Australian & International Market Analyses

A report for the Rural Industries Research Development Corporation

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Asian Markets Research

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Foreword

Culinary herbs consumption in Australia has traditionally been based on the home market and the food service sector. In recent years there has been strong growth in total herb consumption. Supplies have come from both Australian production as well as imports. Within the home market sector, there has been great interest in "ethnic" food. This has oscillated from European styles to Asian cuisine and back to Mediterranean food. With each trend there has been a renewed interest in culinary herbs, both temperate and sub-tropical ones.

Within the retail sector there has been a marked concentration with the major chains seeking to differentiate themselves by providing a more diverse range of products. Culinary herbs are one aspect of this. However the greatest growth has been in the food service sector with its requirements for non-price differentiated products. Culinary herbs are a critical aspect of this.

Common to these trends has been the issue of convenience. More and more foods are appearing in instant or at least partly-prepared forms, and are presented as "meal solutions". Within the all-important food service sector, portion control and food safety are additional imperatives.

Frozen culinary herbs appear to fit these critical criteria.

The project sought to establish the size of the different market sectors that use frozen culinary herb both in Australia and overseas and to assess the market prospects for the domestic industry. Emphasis was to be placed on specific culinary herbs and the preferred form of consumption.

An assessment of the overall market prospects for frozen culinary herbs as well as for specific herbs will act as a platform for further decision-making in the potential development of the Australian culinary herb industry.

This project was funded from RIRDC Core Funds which are provided by the Federal Government and is an addition to RIRDC's diverse range of over 600 research publications. It 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 that have commercial potential for Australia.

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Executive Summary

Culinary herbs have traditionally been consumed in Australia in the fresh, dried, dehydrated, chopped / minced, ground / powdered, and canned forms. The main outlets for herbs have been in the retail, food service, fast food, and food manufacturing sectors.

Demand has been met by local and imported products. Australia has supplied culinary herbs in the traditional forms. In response to the expanding and diversifying market, Australia is now supplying culinary herbs in the paste, bottled, freeze-dried, and frozen forms. Nevertheless, imports continue to occur.

A survey was undertaken of each of the major sectors. That revealed that the issues that are important to the four sectors are convenience and food safety. HACCP requirements are having an increasingly major impact on the form in which food is delivered through the chain. In addition, the catering sub-sector and the food manufacturing sector were extremely cost sensitive and any product that could provide portion control had an advantage.

Culinary herbs presented in the frozen form seem to meet these criteria.

The study was able to establish that there is a market for frozen herbs because product is currently imported. However, it was unable to quantify the exact volume as there are no official statistics and the importers concerned were reluctant to provide data.

The study showed that the market prospects for frozen culinary herbs are mixed.

In the high-end market represented by four and five star restaurants and even the smaller specialist restaurants, there is little demand for frozen culinary herbs. This is because their chef's training and whole approach is that of "fresh is best".

There are prospects within the retail sector as a stand-alone product. However, to be successful, producers of culinary herbs must be conscious that they have to comply with a number of principles that are common with the introduction of nearly all new products. Specific issues to be addressed include the need to offer a range of at least five and preferably ten, frozen culinary herbs, and undertaking cooperative advertising with the chains as a means of educating the consumer. Given that the bigger retail chains have defined policies relating to how long a new product has to make its mark, a detailed program encompassing supply strategy, pricing, promotion, and even product development must be in place before the chains are approached. However, the frozen sector must be aware that since the study was initiated, a major retailer has introduced a range of pre-packed fresh herbs. Consumer response has been encouraging, especially to the size of the packs and the price range.

The food manufacturing sector holds the greatest promise as it leads to the incorporation of frozen culinary herbs into other products and it is the "other products" that have the potential for expansion. "Other products" are both physical products such as the ready-to-eat meals and par-processed foods as well as the service products associated with the expansion in the catering sector. As this sector is extremely price sensitive, the price, quantity, and quality of the frozen product must be regular, reliable, and repeatable over a twelve month period. However suppliers of frozen culinary herbs have to convince chefs that their products are not only better than the competing fresh and dried herbs but are demonstratively better. They have to demonstrate the twin elements of superiority in organoleptic attributes and economic advantages.

Two issues over-reach all the market sectors for frozen culinary herbs. First, there is a demand for organic product. However, producers should not expect a high premium for being organic. Second, considerable effort needs to be given to the packaging of the product. Overseas, the poor experience with packaging that sought to develop the products' attributes of pourability and capable of being repeatedly thawed and frozen was a major element in retailers withdrawing product from their shelves.

Product

Herbs are most remarkable. Some consider all useful plants as herbs. Equally expansive, some consider that "herbs are plants that connect us to the past, present and future" (Bremness 1994).

This report is no where near as generous. It initially defined "herbs" as edible plants. After all, it just over 100 years ago that vegetables were commonly defined as "hot herbs". In doing so, the Pandora Box of "medicinal herbs" was opened. Research for the report took into account books such as ***The Chinese system of using foods to stay young*** (Lu, 1996) and ***The Illustrated Chinese Materia Medica*** (Yen 1992). All of these suggested the dividing line between food for enjoyment and food for health was a very thin one.

A more narrow definition was attempted: "plants associated with enhancing food". This proved to be deceptively wide. One source noted "3,000 herbs and spices", a list that subsequently got narrowed to about 150 (Parker 1999). The International Spice Group defines "spice" as "any of the flavoured or aromatic substances of vegetables origin obtained from tropical or other plants, commonly used as condiments or employed for other purposes on account of their fragrance, preservative or medicinal qualities. They include pepper, pimento, vanilla, cinnamon and cassia, cloves, turmeric, spice seeds (anise, badian, caraway, coriander, cumin, dill, fennel, fenugreek, juniper etc), saffron, ***laurel leaves, spice herbs (sage, thyme, oregano etc***.)…." (my italics).

The term "culinary herbs" is more clear-cut. One source gave a list of 125 "culinary herbs" (CNRC 1999). Even this list produced some challenges as some products have multiple uses: when is ginger a vegetable, spice or herb? when is garlic a vegetable, spice or herb? when is fennel a vegetable or a herb?? Similarly, some "herbs" produce a seed that is clearly known as a spice: coriander, dill. In the import data of a number of countries statistics pertaining to coriander and dill clearly refer to the "spice seed" attributes rather than their herb attributes.

Priority culinary herbs

It was determined that a "culinary herb" in terms of this project were the leafy parts of the following 22 plants:

Basil	Bay Leaves	Chervil
Chives	Coriander/cilantro	Curry Leaves
Dill	Fennel	Fenugreek
Kaffir limes leaves	Lemongrass	Marjoram
Mint	Oregano	Parsley
Rosemary	Sage	Saffron
Savory	Sorrel	Tarragon
Thyme		

This list is more in keeping with that used by Lopresti and Tomkin (1997) in their work on the postharvest handling and packaging of fresh herbs.

Appendix 1 contains a summary of available marketing data in Australia and internationally of the priority 22 culinary herbs. The data is not exhaustive nor equally available for all 22 plants. The Appendix also contains notes on some products[1] variously categorised as "herbs and spices".

[1] Anise, cress and watercress, caraway, mustard, and star anise.

European and Asian herbs

Australia has always had "European" culinary herbs, that is bay leaves, marjoram, mint, oregano, parsley, rosemary, sage, tarragon, and thyme. In recent years, there has been an expansion into "Asian" herbs - basil espec ially the type known as "Asian basil", coriander, curry leaves, kaffir lime leaves, lemongrass, and Vietnamese mint. The increase in "Asian" herbs reflects the surge in popularity of Asian food. It is noted that with the boom in the 'café' society there has been a resurgence in Mediterranean food. This could lead demand back into European culinary herbs.

At the same time, it was noted that arguably Asia's largest exporter of sauces is considering extending production into lines incorporating European herbs as a means of extending its product range.

It was observed that there is considerable interest in organic herbs. This was more noticeable in Australia, the United Kingdom, and the United States than in Asia. A number of commentators stated that the supply of organic herbs would be an essential part of the need to develop a market niche for frozen product. At the same time, it was noted that no one spoken with during the research expressed a willingness to pay a price premium for organic product.

Organic herbs did not seem to hold much interest in Asia. Instead, in both Singapore, Hong Kong, and Japan, mention was made of the need to be GMO-free, that is, free from any aspect associated with the genetically modified organisms. It was argued in Hong Kong that GMO product was contrary to nature and not acceptable to Chinese.

Product form

Culinary herbs are presented in the following forms:

- Fresh
- Dried
- Dehydrated
- Chopped / minced
- Ground / powdered
- Canned
- Bottled
- Paste, either tubed or bottled.
- Frozen
- Freeze-dried
- Par-processed such as in pestos.

The overwhelming consensus in Australia and overseas amongst all sectors interviewed[2] was that fresh is best. Quintessentially, fresh herbs are for visual appeal, dried herbs are for culinary appeal.

A number of users of culinary herbs cited a preference for fresh herbs in the whole form. This is because with a herb like coriander they can use the likes of the seed, leaf, stem and the root.

Dried culinary herbs are the most commonly used form. Their popularity can be attributed to:

- Convenience in use in that it comes pre-prepared through the likes of chopped/minced/cut.
- Convenience in storage in that special and/or expensive storage conditions are not required.
- Commonly available.
- Cheapness.

[2] Caterers, chefs and executive chefs, food consultants, food manufacturers, importers, restaurateurs, retailers.

At the same time, a number of culinary herb users spoke against the dried product because of its lack of quality and the deterioration in that quality of it is not stored under optimum conditions.

With a number of the forms, culinary herbs are presented either as stand alone products.

Increasingly, the trend has been towards blends. In Australia most blends tend to emphasis European herbs, eg "herbs of Tuscany" that incorporates rosemary, thyme, savory and marjoram. There has been an emergence, again in Australia, of Asian-type culinary herbs (and spices) are being developed, eg "herbs of China" that include star anise, cinnamon, sesame seed, ginger, fennel, cloves, sechuan pepper, and orange peel.

Of note has been the expansion in Australia of herb pastes. The most noticeable has been pesto, the basil-based paste of Italian cuisine. Basil has been joined with a number of products, such as sun-dried tomatoes and garlic, to make pesto mixtures. Coriander is also available as a sole paste as well as being incorporated into mixed pastes. Nine brands of herb pastes were identified in Australia[3], with Australian products constituting about half the brands.

Australia is also experiencing a boom in curry pastes. These are not variations on the traditional English mustard made from ***Brassica nigra, B.alba,*** and ***B.juncea*** used to make curries. Instead they are identified as "Indian" and "Thai" curry pastes[4]. Most brands of the former type are imported. However Australia has developed a number of its own brands of the latter form. A large number of the formulae incorporate basil, coriander, lemon grass, and kaffir lime leaves.

The candidate form of this report is frozen and, to a much lesser extent, freeze-dried. Research indicates that the following priority culinary herbs are available in the frozen and freeze-dried forms:

[3] Indicative not definitive.
[4] Even "Red" and "Green" Thai curry.

Processed product availability

Culinary herb	Frozen	Freeze dried
Basil	✓	✓
Chervil	✓	✓
Chives		✓
Coriander	✓	✓
Dill Weed	✓	✓
Marjoram	✓	
Oregano	✓	✓
Parsley	✓	✓
Peppermint	✓	
Rosemary	✓	✓
Sage	✓	✓
Savory	✓	
Sorrel	✓	
Spearmint	✓	
Tarragon	✓	✓
Thyme	✓	✓
Watercress	✓	

Culinary herbs known to be under development for freezing include bay leaf and lemongrass.

Frozen culinary herbs

Freezing of culinary herbs is not a new technique. It would appear that the technology of frozen culinary herbs was derived, but not necessarily exclusively so, from the French company Daregel. The company pioneered the United Kingdom frozen herb market about twenty five years ago. It is only in the last nine years that frozen culinary herbs have become widely used in the food processing sector. Suppliers include Frozen Herbs Ltd, Lion Food Ltd, and Universe Foods Ltd. Daregel, the pioneer, appears to be the market leader. Combined, the four suppliers provide around 75 percent of the total UK market. There are a number of firms in the United States supplying frozen culinary herbs.

In Australia it appears that frozen culinary herb technology has been developed by the Lewis brothers, the founders of Masterfoods, regarded by most as Australia's leading innovator in the use of herbs and spices. It is understood that an English firm purchased from Australia a culinary herb freezing patent. Botanical Food Company based in Nambour, Queensland, uses an Australian-derived frozen culinary herb technology.
Whilst the specifics vary, the herb is washed in a solution and then individually quick frozen. Issues such as the actual solution, the freezing temperature and method, and the time involved are closely held trade secrets.

Proponents of frozen culinary herbs have advanced a number of reasons supporting their product. In all cases their arguments imply "compared with either the fresh or dried products". The alleged advantages are presented below along with comments that emanated from interviews undertaken during the field work.

- *Frozen herbs are extremely convenient, their quick thawing attribute providing both a pourable and re-usable product.*

Comment
It is argued that the small surface area of the product enable quick thawing and thus provide a 'pourable' product.

Several issues arose in discussions.

- First, in the United Kingdom, a retailer advised that whilst the claim of pourability and re-usability was true for the product, his customers found that the container within which the product was packaged was most unsatisfactory in that it did not allow for multiple opening and closingwithin the context of it being held in a frozen container. Whilst there was not a problem with the product as such, the poor packaging did effect the consumer's perception of the product and sales lagged. He eventually stopped stocking the product and is loathe to re-introduce it.

- Second, in the food service sector there was some concern that multiple thawing and freezing could lead to product deterioration. Because of this perception, they stated that their preference was for a package of relatively smaller size that would result in two or three uses before being disposed of.

- Third, it appears that re-frozen herbs have a tendency to clump together. Whilst these can be easily be broken apart, it does tend to detract from the much touted advantage of convenience.

- Fourth, in an "industrial" kitchen in the food manufacturing and food service sectors, space is at a premium. The preferred standard operating procedure is to use a product once. Thus, to take some frozen product out of its package, then reseal it before replacing in the refrigerator is not convenient compared with using it once and throwing away the container. To place the unused portion back in the refrigerator starts to effect refrigerator space management. Whilst both issues could be addressed by adjusting the size of the package, it will be difficult to develop a one-size-suits-all package.

- Fifth, convenience also was related to effort in the kitchen, especially in regard to food preparation. This invariably involves cutting, chopping, and like activities. The argument of convenience has validity as the processor has already cut/sliced/chopped the herb into the appropriate length/size/volume. The ability just to take-and-use has great appeal.

- *Frozen culinary herbs eliminate problems associated with supply seasonality and thus ensure relative price stability.*

  Comment
  The data supporting this alleged advantage is mixed. Australian data supoort the argument, but the international data does not.

  Australia
  In Australia, wholesale market data is available for ten culinary herbs in the fresh form[5]:

basil	chives	coriander	dill
lemongrass	parsley	rosemary	sage
tarragon	thyme		

An analysis of the data resulted in two sets of conclusions:

- Two product - basil and lemongrass - exhibited considerable inter-seasonal price variations but the other eight had relatively identifiable price patterns.

[5] Data provided in each of the respective herbs in the Appendix.

- All ten products had considerable intra-season price variations. In one case - thyme - it was only 40 percent. Five of the herbs - basil, coriander, dill, parsley, rosemary - had price variations around 60 percent -. The other four - chives, lemongrass, sage, tarragon - had intra-seasonal price variations of around 100 percent.

Price and product supply stability are particularly relevant to the food service sector and food manufacturers. This is because of their need to be able to offer firm prices and product availability a fair way into the future. That is, they can be asked to provide a firm quote for a catering event several months away. Failure to supply on time at the quoted price can cost them dearly in terms of penalties and lost reputation and /or the need to purchase expensive alternative supplies elsewhere.

Th data support the argument that the frozen product should offer a greater degree of price stability compared with the fresh form. In turn the argument is supported by chefs and food processors that who stated that during some periods of the year, fresh product is not just available.

Further, product quality during the year is often quite variable. As an adjunct, they also added that during the year the size of the bunches of the fresh product often varied.

One food manufacturer stated that fresh herb bunch size can vary by up to 50 percent during the year. Basil was particularly singled out for adverse criticism.

On the other hand, the conclusion of supply and price variability of fresh culinary herbs is at odds with data developed by the Victorian Institute of Horticultural Development. In its survey of stores stocking Asian vegetables, it included four culinary herbs:

Basil	Coriander
Chives	Lemongrass

Its data showed that supplies of these four products were stable during both the winter and summer months. It is necessary to bear in mind that the survey data came from interviews with Asian stores. It is most likely that these had arrangements with suppliers that provided for year-round supply with surpluses and deficits being handled through the wholesale market.

Price volatility is especially critical in the food manufacturing sector. This is because the cost per unit weight is high even though the actual weight is low. Variation in price can thus have a significant impact on the pricing of the final product.

International

The international data is quite different. Limited international price data are available for eight culinary herbs - basil, dill, marjoram, oregano, rosemary, sage, tarragon, thyme. Some data is available in a monthly form[6] and other relates to annual import prices in the United States.

Dill weed, sage, and thyme exhibited the highest monthly price variations and even then the variations ranged between only 20 - 30 percent. Annual import prices into the United States exhibited minimal prices.

Combined, the data present a picture of considerable stability in international prices of culinary herbs in the fresh form.

This data does not support the contention that, at least on the international level, the frozen product offers advantages of price stability over the fresh product.

[6] Eighteen months.

The argument of superior price stability of the frozen product compared with the fresh product was tested in Singapore. This was because the country has the twin challenges of a large tourist market and limited area for agricultural production[7]. Under these conditions imports are critical. It was advised that an Australia has commenced culinary herb growing in the Malaysian Highlands. He supplies both the retail and food service sectors on a regular basis of at least weekly. Both sectors expressed satisfaction with the quality of his fresh product, the frequency of supplies, and price stability. Under these conditions, chefs have little incentive to seek alternatives to the fresh product.

- *Frozen culinary herbs can be competitively priced.*

Comment
The argument is that a frozen culinary manufacturer could purchase stock when prices of the fresh product are at their lowest. Even when processing costs are added, the low purchasing price will result in a lower average price than that of the variable fresh price.

As the analysis immediately above showed, the fresh product does experience considerable price volatility. This makes the more stable price of the frozen product look more attractive.

In addition, management of inventory stock along the marketing chain effects prices. Traditionally, after harvest stock management lies with producers. During the year responsibility for the management of the inventory shifts to dealers such as exporters and importers. With many penultimate users - such as food processors, retailers, and the food service sector - practicing Just-In-Time management systems, responsibility stays with the intermediate members of the marketing chain. Their prices reflect this service. For a frozen product this price would have to reflect the higher costs of inventory control using refrigerated storage.

From a user's perspective, as a broad rule of thumb, the frozen product requires about the same volume as the fresh product but one and one-half to two times more than the dried product. Thus the price point for the frozen product has to be about fifty percent of that of the dried product. On the other hand, freeze dried herbs are considered to be disproportionately more expensive than both the frozen and the fresh product.

[7] It is noted that herbs are one of the agricultural products that had been promoted by the Government of Singapore as capable of being grown on small areas such as roof tops using hydroponic and aeroponic techniques.

- *Visual appearance is enhanced and the product more consistent and of a more authentic flavour compared with the dried product.*

Comment
A number of commentators supported this statement. In the main, dried product tends to look tired and insipid. Colour and other organoleptic properties deteriorate over a relatively short time, albeit the time involved being a function of temperature and exposure to light and oxygen during storage. It was argued that this deterioration is not really a problem as Just-In-Time manufacturing philosophies mean that storage time becomes increasingly truncated.

However, the comment must be seen in terms of the use of the herb. If the herb is intended solely to affect aroma and taste then visual appearance does not matter. Some of these herbs are naturally dull in colour and so loss of colour is not important. However, four herbs are used for visual effect - basil, coriander, dill, and parsley. Their "greenness" is part of their appeal. Freezing appears to retain the green colour to a vastly superior effect compared with drying.

Nevertheless it was noted that one company promoting frozen product stated that when the product is defrosted "many varieties of herbs will turn dark, just like an apple after it is cut and exposed to the air". It went quickly on to state that "the flavour will still be retained and the herb can be used in this condition". However, it will no longer have the free-flowing characteristics it has in the frozen state.

- *There is minimal product wastage.*

Comment
Frozen herbs are considered to result in minimal product wastage due to the ability of the user to take exactly what is required - a result of the frozen herbs' 'pourability' - and return the unused portion to the freezer. In turn, this is advantage of the products' long shelf life.

Aspects of this have already been discussed under the rubric of convenience.

Experience to date suggests re-freezing will cause some flavour loss, albeit minor. It must be borne in mind the herbs are only used in small volumes because of their flavour enhancing property. Any loss of this all-important factor will result in prejudicial view of the product.

- *Freezing is a health-conscious way of preserving food.*

Comment
Depending precisely on the technique used, frozen culinary herbs can claim to be free of sulfites, additives, preservatives, sodium, fat, and cholesterol. When compared with the dried product, these are major marketing advantages.

Nevertheless, the freezing of a culinary herb in a ready-to-use form may run counter to the increasingly important issue of HACCP. This is becoming a major challenge in the food processing sector. The emphasis here is on the product's microbial quality prior to freezing. Australia, the United Kingdom, and the United States have in place strong regulations that relate to HACCP and food safety. In Asia, Singapore has more stringent food safety and food wholesomeness requirements compared with Hong Kong[8].
One method of addressing potential microbial infestation is through heat. Most products leaving a food processor have been through a "flash point" that is specifically designed to destroy harmful

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[8] It was noted that Hong Kong has no policy in regard to HACCP and food safety. Further, the cost of implementing a HACCP food safety program is considered by the SAR Government of Hong Kong to be unacceptably high.

pathogens. Usually this temperature is between 71°C - 85°C, depending on the sugar content of the products involved.

Some food processors interviewed exported product from their factories after treatment in excess of 100°C[9]. A frozen product offers no such heat protection against harmful pathogens.

Herbs, being grown close to the ground, are a potential source of earth-borne adverse pathogens. This is particularly true for parsley with its curled leaf that acts as a natural receptacle for pathogen associated with moisture. Parsley is arguably the most popular of the culinary herb garnishes.

- *Frozen product can legally be called 'fresh'.*

Comment
At a time when the ability to claim "fresh" is a major marketing ploy, this is a considerable advantage for frozen herbs.

Organic

A number of interviewees in Australia and overseas stated that a particular niche could be established for organic culinary herbs. This follows from the general trend in the decrease in the Europe's "E" numbers and chemical additives and the subsequent in flavours coming from natural products such as herbs.

In the United States the chain Fresh Fields emphases organic product with conventional products being the "special": the chain markets a significant range of organic herbs. A number of British retailers also had a large range of organic herbs and organic products. It appears that around 40 percent of the Israeli herb industry is organic. It is noted that Israel is a major supplier of herbs to the British market. Generally, a small premium can be extracted for organic products.

A different picture was noted with the food service sector.

An interview was conducted with an Australian food manufacturer. He sought to develop a range of organic curries to compliment his "conventional" range. To accommodate the costs involved, he priced the former at $27.50 /kg against $22.50/kg for the latter. He was unable to sustain the price premium and eventually withdrew the product range. His conclusion was that whilst consumers demanded the purity of organic food products, very few were prepared to pay the appropriate price premium.

[9] Arguably Asia's biggest sauce manufacturer has its processing temperature set at least to 100°C and in some cases 120°C.

Market

The term "market" will be used in terms of outlet. However, where appropriate, the geographic concept of market will be employed.

Market size

The size of the international market for frozen culinary herbs could not be established. Volume of international trade is available for a number of spices - anise, caraway, cumin, fennel and juniper berries, saffron, turmeric - mainly as a result of their commercial importance as measured by volume or, in the case of saffron, value. However not all data sources noted the same six spices. Three herbs were identified in the international spice trade data - coriander, thyme and bay leaf.
An examination of the volume, origin, and value of the former clearly indicates that the date refers to the spice form and not the herb form. This data was ignored.

With thyme and bay leaf, the same classification reference of 0910.4000 is used. This makes precise identification of the two individual items difficult. Using data for both Hong Kong and Singapore the two entrepots imported just under 200 tonnes of thyme and bay leaf in 1998. Data are not available to indicate how much of this was frozen

Market size for frozen culinary herbs could only be established for the United Kingdom. In 1995 this market was estimated to be in the region of 1 000 tonnes annually[10]. Approximately half of this appears to have been imported, mainly from France.

It would appear that herbs are imported into Australia by a relatively large number of comparatively small importers. They act as blenders and on-sell the product largely to the food service and food manufacturing sectors. Smaller operators have problems competing with the larger operators and can not be expected to survive. This is because the larger operators tend to use their research and development staff to offer solutions to their clients' challenges[11]. Without such resources, the smaller operators remain just raw product suppliers.

In Australia, two interviewees stated that they were involved with imported frozen culinary herbs[12]. They were reluctant to state the volumes involved but other sources suggested that volume was around 20 tonnes annually. This could not be confirmed through Australian Bureau of Statistics[13]. I was left with the impression that the product came from France and South Africa but again this could not be confirmed. It appeared that the product went into the food processing sector for product eventually destined for the food service sector, especially the catering industry.

The demand for processed culinary herbs is what is called derived demand. Direct consumption of culinary herbs is extremely small. Instead, their demand is based upon there being a demand for a product that incorporates the processed culinary herbs.

[10] Pers.com., Produce Studies Research, Newbury, and British Herb Trade Association.
[11] This includes the likes of Masterfoods as well as the larger caterers.
[12] One in Perth and the other in Melbourne.
[13] There are two dimensions to the inability to quantify frozen culinary herb imports. First, ABS data identifies imports of "Other spices NEI" other than anise and badian, coriander [clearly the spice not the herb], caraway, fennel and juniper berries, saffron, turmeric, thyme and bay leaf that fall between categories 0901 and 1910. This aggregation makes it impossible to identify specific culinary herbs. Second, there is no way within the data of identifying frozen product. .

Demand for processed culinary herbs comes from

- Retail sector.
- Fast food sector.
- Food service sector.
- Food manufacturers.

Retail sector

Culinary herbs sold from the retail sector are overwhelmingly destined for home consumption. They are sold in the fresh, dried, dehydrated, ground / powdered, canned, bottled, paste, and frozen forms. Culinary herbs are sold as stand-alone products; incorporated into other herb products such as sauces, pastes, and dressings; and as the non-price differentiating aspect in a number of ready-to-eat meals.

It was observed in Australia, Singapore and Hong Kong, the United Kingdom and the United States that most retailers offered a wide selection of herbs in the varying forms.

Retail stores' food sales must be placed in two contexts. First, general economic prosperity dictates the volume and type of food sales. When economic activity is strong, consumers tend to eat out thus retail stores food sales decline. Food purchases tend to be for essential items such as breakfast or snacks. When times become more lean, sales increase as people are more likely to economise and eat in. Second, the cultural context is that people in Asia and the United States have a greater predilection to eat out whereas in Australia and the United Kingdom the custom is to eat in.

The upside of this is that to tempt consumers to purchase whatever the economic climate, retailers are increasingly seeking new and different products. A medium size supermarket will carry as many as 17 000 SKUs.

An additional issue for Australia is the domination of retail food sales by just a few major chains. Any food product to be considered a success must be marketed through one or, preferably, two chains.

In examining the retail sector from the perspective of frozen culinary herbs, a number of features stood out.

- First, no frozen culinary herbs were observed being offered for sale. There were certainly none in Australia. A number of outlets of the major multiples in Singapore, Hong Kong, Japan, the United Kingdom and the United States were visited but no frozen culinary herbs were observed. Casual discussions with store staff indicated that no such product had been stocked at least in the recent past. One store did stock frozen culinary herbs but has ceased to do so[14].

- Second, with the dried product it was extremely rare to see just a few herbs, say three to five, offered by the one supplier. Invariably, the supplier offered at least ten culinary herbs. In some cases the range of types offered covered all of the 22 priority herbs. In addition, some suppliers offered other products. The only exception was with the pastes where often only one, two and sometimes three products were offered. However these are well-known brands and thus the product could be seen as a form of line extension thereby removing the need to have a large range.

[14] See comments noted on page 5 in regard to convenient and pourability.

- Third, the entire culinary herbs sector in whatever form is dominated by less than ten suppliers. In the dried form, the number of suppliers is around five. This statement is based on observations in a large number of stores throughout Australia, Asia, the United Kingdom, and the United States. Only one brand was seen just the once[15]. Often times, albeit not always, the supplier also supplied the gondola. These are both free-standing as well as fitting within existing shelves.

- Fourth, nearly all retailers maintain a "depth-and-breadth" policy, where depth refers to multiple suppliers of the same product and breadth to multiple size packages of the same product. With "depth" in the culinary herb sector, invariably at least two suppliers were noted. With "breadth", multiple sized containers of herbs were not common, albeit different sized containers of dried culinary herbs was more common in the United States than elsewhere.

- Fifth, retailers are increasingly developing their own brands. Whilst this does not eliminate the role of the independent supplier, it does suggest that unless one is large enough to develop and maintain one's own brand, the independent supplier may have to become just a packer for a chain/chains.

- Sixth, HACCP actually started with the British multiples or chains. They started and have continued to led the drive towards food safety. Their actions are increasingly being copied by chains in other countries. All suppliers to them will be expected to have in place HACCP systems. A potential frozen culinary herb supplier will be expected to have HACCP systems in place before being able to deal with the chains.

- Seventh, the chains in the five countries examined used a unit pricing policy for dried herbs. That is, the price of the package stays constant with the size of the packet varying according to the perceived value of the herb. Frozen product would be expected to adopt the same approach.

- Eighth, competition for refrigerated space in a chain store is extremely aggressive. Product placed there must either have a high turn-over or the chain must make a high margin. It is doubtful if the chains would make an exception for frozen culinary herbs.

- Ninth, chains, at least in Australia and the United Kingdom practice ullage or shrinkage[16]. That is, it is virtually inevitable that a shipment from a supplier will have some defects.
  This usually results in a claim by the chain against the supplier. For convenience, both parties inevitably agree that the supplier will provide a uniform discount to overcome the need for the chain to constantly making claims. The discount can be in the form of "a baker's dozen" or having the invoice include the discount. It was advised that ullage associated with frozen products can be as high as 20 percent, certainly way in advance of the usual five percent for dry good. There is little reason to assume that this practice will not operate for frozen culinary herbs. Allowing for ullage will affect the price of the product supplied by the producer.

- Tenth, frozen culinary herbs are an unknown product. Considerable promotion will be needed to advise consumers of their advantages. It is most unlikely that the chains will do this in their own. Co-operative advertising is a long-standing business practice for chains stores and suppliers. It is most likely that these arrangements will continue for frozen culinary herbs.

- Eleven, ready-to-eat-meals and ethnic foods are key growth areas in the retail sector in most countries. This augers well for the total culinary herb market. However use of culinary herbs would be through the food manufacturing sector.

[15] In Perth.
[16] This is separate from the returns policy associated with proprietary lines.

In late 1999 a major retailer introduced a potentially major competitor to frozen herbs. This was a range of fresh pre-packed herbs. The herbs were unit-priced at $1.99 and were in packs of 25 g and 50 g (some in both).

Basil	Chervil	Chives	Coriander
Lemongrass	Marjoram	Mint	Oregano
Parley (and Italian Parsley)		Sage	Sorrel
Tarragon	Thyme	Vietnamese Mint	

Response has been favourable.

The British retail sector offers some lessons for Australia. In the early 1990s, whilst the rate of annual growth was estimated to be between 20-30 percent[17], this rate appears to have now levelled off. Growth rate has been adversely affected by the fact that herbs are a small category that would appear to be taking up a disproportionate amount of shelf space. The other issue is that the British market is very crowded. Bearing in mind that Britain was one of the pioneers in frozen culinary herbs, it has a sizeable domestic supply base, and is the destination of a number of international suppliers. Israel supplies on a year-round basis and between suppliers such as Spain, Canary Islands, Morocco, Egypt, Italy, and Colombia the country is well supplied throughout the year.

Fast food sector

The fast food sector traditionally revolves around three products:

- Pizzas
- Chicken
- Hamburger

Herbs and spices have always been a major marketing tool in this sector to provide non-price differentiation. That is, herbs allow the maker of fast foods to differentiate his product in terms of organoleptic attributes rather than by price.

As these outlets have become more competitive, the move has been away from in-house preparation to centralised industrial preparation. Centralised industrial facilities tend to use herbs in the dried form and spices in the oleoresin form. The herbs provide both visual and organoleptic appeal. This is especially true for oregano.

Frozen herbs do not appear to offer any marked culinary or economic advantage over the dried product.

Prospects in this sector appears limited.

Food service sector

This is an extensive sector covering a vast array of participants. Fast food outlets have been treated above. The balance will be conveniently categorised into four and five star establishments and "others".

[17] Drawn from a combination of discussions with the British Herb Trade Association and contributors to the ***Fresh Produce Journal's*** special on culinary herbs in late 1999.

Four and five stars

Four and five star hotels and restaurants are at the high end of the product spectrum. . This sector is occupied by qualified chefs whose training emphasises "fresh".

Ingredient buyers in this sector are chefs, executive chefs, and food and beverage managers. Like the operational chefs, their training is orientated towards the fresh product. Frozen and or dried product will only replace fresh when nothing else is available. Price is not the issue as usually their end products are demand inelastic to price, that is prices must move a great deal before consumer price resistance starts. Freshness is the key.

A worrisome issue to the total industry is the decline of the sector. In Australia, "fine dining" is an endangered specie. Whilst Brisbane has no establishments dedicated to fine dining, it continues to survive, as distinct from flourish, in Sydney and Melbourne. This is not to say that Brisbane, and other major Australian cities, do not have four- and five- star restaurants. Chefs in this sector are vibrant and innovative often make creative use of herbs to provide product differentiation and the chef's "signature". Nevertheless, this sector must be viewed as a comparatively small sector. In contrast, fine dining is thriving in the United Kingdom. In any case, the form of preference for chefs in this sector is always for fresh.

This issue was explored in Asia. The volume of "western" tourists to Singapore and Hong Kong is sufficient to ensure that "their" food is supplied. Many, but by no means all, stay in the high end hotels. Thus the four and five star restaurants cater to European tastes and thus they use European herbs. However it is noted that seventy percent of guests dine-in. Of this, only about sixty percent are Europeans.

This suggests that the market is not that great. Mention has already been made of the Malaysian-based Australian producer supplying fresh herbs to the retail and food service markets in Singapore[18]. In Hong Kong it was advised that fresh herbs can be flown in from Australia and New Zealand on a Just-In-Time basis, thereby eliminating the need for frozen product.

An additional issue is the management of refrigerated space. In a busy kitchen, movement in and out of this scarce resource becomes a major time-and-motion issue. If the menu calls for a number of dishes with herbs then movement in and out of the refrigerated space becomes an issue and may count against the frozen form.

The consensus was that there is little prospects for frozen herbs in this sector.

"Other"

As one moves away from high price end, the culinary imperative for "fresh" product is rapidly replaced by other issues. Price, as with most issues, becomes the dominant imperative. For any given one dollar, a chef will have year-round access to a greater volume of herbs in the dried form than he will in the fresh form. Price also relates to the cost of labour. This means that product supplied in a ready-to-use form has great advantage.

Price is important because of the difficulty in passing on costs. The trend appears to be that "chefs" in this sector are really becoming "food assemblers". This is certainly the case with the vast majority of institutional outlets such as hospitals, old age homes, in-house cafeterias, and large and small scale sites requiring catering such as sporting venues, exhibition sites, and industrial sites.

Food is received in these sites in various stages of preparation.

It can be pre-made, pre-prepared, and par processed products and whole meals: for example, meats can come pre-roasted, sauces pre-made, vegetables trimmed/chopped/par cooked. Thus in arguably

[18] See page 7.

Australia's largest hospital catering site[19], a series of frozen meal components are brought into the kitchen, albeit after some parts are "relaxed", combined by the cooks and then distributed. Little "cooking" in terms of ingredient preparation and then actual cooking is undertaken. Culinary herbs are used at stage mainly as garnishes to "finished" the meal.

In instances like these, food costs are measured in terms of cents per dish not dollars per dish. It is more cost efficient to bring in food par-processed under the advantages of economies of scale.

Most of the prior preparation activity occurs in relatively unknown facilities.

This is despite the absolute scale of operation. Australia's largest food caterer[20] delivers over one million meals a day. Whilst it operates from the principle of having in-house chefs it also makes great use of bulk purchases. The economies of "industrially" prepared meals are such that Australia's second biggest caterer is based in Perth and uses a central factory. It is able to prepare and transport its products to eastern Australia and still remain competitive.

None of these operators currently use frozen herbs. Whilst none of them ruled out using frozen herbs in the future, in the immediate future they do not have plans to do so. A number of suppliers into the sector also said that the catering sector was amenable to using frozen culinary herbs if it could be shown the advantages the frozen product had over the current products in the fresh and dried forms. It was noted that to use culinary herbs would require them to undertaken readjustment to their operations, an issue that would require the frozen products to have noticeably marked advantages both culinary and economic over the dried product.

Food manufacturers

The food manufacturing sector remains the largest user of herbs and spices. Specific sub-sectors are meat preparations, bakery products, beverages, snacks, confectionary, and convenience foods. Spices have tended to be used in the natural and powdered forms. Oleoresins have become the form of choice for this sector as they are cleaner to use and easier to dispense. This is particularly true for the meat and beverage sectors. "Natural" forms are still popular in the bakery sector.

Whilst one food manufacturer stated that he used herb oleoresins, it could not be established how many herb oleoresins there were or how widespread their use was.
Their application would have to adhere to the same principles governing their use as spice oleoresins, that is, cheap, convenient to use, and convenient to dispose of.

The growth of the ready-to-eat meal sector has been good for the herb sector. This is because herbs, as well as some of the spices, are clear evidence that the product is "fresh". Thus, frozen pizzas, and frozen bakery products such as foccacia and flavoured breads, have a disproportionate amount of chopped chillies, basil, oregano, and dill weed. These add visual appeal, as well as product differentiation.

Manufacturers stressed the need for sterilised product. They noted that as herbs are incorporated into a large number of cooked items, the potential for cross-contamination within the entire operation is increased significantly.

The move into high-end products could see greater use of culinary herbs as a means of product differentiation. Examples are gourmet casseroles, gourmet pies, and pasta with flavoured sachets.

In Britain, the next movement for the culinary herb industry is considered to be in the food manufacturing sector. Again, from Australia's perspective, the British food manufacturing sector may be considered to be a matured market. There are five suppliers of frozen culinary herbs and they

[19] Royal Brisbane Hospital with over 5000 meals a day.
[20] Spotless Services Australia Limited.

appear to be servicing the sector adequately. Food manufacturing is a less mature industry in Europe, especially France and Germany. Whilst this indicate that there are opportunities there, it must be borne in mind that these countries tend to be culinary ethno-centred. As such they tend to be less adventuresome in the food they eat and thus the urge to explore different flavours and textures through herbs is less pronounced. Further, it is noted that France was perhaps the first country to develop frozen herbs and thus further limiting the opportunities for Australian suppliers.

Conclusions

The market place for culinary herbs is strong and growing. Demand is being fuelled by two imperatives.

- First, the growth in the retail sector's provision of ready-to-eat meals. Culinary herbs provide a non-price means of product differentiation.

- Second, the growth in the food service sector's catering sub-sector. Demand for culinary herbs will be both by the sub-sector itself and the food manufacturing sector that supplies into the sub-sector.

The issue is - what will be the frozen product's share of this growth.

The answer is - relatively small. It will also be uneven across the four sectors of retail, fast food, food service, and food manufacturing.

Retail sector

There are prospects for the retail sector. However, to be successful a number of principles must be applied.

- A range of frozen culinary herbs must be offered. Ideally ten products should constitute the range. At a minimum, the range should be five products.

- The chains must be convinced that the products are HACCP compliant.

- As consumer education is critical, cooperative advertising must be considered. After all, who would think of looking in the refrigeration section for herbs?

- As a means of product differentiation, the products should be organic.

- Considerable effort needs to be given to the packaging to ensure that the attributes of the product are not thwarted by inferior packaging.

Suppliers must be aware that some of the bigger chains have a policy of product review every six months. Thus, six months must be seen as the time frame within which the education and promotional campaigns have to succeed.

Food manufacturing

This sector holds the greatest promise as it leads to the incorporation of frozen culinary herbs into other products and it is the "other products" that have the potential for expansion. "Other products" is both physical products such as the ready-to-eat meals and par-processed foods as well as the service products associated with the expansion in the catering sector.

Again, to be successful in this sector, a number of principles are suggested

- Price, quantity and quality must be regular, reliable, and repeatable over a twelve month period.

- Chefs have to be convinced that frozen herbs are not only better than the competing fresh and dried products but are demonstratively better. This has to have the twin elements of superiority in organoleptic attributes and economic advantages.

- An avenue of demonstrating the superiority of the product is to ensure that the product supplied is what is required. Taking coriander as an example, it may be that the demanded product is really the immature seeds or the root rather than the commonly used leaf. Again, if the main purpose of the product is as a garnish rather than as a flavour enhancer, then the size of the product may need to be bigger than that usually considered.

- Package size is critical.

- Given that at least the British market is dominated by a few major players, a strategic alliance should be considered with them rather than entering into outright competition with them.

- The rise of ethnicity in food is not always from the Occident to the Orient. The marketing of European herbs in Asia as Asian food manufacturers seek to widen their product base should not be ignored.

- Promotion of the product to this sector should occur. Suitable vehicles are the likes of London's Restaurant Show, and Europe's joint SIAL/Enuga.

Frozen technology

It would appear that frozen culinary herb technology is readily available. The survey discovered that at least in Australia, the United Kingdom, and the United States frozen technology had been developed.

Marketing research

Research on this project was handicapped by the lack of having to hand product, a price schedule, and a supply capability statement. Without any of these it was considered that many of the interviews resulted in hypothetical feedback - "yes we are interested".

Subsequent research must be accompanied by product, pricing and supply capability statements.

APPENDIX

Anise

Asia and the Levant have two distinctly different products known as "anise".

(i) Anise - Asia
Zanthoxylum piperitum, Z.simulans, Z bungei, Z.bungeanum

English:	*Szechuan pepper* ***Z. simulans*** *, Sichuan pepper, anise pepper, Chinese pepper* ***Z. armatum****, fagara, wild pepper, sansho pepper, brown pepper, Japanese pepper* ***Z. piperitum,*** *prickly ash, Indian pepper* ***Z. rhetsa***
Chinese:	*chiao, huang chiao, faah jiu, hua chiao*:
French	*poivre anise*
German	*anispfeffer*
Italian	*pepe d'anis*
Japanese:	*sansho*
Spanish	*pimienta de anis*

Description
Not a true pepper with the small red-brown berries being grown on the Prickly Ash shrub-tree, not on a vine.

Use
Berries, leaves, shoots, and flower buds are used. It has less heat but more tang compared with traditional pepper.

Sold as dried berries either whole or husked, they are more aromatic than hot. They are usually sold in the ground form as they keep their aroma well.

The dried berries are utilised without their bitter black seeds. They are used in Chinese five spice powder and Japanese *shichimi togarashi* seven-spice mix.

The leaves' aroma is best achieved with a gentle beating before being used. They can be used in the fresh and dried form for flavouring. Called *kinome* in Japan, the 5 cm sprigs are used to garnish soups and dishes such as *yakimono* grilled food.

The shoots are used with *miso* Japan's ubiquitous soybean paste.

Flower buds are preserved with soy sauce and *sake* rice wine.

(ii) Anise - Levant
Pimpinella anisum

English	*aniseed, sweet cumin*
French	*anis*
German	*anis*
Italian	*anice*

Description
Indigenous to the Levant region that encompasses southern Russia, North Africa, and India. Turkey, Spain, and Egypt are sources of anise seed. Of these, the bolder, more flavorful Spanish seed is considered a premium seed.

The plant is a slow-growing annual herb of the parsley family. It grows to about a metre in height. The fruit consists of a two-piece carpel with the seeds separated from the flower head by thrashing. Seeds are about 0.5 cm in length, green-grey and ovoid.

Although the anise seed has an unmistakable licorice flavour, it is not related to the European plant whose roots are the source of true licorice.

Use
Anise seed is commonly used to give a licorice-like flavour to spice cakes, baked confectionaries, breads (especially rye bread), and sweets. As a drink, it is popular as France's *pastis*, Pernod, and *anisette;* Spain's *ojen;* Turkey's raki; Greece's *ouzo;* and the Arabs' *arrak*.

Portuguese and Italian recipes often call for anise seed. German and Italian bakers use anise in cookies, coffee cakes, and sweet rolls. Sometimes Scandinavian rye bread is flavoured with anise instead of caraway.

Industrial uses include incorporation in perfumes and soaps[21].

Medicinal uses are in cough mixtures, lozenges, and anti-septics. T he ancient Romans believed that when used in a particular spice cake baked in bay leaves it prevented indigestion.

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[21] As a trivial aside, in 1305, the English collected a toll on anise seed to fund repairs to the London Bridge. Anise was also used to perfume the clothing worn by King Edward IV. In 1619, the Virginia Assembly enacted a law requiring each family to plant at least six anise seeds each year.

Basil

Ocimum spp.
"Basil" comes from the Greek word *basilikós* royal.

English:	*opal basil, lemon basil, cinnamon basil, sweet basil, Greek basil, holy basil* ***O.tentuiflorum****, garden basil, tulsi, wild basil* ***O.campechianum****, camphor basil* ***O.kilimandscharicum*** *bush basil* ***O.minimum***
Hindi:	*babuitulsi*
India:	*sabzah, tulsi, gulal tulsi*
Indonesia:	*selasih, kemangi*
Malaysia:	*selasih, kemangi*
Philippines:	*belanoi, sulasi*
Sri Lanka:	*suwenda-tala, madura-tala*
Thailand:	*hai horapha, hai kaprow, hai manglak*
Vietnam:	*rau que*

Description
Member of the mint family. Basil is an annual summer herb.
Asian basil leaf is darker compared with European basil. Has a slightly sharper flavour than that of European basil.

O.basilicum:	Medium to large leaves with sweet licorice-like flavour. Called *horapa* in Thai and "Thai basil" in English, it is best picked and added just before serving in order to preserve the very volatile aroma.
O.canum, O.citriodorum:	Smaller, with slightly hairy but still green leaves, lemon scent, quite pungent. Called *manglak* in Thailand
O.sanctum:	Strong odour, with small, purplish leaves. Its strong odour makes it popular in strong flavoured dishes.
O.americanum	lime flavoured.

Opal Basil and Purple Basil are purple. Lemon basil and cinnamon basil have green leaves but their fragrance and flavour matches their respective names.

Use
O.basilicum is the type common used as a culinary herb. Basil leaf is extremely popular in Mediterranean cooking. It is essential to Italian pesto. Preferably consumed fresh, not dried, and even then added to the dish just prior to serving. Torn rather than cut leaves are said to taste better. Usage of the dried product is about a third of that of the fresh. Seed of ***O.canum*** are used to sweeten cold drinks in parts of Asia.

The leaves and seed of ***O.canum*** are said to aid digestion, expel worms, and treat ringworm, insect bites, and acne. Anti-bacterial properties are ascribed to an infusion.

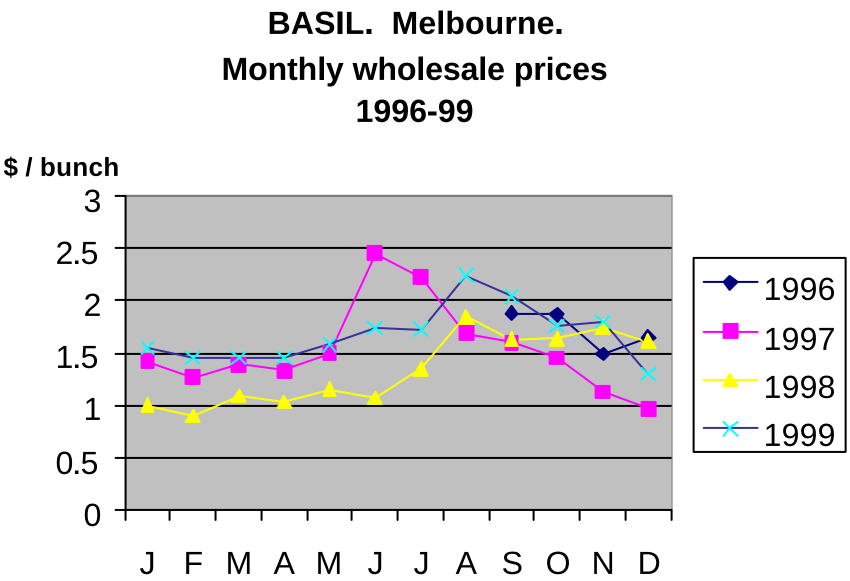
Industrial uses: essential oils are used in condiments, liqueurs (especially chartreuse), perfumes, snuff manufacturing, and soap. The oils are incorporated into massage oils.

Basil - Australia
Fresh markets differentiate between "sweet basil" and "Thai basil". Prices are difficult to compare because reporting is for basil in the bunch form and Thai basil in the kilogram form.

Prices for Thai basil are relatively uniform, staying within the range of AUS$4.50 - 5.50 / kg for the eight months May - November 1999[22]. This data support Victoria's Institute for Horticultural Development estimated that about 12 000 bunches per week throughout the year were retailed in Melbourne as "Asian Basil". It is considered that bunch size tends to be more consistent compared with other leafy herbs sold by the bunch.

Attitude to supply varies with some users considering supply to be reliable whilst others stating that supply is quite variable. Volatility of sweet basil prices at the wholesale markets supports the latter view.

In the fresh form, basil exhibits considerable intra-seasonal price variations. In August 1999, fresh basil was retailing for $0.99 / 10 g bunch.



Source: Ausmarket Consultants

Basil is the major ingredient in pestos both conventional and "enhanced" with different flavours such as garlic and sun-dried tomatoes. At least five brands were identified, both domestic and imported. Retail prices were around $2.89 / 190 g - $2.04 / 165 g. Also presented in vegetable oil around $3.50 / 210 g.

Basil is specifically identified in Australia as a major ingredient in soups such as "Tomato and basil".

Seeds of ***O.bascilicum*** is used in Indian and Asian desserts after they have been added to water.

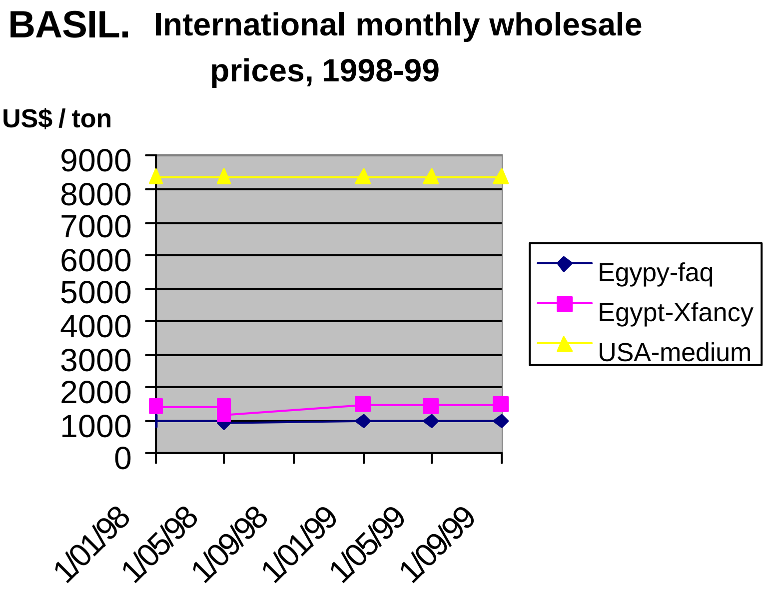
Basil - International
Sweet basil ***O.basilicum*** is the main variety traded.

Reported international basil trade is one-dimensional: from Egypt to the United States. Egypt is the major international volume trader. In contrast, United States is the high-priced trader, gaining a near

[22] Pers.comm. Ausmarket Consultants, based on Melbourne wholesale market.

four-fold price premium over Egyptian product. Since the early 1990's Egypt's share of the United States market has increased from over half to more than 65 percent in 1998. Mexico is the other major supplier with its share nearly trebling from 12 percent to 30 percent from 1997 to 1998. United States imports in 1998 were 3 431 tons.

Data do not differentiate between the types of basil. International wholesale prices are extremely static. For the 21 month period January 1998-September 1999 available price recordings of the superior grade "USA-medium" did not vary once from the value of US$8375 /ton. There was some price variation in the "Egypt-Extra Fancy" but even that was marginal.



Source: ITC Market News

The general low price of Egyptian product is confirmed by an analysis of import data into the United States:

Basil: Imports into United States by origin: 1997-1998

	Egypt US$/ kg	Israel US$/ kg	Mexico US$/ kg
1997	1.18	1.83	1.92
1998	1.15	1.98	2.36

USDA: Foreign Agricultural Service

The United Kingdom imports basil on the following basis:

- France June to November
- Guernsey year-round
- Israel October-July
- Italy year-round

Randomly recorded international retail prices are:

- Hong Kong HK$18.00 / 16 g

- London

Organic product, Waitrosse	£0.75 / packet
Fresh	£0.99 / packet

- New York

Mediterranean, minced	US$4.25 / 37 g
Local basil	US$2.89 / 62 g
Master Choice, chopped	US$2.89 / 62 g

- Singapore

Brand #1 dried leaves	S$2.48 / 7 g
Brand #2, "sweet"	S$2.90 / 18 g
Fresh, ex-Malaysia	S$3.99 / 20 g
Fresh, Brand #2	S$2.50 / 20 g

- Washington

Fresh purple basil	US$1.99 / packet
Fresh basil	US$1.99 / packet

Bay Leaf

Laurus noblis

Arabic	*warak al gar*
English	*bay laurel, bay tree, sweet bay, Apollo's bay leaf, Indian bay, wreath laurel*
French	*feuille de laurier, laurier franc*
Greek	*thaphne*
Italian	*foglia d'alloro*
Spanish	*hoja de laurel*
Turkish	*dafne yapregi*

Description

From the Bay Laurel tree, a medium sized, evergreen that is native to Asia Minor but spread to the Mediterranean in ancient times. The two main varieties of bay leaf are Turkish (which has 1- to 2-inch-long oval leaves) and Californian (with narrow, 2- to 3-inch-long leaves). Turkish bay leaves are considered to have a more subtle flavour than the California variety.

The leaves are considered to be mildly narcotic.

Most other laurels are poisonous. Leaves from the Caribbean bay ***Pimenta acris*** are used to make bay rum.

Use

The leaves give off a pungent bouquet and flavour when broken. They are strongly aromatic when the slightly aged. In the dried form the leaves lose their flavour quickly.

Whole leaves are used in Greek, Turkish, and Cypriot cooking to flavour soups, stews, vegetables and meats, and are generally removed before serving. Overuse can make a dish bitter. Used to both flavour and garnish pates and terrines. An important ingredient in the French herb mix *bouquet garni.* They are an essential flavouring ingredient in the classic sauces of bechamel, and tomato sauce. The leaves can be added to pickled foods.

Other leaves, notably Cassia Leaf ***Cinnamomum cassia***, have been mislabelled "Indian Bay Leaf". Solomon (1996) is adamant*: it is necessary to state unequivocally that [Bay Leaf] also has no place in Asian dishes as a substitute for other leaves which are used for flavouring.*

The wood is used to give an aromatic flavour to smoked foods.

Industrial uses include Oil of Bay distilled from the black fruit. The fruit also yields a fatty oil used in soap manufacture. An essential oil is distilled from the leaves.

Bay leaves have diuretic and digestive qualities. They can also act as an appetite stimulant.

Bay Leaf - Australia
Australia grows a premium Bay Leaf that is air dried.

Bay Leaf is sold fresh in packets at markets and in the dried form. In the dried form, they are sold whole and minced. Several brands of dried product were noted with the pricing being based on a unitary price basis; that is, the price of all dried herbs in the brand range is the same but the weight of the packs varying. One brand's retail price was $2.29 for 12 g packet and another $0.80 for 3 g. Minced product retails for $2.25 / 12 g packet.

Bay Leaf - International
In the data sets of Hong Kong, Singapore, Australia, and the United States, Bay Leaf was aggregated with thyme.

Market News Service[23] data specifically referred to just Bay Leaf, albeit just the one observation, indicating that the Service has just started reporting the herb. The observation was that the grade "Turkey Fancy" had a wholesale price of US$2 160 /ton whilst "Turkey semi-selected" had about a twenty percent premium at US$2 535 /t. This spot data supports the comment that show that the average annual price of Turkish Bay Leaf imports into the United States was US$2 636 /t in 1997 and US$2 282 /t in 1998. Other data[24]: suggests that import volumes vary only marginally each year.

Other randomly noted international retail prices in September 1999 were:

- London
  - Fresh — £0.99 / packet
- New York
  - Turkish — US$6.99 / 0.18 oz
- Singapore
  - Dried — S$3.55 /3 g
- Washington
  - Organic — US$1.99 / packet

[23] International Trade Centre, Geneva
[24] USDA's 1994 **The Spice Market in the United States: Recent developments and prospects**.

Caraway

Carum carvi, C.ajowan

English *foreign cumin, karawya*

Description
From the same family as coriander, cumin, dill and fennel. Biennial native to Europe, Asia, and North Africa. Fine feathery leaf. The seed is actually the split halves of the fruit. They have a nutty, anise flavour.

Seeds are comparable in appearance to cumin but a little darker. Taste is similar to anise.

Use
Entire plant is edible but the seeds are the most commonly consumed part is the seed. Widely used in German, Austrian and Hungarian cuisine. Caraway seeds flavour many foods including cheese, breads (especially rye breads), cakes, stews, meats, and vegetables, especially sauerkraut. The seeds are consumed whole and ground.

Leaves are chopped for use in salads and the root used as an aromatic vegetable. The root is consumed as a vegetable.

C.ajowan is an annual grown for its hot spicy seed. It is used in *naan* bread.

The essential oil distilled from the seed is used to flavour gin as well as the liqueur *Kummel.* It is also used in mouthwashes.

Medicinal uses are as a remedy for flatulence and colic - in England it was used in "gripe water" for babies.

Not commonly consumed in Asia where the term is confused with cumin. Thus, in Asian curry recipes requiring "caraway", cumin should be used whereas North African spice mixes use ***C.carvi.***

Chervil

Anthriscus cerefolium

English *cicily, sweet ciciy, garden chervil*

Description
An annual that is a member of the parsley family. Has bright green fern-like leaves. Aromatic but mildly flavoured.

The leaf contains vitamin C, carotene, iron, and magnesium.

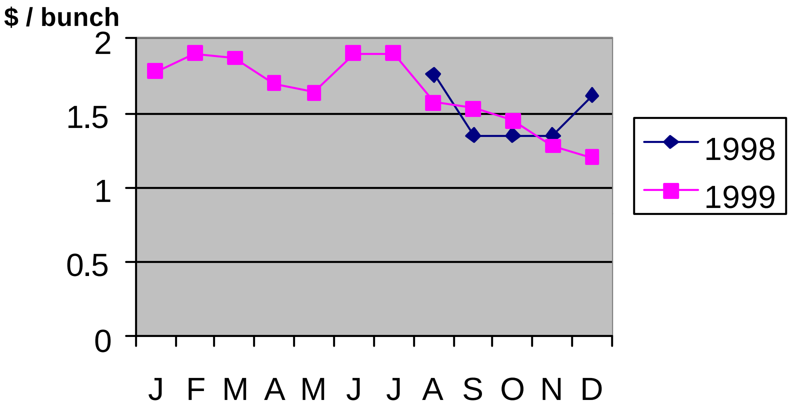
Use
The stem and the leaves are utilised.

Leaves are used fresh as a garnish but also consumed in the dried form in egg dishes, fish flavouring, and cream sauces and salads.

Medicinal uses include as a mild digestive, circulation stimulant, and to reduce liver and catarrh problems. Industrial uses include as a face mask as a cleanser and to maintain suppleness.

Chervil - Australia
Monthly wholesale market data are available for chervil as of late 1998. Even though this is a small data set it is worth graphing because of the extent of inter-month pricing volatility.

CHERVIL. Melbourne.
Monthly wholesale prices
1998-99



Source: Ausmarket Consultants

The data show quite a wide range of prices, from $1.20 / bunch to $1.90 / bunch.

Chives

Allium tuberosum, A.odorum, A.schoenoprasum

China	*jiu tsai, gau tsoi, gau choy fa*
English	*Chinese chive, garlic chives* ***A.tuberosum***
Indonesia	*kucai*
Japan	*nira*
Malaysia	*kuchai*
Philippines	*kutsay, ganda, amput, imayyaw*
Thailand	*kuichai, hom-paen*
Vietnam	*he*

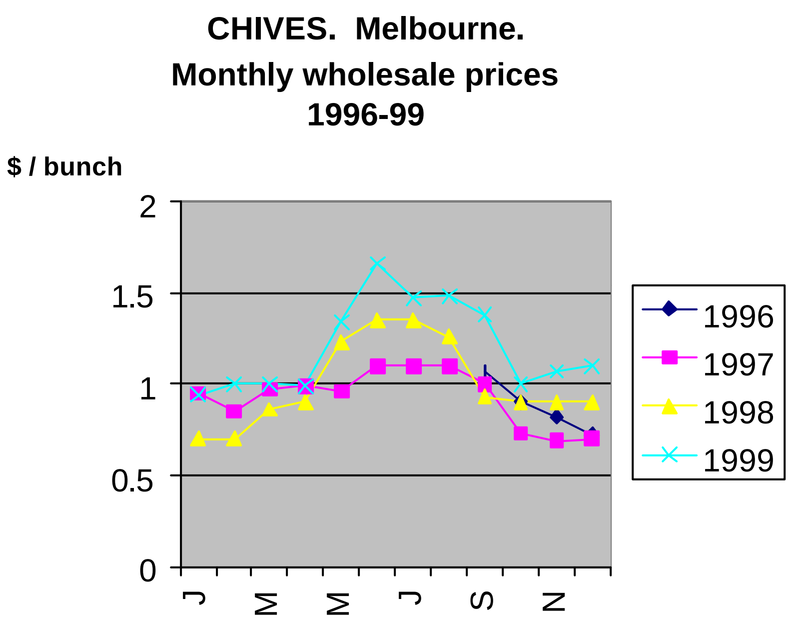
Description
The leaf, flower stem, flower bud, and flower are consumed either by cooking or in the raw form.

Chinese chives tend to be longer and flatter, and have a much stronger flavour compared with the "European" chive. Two variations are common:

- Flowering Chinese Chive (*gau choi fa*). A tubular stem about 20-25 cm long with a single conical tip. Smaller, harder, tighter flower heads are associated with younger stalks are considered the more tender and thus the more preferred.
- Blanched Chinese Chive (*gau wong*). The blanched appearance comes from being grown under darkened conditions. The Blanched Chinese Chive has a very short shelf life after being exposed to light.

Chives - Australia
Both garlic and onion chives are available in the fresh form. Victoria's Institute for Horticultural Development estimates that 3500 kg of garlic chives are sold weekly in Melbourne.

Wholesale market data show price variations of over 50 percent in each of the four years for which data are available. Inter-seasonal price patterns show a consistent rise in the winter months indicating that supplies become more scarce.



Source: Ausmarket Consultants

Chives are available in the freeze dried form but the type, that is, garlic or onion, not identified. Retail price was $1.95 / 3 g packet.

Two brands sold processed onion chives on a unitary price basis, that is for nearly the whole range of herbs and spices sold under that brand, the price was consistent but the volume varied. One was "minced" with a retail price of $0.54/ 4 g and the other "chopped" with a retail price of $0.80/ 4 g.

Chives - International

Randomly noted international retail prices in September 1999 were:

- Hong Kong
  No weight HK$12 / packet
- New York
  The same manufacturer had two brands in the freeze-dried form, one for US$4.19 / 0.31 oz, the other for US$5.89 / 0.16 oz.
- Singapore
  Chive flakes were available at S$4.20 / 9 g and S$4.20 / 27 g.
- Washington
  Fresh flakes were priced at US$1.99 / packet.

Coriander

Coriandrum sativum

Afghan:	*gashneez*
Arabic:	*kazbarah*
China:	*yuen sai*
English :	*Chinese parsley, cilantro* ("perennial coriander" is **Eryngium foetidum**)
French	*coriandre*
German	*koriander*
Hindi:	*dhania pattar, hara dhania, kothmir*
Indonesia:	*daun ketumbar*
Malaysia:	*daun ketumbar*
Philippines:	*ketumbar*
Sri Lanka:	*kothamalli kolle*
Thailand:	*pak chee*
Turkey:	*kisnis*
Vietnam:	*ngo*

Description
An annual, coriander is native to southern Europe. The whole plant is quite aromatic. It has fine foliage, summer flowers, and round seeds.

Use
Reflecting its membership of the parsley and carrot families, the seed, leaf, stem, and root are utilised.

In the fresh form, the top leafy section is widely used in Middle East and Asian cuisine, especially stirfries, curries, soup, and salads as it adds a pungent flavour. It is also used in Indian chutneys, Moroccan stews, and Thai salads. The stem is used in bean dishes and soups. Because of its lively flavour coriander leaf is commonly used to finish off pre-cooked curries. Thus the dried product is used in the manufacturing process and the fresh in the final form.

The seed has a lemon flavour and is mildly narcotic. It is popular in pickles, curries, and *ratatouille* and a number of African, Indian, Asian and Middle East dishes. Seed is consumed in whole and ground forms.

The root is popular for use in Thai red curries as it gives flavour without adding an undesirable green colour.

Medicinal uses are as a cough medicine, mild sedative, and a digestive aid. It has mild antibacterial properties.

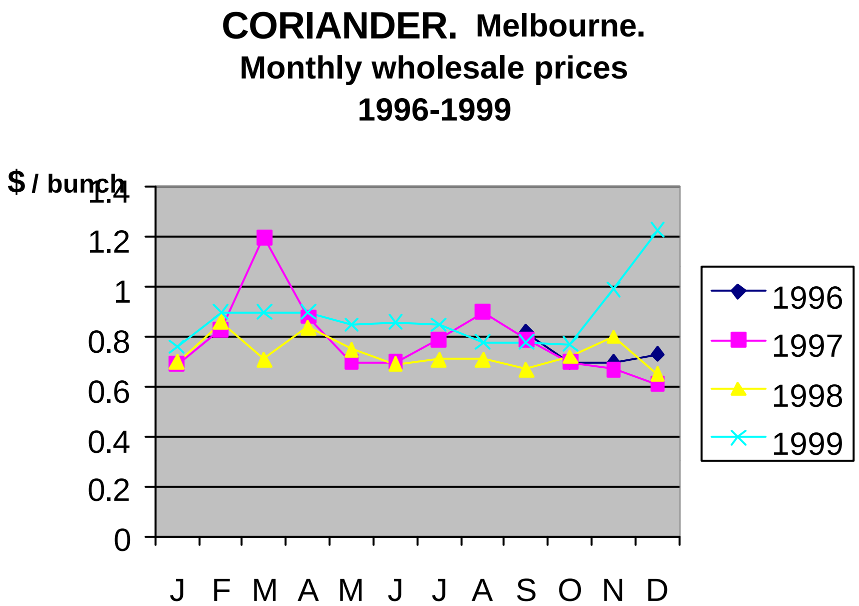
Industrial uses derive from the essential oil distilled from the seeds and involve use in perfumes, incense, and toothpaste. It can be used to flavour gin.

The seed has a lemon flavour and is an ingredient for nearly all Asian curry powders and spice mixes.

Coriander - Australia
Coriander is consumed in Australia in a wide range of forms.

In the fresh form, Victoria's Institute for Horticultural Development estimates that 30 000 bunches are sold weekly in both summer and winter in Melbourne. The estimate for "long coriander" was 7 000 bunches weekly.

Wholesale prices tend to operate within a seasonal average of about 50 percent.



Source: Ausmarkets Consultants

In Perth in August 1999 fresh coriander was retailing for $0.99 / 10 g bunch.

Coriander is available as minced product both as a stand-alone product as well as an incorporated product. As a stand-alone product, it retails at $2.41 / 190 g, and minced in vegetable oil at $3.50 / 210 g. Incorporated with lemon grass it retails at $1.95 / 165 g.

There are a number of dried forms. As ground product it is marketed on a unitary price basis by a number of packers. That is, the packer keeps a constant price for all the herbs and spices packed by him but adjust the size of the pack. All herbs and spice packers deal with coriander. Retail prices for ground product vary between $0.54 /20 g, $0.80 / 20 g, $1.79 /60 g, and $2.25 / 60. Crushed coriander leaves retail for $2.25 / 10 g.

Coriander - International
Fresh coriander is imported into the United Kingdom on the following basis:

- Cyprus year-round
- Guernsey year round
- Israel October - July
- Kenya year-round
- Portugal year-round
- Spain October - November

Cyprus Dried coriander leaves were available in Singapore between S$4.20 - $4.95 / 14 g.

Cress

Arabis causasica

Arabic	*barbeen*
English	*garden cress* ***Lepidium sativum****, upland cress* ***Barbarea verna****, wild cress* ***L.virginicum***
Iranian	*shahat*

Description
Although similar in appearance and flavour to watercress, its leaves are a little larger.

Use
Commonly used in the Arabian Gulf area as a green herb.

Watercress
Nasturtium officinale

English	*Water Pepper, small leaved water cress* ***N.microphyllum***

Description
An aquatic pungent herb.

The leaves contain manganese, iodine, iron, phosphorus, and calcium.

It is noted that the wild-harvest product may contain liver fluke.

Use
Used in salads and soups.

Watercress - International
Watercress is a crop of considerable size in the United Kingdom. About 2 400 tonnes were produced in 1996. Average wholesale prices were around £1.82 /kg.

The United Kingdom imports product from France and Portugal on a year-round basis.

Exotic Cress
The Netherlands has developed the 'Exotic Cress', a series of cresses that combine visual appearance, taste and nutritionally sound. Their different shapes allows them to be sued in the traditional form of a garnish but their other features allow them to be used as a flavour enhancers. Specific varieties are Daikonkers that is somewhat spicy, Shiso that is mint-like, and Biocress.

Curry leaves

Murraya koenigii (**syn*****. Chalcas koenigii, Bergara koenigii)***
M.paniculata (**syn*****. Chalcas exotica)***

English	*nim leaf*
French	*feuille de cari*
Greek	*curryblatt*
Indonesia:	*daun salam*
Italian	*foglia di cari*
Hindi:	*kitha neem, katnim, karipattar, karapincha*
Malaysia	*daun kari, karupillay*
Sri Lanka	*karapincha*

Description
An evergreen tree of about 6 m native to Southern India and Sri Lanka. Leaves are small and slender, very shiny, dark green on top with a more pale underside, and spice-scented.

Not to be confused with leaves from the "curry plant" ***Helichrysum italicum***.

Use
Most parts of the plant are used but the leaves are the major part consumed. They are used in the fresh and dried forms, albeit there is considerable loss of flavour when dried. Their strong curry aroma is heightened when they are bruised and/or rubbed.

A common Indian flavouring, curry leaves are used in southern Indian vegetarian cooking, mulligatawny, and curries.

The bark and roots are used as tonics.

The leaves of ***M.paniculata*** (*Cosmetic Bark, Orange Jasmine*) are used for menstrual problems.

Curry leaves - Australia
Fresh curry leaves were retailing in August 1999 at $1.69 / 10g pack. Supplies were drawn from the Northern Territory. The unit of supply is a one kilogram box.

Curry leaves are incorporated into a number of pastes. The brands noted were all imported.

A Melbourne food manufacturer stated that he had seen frozen curry leaves at Chinese grocery supplier.

Curry leaves - International
Fresh curry leaves from Malaysia were available in Singapore at S$14.50 / kg.

The United Kingdom imports curry leaves from India, Kenya, Mauritius, and Sri Lanka on a year-round basis. Pack weights are around 5 kg.

Dill

Anethum graveolens (**syn*****. Peucedanum graveolens)***

Afghan:	*shabit*
English	*aneto, dill weed/dill herb (**A.graveolens**), Indian/Japanese Dill (**A.sowa**)*
French	*aneth*
Greek:	*anitho*
India:	*anithi*
Indonesia:	*adas mani*
Italian	*aneto*
Spanish	*eneldo*
Sri Lanka:	*enduru*
Thailand:	*phak chee lao*
Turkish:	*dereotu*

Description
A member of the parsley family. An aromatic annual that grows up about a metre in height. The feathery leaves are blue-green colour.

The seed is oval-shaped and rich in minerals.

Use
The flower, leaf, stem, fruit, and seed are all used, albeit the two major varieties having specialist use with ***A.graveolens*** being used largely for its leaf and ***A.sowa*** for its seed. As the flavour of the two varieties differs significantly they cannot be used as substitutes for each other.

The seed can be consumed dried but most popular form is in the fresh immature green form, especially for dill pickles, and oils and vinegar. Their use gives a slightly aniseed flavour to dishes. The immature leaves can be used to flavour sour cream, meat and fish. Heating brings out the flavour of dill seed that is stronger and more pungent than that of the leaves.

Whilst the plant is native to Asia it is not a popularly consumed herb, albeit it has use in various dishes in a number of Asia countries. It is popular in Europe, especially Scandinavia, in pickled cucumber, vinegar, pickled and fermented cabbage, sauces, marinades, and fish (for example Scandinavia's *gravlax* marinated salmon). In the Balkans and Middle East it is used in yoghurts and sour cream.

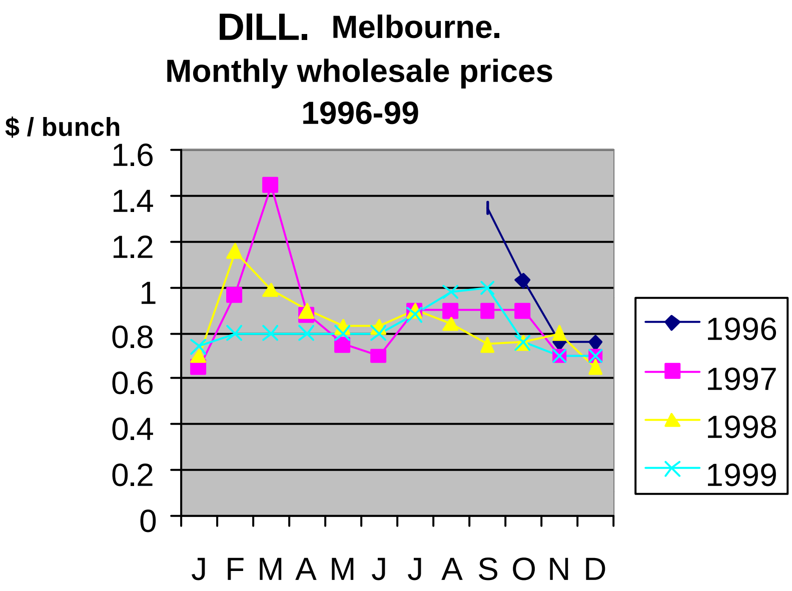
When grown as a broad-acre crop, dillweed oil is extracted.

Medicinal uses derived from ***A.graveolens*** include as a digestive aid, and to reduce flatulence, hiccups, and stomach pains.

Dill - Australia

Dill is marketed in Australia in the fresh and processed forms.

In the fresh form, there is marked intra-season price variations. Prices appear to rise in late summer.



Source: Ausmarket Consultants

In August 1999, fresh dill was retailing in Perth for $0.99 / 10 g.

Dried dill is marketed in unitary pricing by three brands. There was great variation in prices on a per gram basis. Brand A retailed for $0.54/5 g, Brand B for $1.95 /75 g, with a third brand retailed for $0.80/25 g. A non-unitary brand was retailing for $0.99/10 g.

Ground dill tips retailed for $1.95/20 g.

Dill - International
The "dill" referred to in some international data sets refer to the dill seed. India is the major dill seed supplier to the United States.

Dill weed prices, that is, the leaf form of the plant that is considered a herb and not a spice, is specifically recorded by the ITC in Geneva.

International wholesale prices for the 21-month period to September 1999 are shown below.

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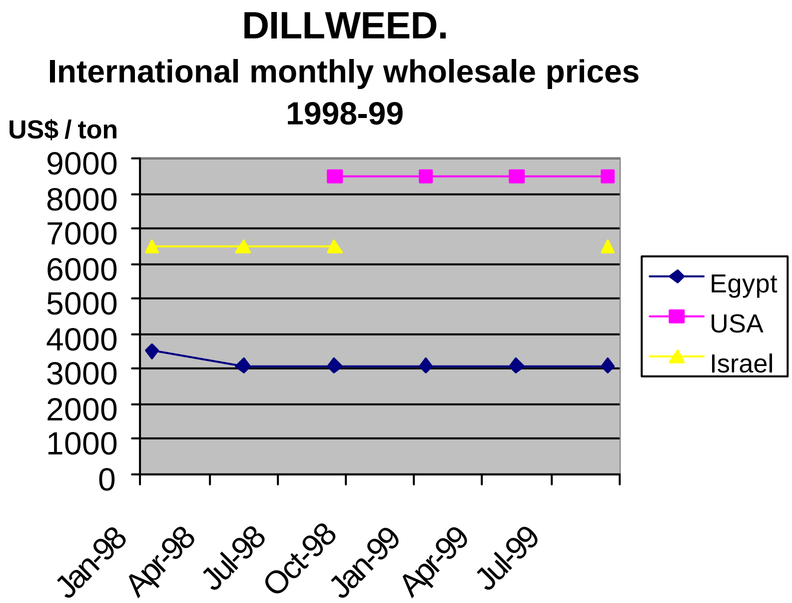


Source: Market News

The data show an unusual degree of non-variability. Except for a one-off variation in Egypt's prices of around 15 percent in the first two months of 1998, prices did not change even though Israeli and United States supplies came in and out of the market over the same period.

As with a number of herbs, the United States product held a price premium of nearly 300 percent over the Egyptian product, that is US$8 485 /t compared with US$3 085 /t.

Other randomly observed retail prices in September 1999 were as follows.

- New York

Brand #1	US$6.15 / 0.5 oz
Brand #2	US$5.39 / 0.3 oz

- Singapore

Fresh dill	S$3.99 / 20 g
Dried dill weed	S$3.90 / 21 g

Fennel

Foeniculum vulgare

English:	*sweet cumin/sweet fennel, large cummin/sweet cumin, finocchio, Florence fennel, fenouil (Sea Fennel* is ***Crithmum maritimum)***
French	*fenouil, anet douce*
German	*fenchel*
Greek:	*maratho*
Hindi:	*saunf, sonf*
Indonesia:	*adas*
Italian	*finocchio*
Malaysia:	*jintan manis*
Sri Lanka:	*madura*
Thailand:	*yira*
Turkey:	*resene*

Description
Native to southern Europe and Asia. The plant is high in sulphur, potassium, and organic sodium.

Seed is larger but more pale compared than cumin seed: the name *sweet cumin* refers to the similarity in size and shape, not the flavour. It has a mild hint of anise.

There are two main types of this aromatic plant. The Florence fennel, also called *finocchio*, is cultivated throughout the Mediterranean and the United States and is treated as a vegetable. The other is "common" fennel from which the oval, greenish-brown fennel seeds come.

Use
The flower, leaf, stem, roots and seed are all used. In Europe fennel is used as a vegetable and a herb whilst in Asia it is mainly the seed that is consumed.

As a vegetable, both the base and stems can be eaten raw in salads or cooked. This part is commonly consumed in Europe but not in Asia. The fragrant greenery can be used as a garnish or snipped like dill and used for a last-minute flavour enhancer. The flavour of fennel is sweeter and more delicate than anise. When cooked, the anise flavour becomes even lighter and more elusive than in its raw state.

Fennel seed is available in the whole and ground forms and used in both sweet and savoury foods. In the Occident fennel seed is used whole or ground to season bread, rolls, pastry, pickles, fish dishes and sauces. In the Orient, fennel seed is used in curries. In India, seeds are mixed with betel leaf and chewed as a digestive and breath sweetener. Fennel seed is used in the various five-spice powder combinations of Asia.

Medicinal uses include addressing shortness of breath, stomach aches, constipation, irregular menstruation, and to increase breast milk.

Fennel - International
United Kingdom imported nearly 9 000 t of fennel as a vegetable in 1996. Nearly 80 percent of this came from France. The average price was £2.03 /kg

Fenugreek

Trigonella foenum-graecum [25]

Arabic	hulba
English	*Greek hay*
French	*fenugrec senegre, trigonelle*
German	*bockshornklee, griechisches*
India	*methi*
Italian	*fieno greco*
Malaysia	a*l*ba
Sri Lanka	*uluhaal*

Description
A native to southern Europe and Asia, it is now widely grown in the Mediterranean countries, Argentina, France, India, North Africa, and the United States.

The three-sided seeds are flat, oblong and brownish, about 3 mm long. They contain vitamins, iron, and minerals. Fenugreek seeds can be quite bitter.

Use
Fenugreek has a curry-like aroma.

The leaf, stem and seeds are used.

Seed sprouts, that have a tangy burnt like flavour, are added to salads whilst larger more mature leaves are consumed in curries. The seeds are roasted and ground for flavouring chutneys, curries, coffee, and, because of its maple aroma, imitation maple syrup. Young seedlings and other portions of fresh plant material are eaten as vegetables or in salads.

Fenugreek seeds have a hormone precursor that is used to assist increased breast milk, and as an ingredient to oral contraceptives. They reduce blood cholesterol and urine sugar in late age diabetes. Other medicinal properties are as an antipyretic and a laxative.

Fenugreek - International
Product is available in the United Kingdom from local product from June to October. Product is imported from Cyprus between November and May.

[25] ***Trigonella*** refers to the angular seed, ***foenum graecum*** means 'Greek hay' as it was used as cattle fodder.

Kaffir lime leaf

Citrus hystrix, C.papedia, C.amblycarpa

China	*fatt-fund-kam*
English	*leprous lime, porcupine orange*
Indonesia:	*daun jeruk* (the lime itself is *jeruk sambal/jeruk limo*)
Malaysia	*limau purut*
Philippines	*swangi*
Thailand	*makrut/bai makrut, som makrat*

Description
Kaffir lime trees are about three-five metres high. The dark green fruit weighs about 50 g and has a thick wrinkly rind. The leaves are highly aromatic.

Use
The rind of the fruit is chopped or grated for use in curry pastes whilst the leaves are used in soups and curries. Usually they are torn or finely shredded as this provides the release of the full citrus flavour.

The leaves appear to freeze well.

Kaffir Lime Leaves - Australia
Fresh and dried whole leaves are produced in Australia but none were observed during the study period nor could any prices be determined.

The product is incorporated into a number of pastes. There are a number of brands of green and red curry pastes available.

Kaffir Lime Leaves - International
The United Kingdom imports lime leaves[26] from Egypt, Malaysia and Thailand on a year-round basis. The product appears to be marketed solely through 'ethnic' shops to the 'ethnic market'.

[26] Called "lime leaves" not kaffir lime leaves but identified as ***Citrus hystrix***.

Lemongrass

Cymbopogon citratus

China	*heung masu tso*
English:	*citronella grass* ***C.nardus****, East Indian lemongrass* ***C.flexuosus****, ginger grass* ***C.martinii****, Melissa Grass*
French	*herbe de citron*
German	*zitronengras*
India	*sera, ghanda*
Indonesia*:*	*sereh*
Italian	*era di limone*
Malaysia	*serai*
Thailand	*takrai*
Vietnam	xa

Description
A tall tufted grass with sharp edges. Grows in clumps and sold fresh in bundles. As the name suggests, the stem and leaves have a distinct lemon flavour. Favoured part is the white base after the tougher outer layers are peeled away.

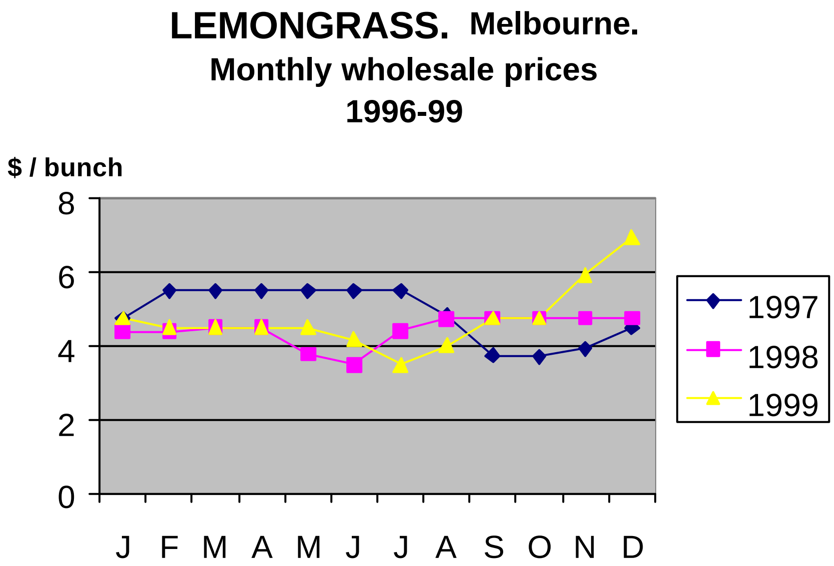
Use
The plant has no real identifiable aroma until it is cut or bruised. Then it imparts a lemon flavour to curries, soups, prawn dishes, stir-fries, salads and pickles. This is why the stem is bruised and then added whole during the cooking.

The essential oil is used in the cosmetic and food industries, and in aromatherapy. ***C.flexuosus*** produces the oil *Vervaines des Indes* whilst the leaves of ***C.martini*** produce Palmarosa oil that has a slight gingery scent and the oil from ***C.nardus*** tends to have industrial applications such as household detergents and airborne sprays. .

Lemongrass is a common herbal medicine in Asia considered to have properties useful in treating coughs and colds, reducing swelling, improving blood circulation, and acting as a diuretic.

Lemongrass - Australia
Lemongrass is available in the fresh, dried and processed form.

In the fresh form, Victoria's Institute for Horticultural Development estimate that Melbourne consumes about 4 500 kg /week. Intra-seasonal wholesale prices are comparatively stable albeit there are still variations of over 50 percent.



Source: Ausmarket Consultants

In August 1999, fresh lemon grass stalks were retailing in Perth for $0.99 / 10 g.

Lemon grass is available in the dried and crushed form, retailing around $2.25 / 20 g pack.

In the processed form it is present as a stand-alone product and as an ingredient.

As a stand-alone product it is minced with a retail price of around $2.14 / 190 g bottle. Whole lemongrass pieces are retailed at $3.50 / 210 g bottle with a remarkably consistent 13 pieces per bottle.

Lemongrass is arguably the most commonly incorporated herb in Australia. There are at least five domestic and imported brands on the market that use lemongrass: red and green curry pastes, non-specific curry pastes, Thai-based products such as "Tum Yum", and a series of "Asian" products such as "Laksa".

Marjoram

Majorama hortensis
Origanum majorana, O.onites

English *Sweet Majoram, Knotted Majoram*

Description
A member of the mint family, marjoram is a perennial. There are a number of forms:

O.majoram	"Sweet Majoram", small leafed
O.onites	Pot majoram", small leafed

It has oval, inch-long, pale green leaves and a mild, sweet, oregano-like flavour. One form, "pot marjoram", has a stronger, slightly bitter flavour.

Use
Because it imparts a sweet and pungent flavour with some bitter undertones, marjoram is used as a flavouring agent for gamey meats and meat products such as terrines,pates, salami, liverwurst, and bologna. It is also incorporated with dairy products such as milky foods, cheeses, and cream dressings.

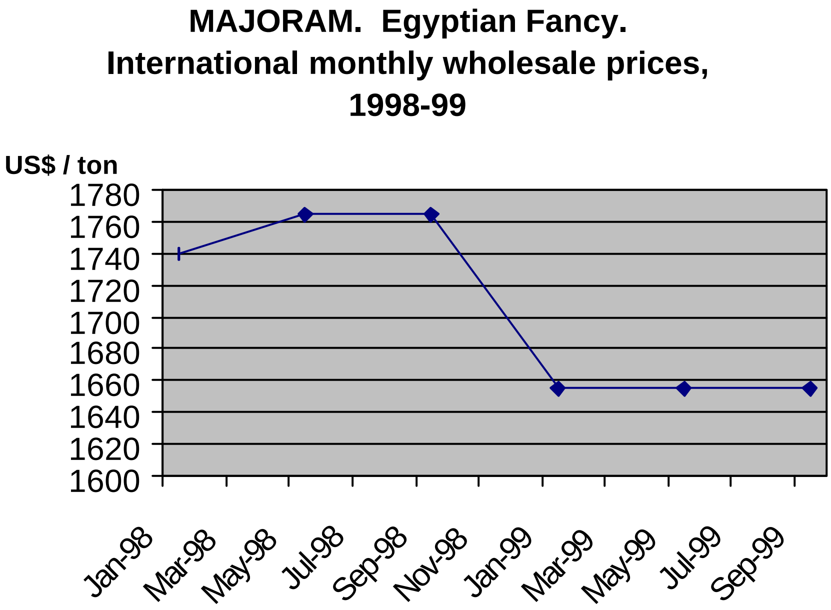
There is a small industrial use in the manufacture of vermouth and bitters. n essential oil is derived from the herb to formulate compounded oils for flavouring sauces, condiments, and canned meats.

The plant has some medicinal uses.

Marjoram - Australia
Marjoram is available in the fresh and dried forms.

It retails in the fresh form around $0.99 /10 g and in the dried form around $0.80 /7 g.

Marjoram - International
Only the one product was recorded - "Egyptian fancy". The product's price was remarkably static, varying only six percent over the 21 months' of observation.



Source: Market News Service

Other international retail prices randomly noted in September 1999 were:

- New York

Brand #1	US$0.99 / 1 oz
Brand #2 "ground, fancy"	US$4.89 / 1.25 oz
Brand #2 "leaves"	US$3.09 / 0.2 oz

- Singapore

Brand #1ground	S$2.77 / 18 g
Brand #2 ground	S$3.40 / 18 g
Brand #3 ground	S$3.90 / 31 g
Dried leaves	S$2.54 / 5 g

- Washington

Organic	US$1.99 / packet

Mint

Mentha spp.

Afghan:	*nauna*
Arabic:	*na'na*
China	*yang po ho, paoh-ho*
Greek	*thiosmos*
India	*podina*
Indonesia	*janggat*
Malaysia	*daun pudina, pohok*
Philippines	*yerba buena*
Thailand	*bai saranae*
Turkey	*nane*

The term "mint" covers

M.suaveolens	applemint
M.smithiana rubra	a spearmint
M.gracilis	a mild mint with ginger tones
M.spicata	a spearmint from Morocco
M.pulegium	pennymint, a type of peppermint
M.aquatica	a watermint
M.aquatica citrata	a lemon mint
M.arvensis	Japanese mint
M.piperita	"Eau de Cologne"[27]
M.spicata	spearmint[28]

Use

Mint is arguably the most popular flavour after vanilla and citrus. It is used in the dried and fresh forms with the fresh leaf form being one of the world's most important herbs.

Most mint flavouring demand is met through the essential oils extracted from the various members of the ***Mentha spp***.

Teas made from mint are popular where the consumption of alcohol is prohibited by religion, especially in the Arab world. Here, the preferred mint flavour is spearmint. It is consumed in the fresh and dried forms.

Mint - Australia

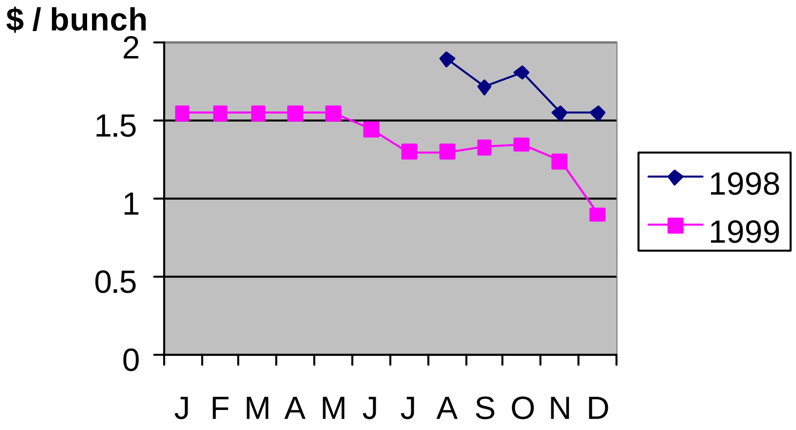
Some fresh markets distinguish between "hot mint" and "mint", the former being associated with Vietnamese mint.

Victoria's Institute for Horticultural Development estimates that 9 000 bunches of "hot mint" and 9 000 bunches of "mint" are sold weekly in Melbourne.

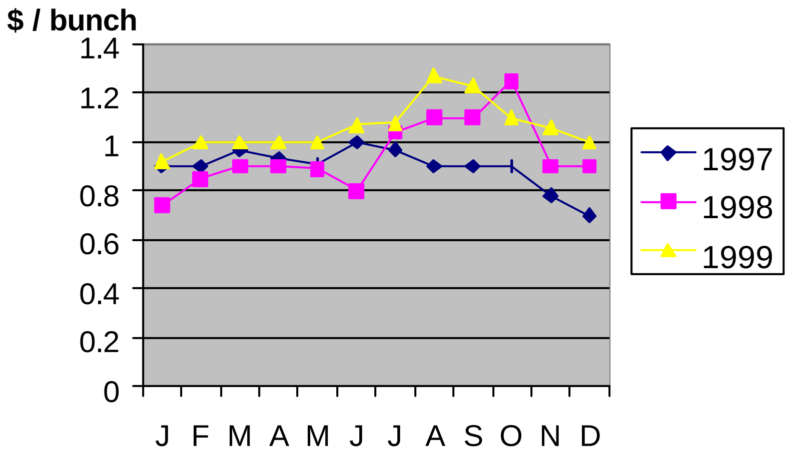
Vietnamese mint receives a premium over traditional mint. Over the 17 months for which data are available the premium varied from negligible to 60 percent. The lack of significant data hinders a general statement regarding the size of the premium and the time of the year that the premium is at its maximum,

[27] In U.S. literature, referred to as "peppermint" and "peppermint flakes".
[28] In U.S. literature referred to as "spearmint flakes".

VIETNAMESE MINT. **Melbourne. Monthly wholesale prices 1998-99**



MINT. **Melbourne. Monthly wholesale prices 1997-99**



Source: Ausmarket Consultants

Dried mint retails for around $1.95/18 g packet.

Mustard

Brassica nigra, B.alba, B.juncea, syn. Sinappsis alba

English	*white / yellow mustard* (***B.alba***), *brown mustard* (***B.juncea***), black mustard (***B.nigra***), *Indian mustard*
France	*moutarde blanche* (white/yellow), *moutarde noire* (black), *moutarde de chine* (Indian)
German	*senf, weisser senf* (white/yellow), *schwarzer senf* (black)
India	*rai, sarson, kimcea*
Indonesia	*biji sawi*
Italian	*senape bianca, mostarde* (white/yellow), *senapa nera* (black), *senape Indiana* (Indian)
Malaysia	*biji sawi*

Description
The mustard plant belongs to the same family as broccoli, Brussels sprouts, collards, kale and kohlrabi. Two types predominate - white, and brown or Asian. A third species, the black mustard seed, has been replaced for most purposes by the brown species because the latter can be grown and harvested more economically. White mustard seeds are much larger than the brown variety but a lot less pungent.

Black mustard seed ***B.nigra*** is the hottest, and ***B.alba*** is the mildest.

Use
By themselves, mustard seeds have little to no smell. The bite invariably associated with mustard seed only occurs when the seed is crushed and mixed with water. White seeds have an initial sweetness with a mild taste, whilst brown and black seeds have an initial bitterness. Black seeds have a sharper "bite" and pungency.

Mustard seeds are the main ingredients in American-style mustards. White and brown seeds are blended to make English mustard. Brown mustard seeds are used for pickling and as a seasoning, and are the main ingredient in European and Chinese mustards.

Mustard seeds are sold whole, ground into powder or processed further into prepared mustard. Powdered mustard is simply finely ground mustard seed. Whole seeds are used for pickling, flavouring, and as a source for freshly ground mustard.

Classic mustards include:

- English mustard — made from yellow seed, with the colour coming from turmeric: hot
- American mustard — made from mild white seeds, colour from turmeric: mild to sweet.
- German mustard — made from black seed: sweet and sour flavour
- Djion mustard — made from black and brown seed with husk removed: salty and sharp
- Bordeaux mustard — made from black and brown seed with husk retained: milder sweet and sour
- Meaux mustard — made from black seeds that are both ground and crushed

Not withstanding its use to make and English-style mustard in China, the white variety is not generally used in Asia. Instead the black type is more commonly used, albeit after soaking in vinegar that inhibits the enzymatic activity that contributes to the English-type heat and pungency.

Oregano

Origanum vulgare
Oregano is a compound from the Greek words o*ros* mountain and *gános* joy, thus *"joy of the mountain"*, probably due to the fact that the oregano roots inhibits soil erosion.

English *Sweet Majoram, Greek Majoram/Greek Oregano, Pot Majoram* ***O.onites***, , Dittany of Crete ***Origanum dictamnus***, *Italian oregano* ***Origanum ×majoricum***, *Small-leaved oregano* ***Origanum microphyllum***, *Syrian oregano* ***Origanum syriacum,*** *Wild Majoram*

Description
Oregano belongs to the mint family and is related to both marjoram and thyme. Native to the Mediterranean, oregano is a perennial cultivated as an annual. It has dark green pungent leaves. ***O.vulgare*** has large dark green pungent leafs.

Oregano is similar to marjoram but is not as sweet and has a stronger flavour and aroma. Mediterranean oregano is milder than the Mexican variety.
O.vulgare var***. aureum crispum*** has a milder savoury taste.

Use
A key ingredient in traditional Italian tomato-based pasta sauces but also popular in pizzas, salads, egg and vegetable dishes because of its peppery flavour. The more pungent Mexican variety is used in highly spiced dishes such as *chilli con carne, enchiladas* and even chilli powder. .

Oregano oil is used to slow down food spoilage and rancidity in high fat dishes such as sausages through its anti-bacterial, anti-fungal, anti-parasitic and antioxidant activities.

Oregano destined for medicinal use is best collected when the fragrant oil (**O*lio origani***) concentration reaches its maximum. ***Olio origani*** contains 80 percent carvacrol that in dilutions as low as 1/50,000 appears to destroys ***Candida albicans***, the ***Aspergillus*** mold, ***Staphylococcus***, ***Campylobacter, Klebsiella, E.coli, Giardia, Pseudomonas*** and ***Proteus***. It also contains 15 percent thymol that is considered to boost the immune system. Oregano is used as an expectorant, tonic, digestive and as an infusion in cases of respiratory infections

Oregano - Australia
Oregano is one of the major European herbs consumed in Australia. It is available in the fresh and dried forms.

In the fresh form, marjoram retails for $0.99 / 10 g.

Retail prices for the dried form vary considerably. In September 1999 the following were observed: Brand #A $0.54 /10 g, Brand #B $1.60 /30 g, Brand #C $1.95 /15 g.

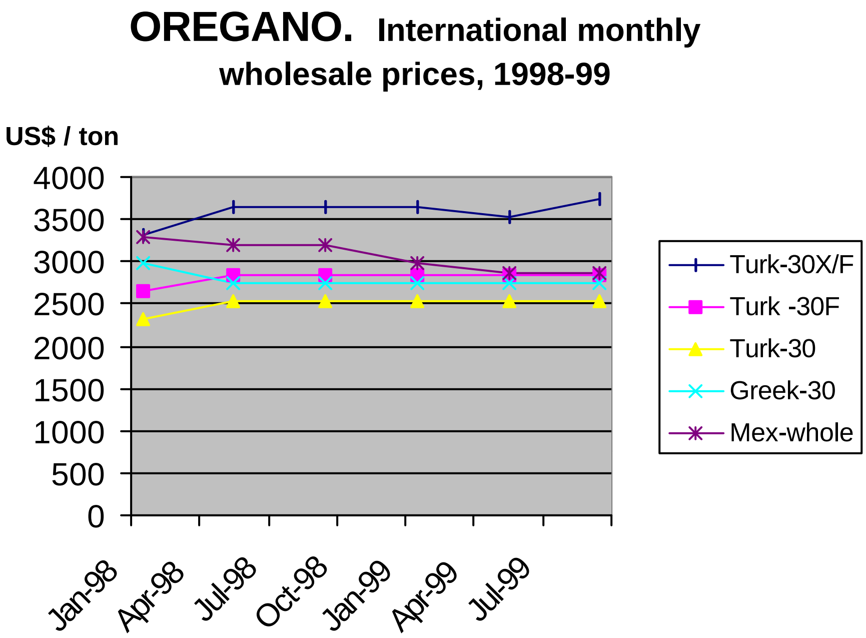
Oregano is popularly incorporated in pre-frozen bakery products such as focaccia with large flakes evident on the surface.

Oregano - International
Three sources of product are identified by the International Trade Centre: Turkey, Greece, and Mexico.

Turkey appears to be the market leader with its grades being the international standards. The various grades and their price range over the period January 1998 - July 1999 are:

- Turkish 30 Mesh Extra Fancy: US$3 305 /t - US$3 745 /t
- Turkish 30 Mesh Fancy : US$2 645 /t - US$2 845 /t
- Turkish 30 Mesh FAQ : US$2 315 /t - US$2 535 /t
- Greek 30 Mesh : US$2 755 /t - US$2 975 /t
- Mexican Whole Leaf : US$2 865 /t - US$3 285 /t

Price movements are shown below



Source: Market News Service

The United States imported in 1998 around 6 500 t of Origanum product[29]. Turkey, Mexico and Greece supplied over 95 percent of imports in 1998. United States' import prices were well below those noted by the International Trade Centre:

Origanum. United States import prices
Select origin, 1997-98

	Greece US$ / kg	Mexico US$ /kg	Turkey US$ / kg
1997	1.78	1.48	2.32
1988	1.84	1.97	2.32

29 Defined as "Origanum" and "Origanum, other than crude".

International retail prices randomly noted in September 1999 were:

- New York

Brand #1	US$0.99 / 1 oz
Brand #2 "Ground Mediterranean"	US$6.69 / 1.5 oz
Brand #3 leaves	US$2.29 / 2.25 oz
Brand #2 leaves	US$3.99 / 1.37 oz

- Singapore

Brand #1 ground	S$4.03 / 21 g
Brand #2 ground	S$7.50 / 44 g
Brand #1 leaves	S$2.31 / 8 g
Brand #2 leaves	S$5.75 / 6 g
Brand #3 leaves	S$3.85 / 6 g
Fresh leaves from Malaysia	S$3.99 / 20 g

- Washington

Organic fresh leaves	US$1.99 / packet

Parsley

Petroselinum crispum

Arabic	*bakdounis*
Greek	*maidano*
Turkey	*maydanoz*

Description
Parsley is a taprooted biennial native to north and central Europe. There are more than 30 varieties with ***P.crispum*** var***. tuberosum,*** "Hamburg Parsley" being noted for its root that is boiled as a vegetables, and ***P.crispum*** var***. neapolitanum*** "French/Italian Parsley" having a coarse strong flavour and succulent edible stems.

The leaves and stems are rich in the minerals iron, iodine, manganese, and copper, as well as the vitamins A and C.

Use
Whilst the leaf, stem, carrot-like root, and aromatic seeds are consumed, it is the leaf that is the most commonly used, especially as a garnish and seasoning in European cuisine. The Hamburg parsnip-rooted type is cultivated for its fleshy root.

In the Middle East, the flat-leafed Italian Parsley is regarded more favourably than the curled leafed variety.

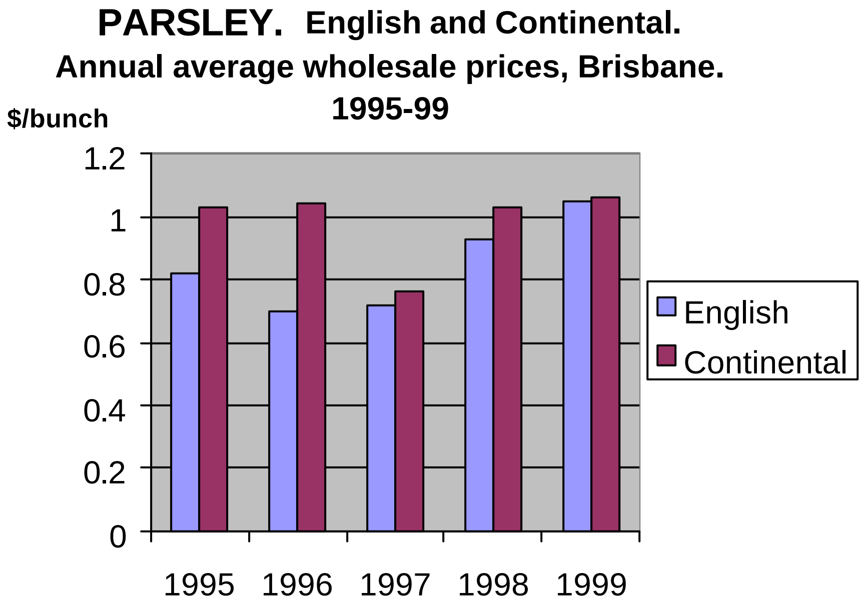
Parsley is available in the fresh and dehydrated forms. It was one of the first herbs to be developed in the frozen form.

Three essential oils are obtained: parsley seed oil, parsley leaf oil, and parsley herb oil that is a distillation of the whole plant. An oleoresin is also obtained from the seeds.

Pharmaceutical uses involve the leaves and the roots.

Parsley - Australia
Parsley is the most commonly marketed herb in Australia. It is sold in the fresh and dried forms.

The margin achieved by Continental parsley over the English type has declined over the five years to 1999.



Source: Ausmarket Consultants

In the fresh form there is considerable intra- and inter- seasonal variations.

Parsley is marketed in the dried form as flakes and minced. Flakes prices are less than those of mince with the former retailing for between $0.54-0.80 / 4 g packet and the latter for $2.25 /10 g.

Parsley - International

The United Kingdom produced 535 tonnes of parsley in 1996. Product availability is shown below.

Source	Availability into the United Kingdom
United Kingdom	Year-round
Cyprus	Year-round
France	Year-round
Germany	May - November
Guernsey	Year-round
Israel	October - May
Jersey	October - May
Portugal	October - June

Source: **Fresh Produce Desk Book**

Rosemary

Rosmarinus officinalis

English *sea dew*
Greek: *thendrolivano*
Turkish: *biberiye*

Description
Rosemary is a member of the mint family native to the Mediterranean. It has short needle-shaped leaves that are silver green and is highly aromatic. Flavours are described as "lemon" and "pine".

Use
Rosemary is consumed in the fresh and dried whole-leaf form, as well as the powdered form.

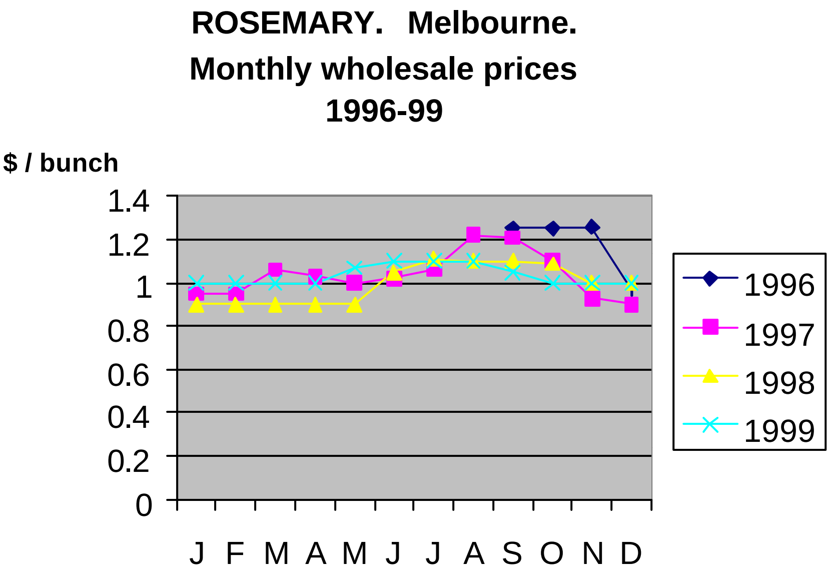
It has antiseptic and anti-oxidant properties making it useful as a preservative, and in aiding digestion of fat. Thus, it is used as a seasoning, especially in soups; the pale meats such as poultry, veal, rabbit, lamb and mutton; fish; egg dishes; stuffings and dressings. It is popular in Mediterranean dishes.

Rosemary flowers are used as garnish.

Oil distilled from the flowering tops has anti-bacterial and anti-fungal uses. The man use of the oil is in toiletries such as hair shampoos, bath essences, deodorants, and cosmetics. Rosemary essential oil is also employed in insect repellents.

Rosemary - Australia
Rosemary is marketed in the fresh and dried forms.

In the fresh form there can be intra-season price variations of up to 50 percent. In August 1999, fresh rosemary was retailing for $0.99 / 10 g. In the dried form rosemary retails for around $0.80 / 11 g pack.



Source: Ausmarket Consultants

Rosemary - International
Origins of internationally traded rosemary are Moroccan / Turkish, Spanish, and Yugoslavian / Albanian.

Approximate annual New York spot prices are:

Rosemary. New York spot prices, 1997-99

	Moroccan / Turkish US$ / kg	**Spanish** US$ / kg	**Yogoslavian/ Albanian** US$ /`kg
1997	1.49	1.74	1.87
1998	1.38	1.74	1.87
1999	1.32	1.74	n.a.

Source: **USDA - FAS. Horticultural and Tropical Products Division**

In Singapore in September 1999, fresh rosemary from Malaysia was retailing for S$3.99 / 20g, about the same price as dried leaves.

In the United States, "Fancy Leaves" were retailing for US$3.99 / 0.62 oz but "Leaves" for US$3.99 / 0.35 oz.

Saffron

Crocus sativus

Afghan	*zafarron*
Arabic	*zaffaran*
English	*wild saffron* ***C.cartwrightianus***
Iranian	*zaffaron*

Description
Saffron is a perennial with grass-like leaves. The mauve flower with three vermilion stigmas is the sought after part of the plant. About one kilogram of saffron is produced from 5 kgs of stigma that comes from around 80 000 kgs of fresh flowers that in turn is derived from around 150 000 flowers[30]. Harvesting is labour intensive as is sun-drying, the usual method of reducing moisture down to the industry standards of 8-10 percent. The requirements of saffron are *a noble class sufficiently sophisticated to appreciate [saffron's] culinary subtleties and a class of slaves or workers which can be forced or persuaded to harvest it* (Greenberg and Ortiz 1983).

Geographic origins can indicate grade. Spanish saffrons of "Mancha", "Rio", an "Sierra", are premium grades. Other grade attributes are stigma length, colour, and aroma. Other premium grades are Kashmir Mongra No.1 that has a long-cut stigma.

Note: "saffron powder"/"crocus powder" is invariably ground turmeric; "saffron colour" is unlikely to be true saffron; "bastard/false saffron" is ***Carthamus tinctorius.***

Use
Having a sweet, spicy, floral odour, saffron is used in the bakery, confectionery, and beverage industries. It is incorporated either by soaking the stands in hot milk or water for about fifteen minutes before adding to the dish, or, toasting the strands lightly and then crushing with a spoon.

Its formerly popular use as a food colourant is declining due to price pressures from turmeric and tartrazine. There has been a small revival due to the banning in Europe of tartrazine due to its carcinogenic properties.

Its use as a textile dye has all but disappeared due to the pressure of synthetic dyes.

[30] From Sampathu et al. 1984. Greenberg and Ortiz (1983) and ITC (1982) use different conversions albeit in the same high numbers.

Sage

Salvia officinalis[31]

English	*Dalmatian sage* ***Salvia officinalis****, Blue sage* ***S.clevelandii****, Red sage* ***S.coccinea****, Golden chia* ***S. columbariae****, Peruvian sage* ***S. discolor****, Salvia of the Gods* ***S. divinorum****, Fruit sage* ***S.dorisiana,*** *Pineapple sage* ***S.elegans****, Mealy sage* ***S.farinacea****, Greek sage* ***S.fruticosa,*** *Roseleaf sage* ***S.involucrata****, Spanish sage* ***S. lavandulifolia****, Garden sage* ***S.officinalis,*** *Apple sage* ***S.pomifera,*** *Bluebeard sage* ***S. viridis***

Description
A perennial herb from the Mediterranean that is cultivated as an annual in more temperate climes.

Sage is an oval gray-green fuzzy leaf. Technically, it is described as a strong aromatic herb with a bitter afternote. Smell is pungent, slightly bitter, and mildly camphoric.

There are a number of varieties. Of major culinary interest are:

S.officinalis var***. icterina***:	*aka* Gold Variegated: mild flavour
S.officinalis var***. tricolor***:	mild flavour
S.officinalis var***. balsamic***	scented leaves

Use
Taste increases when dried, thus used with strongly flavoured foods. It aids the digestion of fatty meats, thus is commonly incorporated into sauces and mustards for dishes containing pork, cheese and beans, as well as stuffing for poultry and game. Sausage makers also frequently use it to flavour their products.

The hormone precursor helps irregular menstruation and in menopausal conditions.

Sage oil is used to flavour liqueurs, bitters, condiments, and in perfumery formulations. Sage oleoresin is used as a flavouring agent in industrial meat processing. It is probably the second most important herb oleoresin after celery seed.

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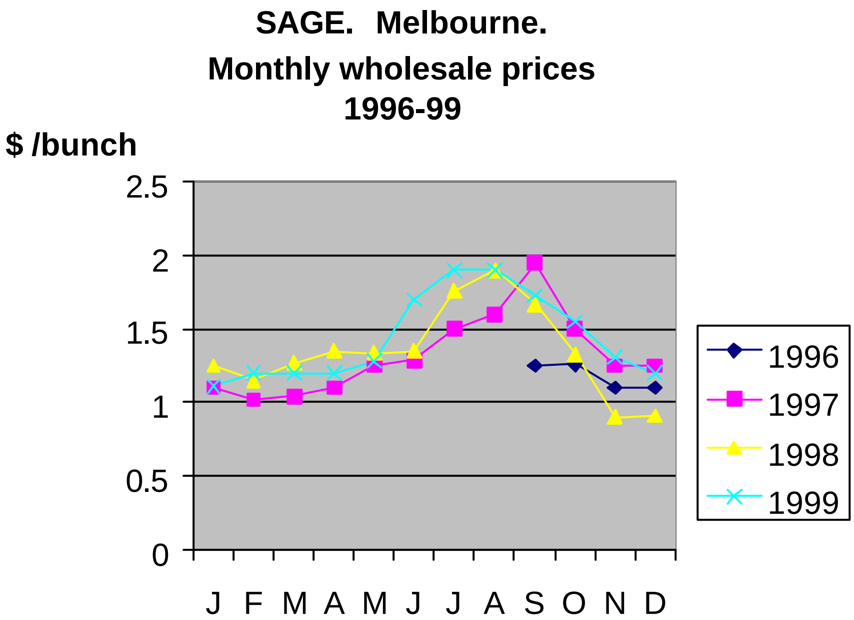
[31] U.S. literature refers to ***S.triloba***.

Sage - Australia
Sage is sold in Australia in the fresh and dried forms.



Source: Ausmarket Consultants

In the dried form, its retail price varies significantly with pack size; $0.80 / 5 g and $2.25 / 25 g.

Sage - International
Dalmatian sage ***Salvia officinalis*** is the commonly trade sage.

Befitting its traditional centre of origins, the Balkans is the major source of product imported into the United States. Albania, Croatia, and Macedonia (Skopje) supplied nearly 70 percent of all imports in 1998. Greece and Turkey supply most of the balance.

As with most herbs it exports, Turkish product tends to be at the higher end of the price spectrum.

Sage. United States imports by select origins, 1997-98

	Albania US$ /kg	Croatia US$ /kg	Macedonia US$ /kg	Greece US$ /kg	Turkey US$ /kg
1997	1.61	2.17	1.47	1.49	1.72
1998	1.60	2.54	1.70	1.64	2.12

Source: **USDA - FAS. Horticultural and Tropical Products Division**

Japan imports about 10 t annually[32].

[32] Pers.com. Japan Herb Association.

International retail prices noted randomly in September 1999 were:

- London

Organic	$0.75 / packet

- New York

Dalmatian leaves	US$4.99 /0.43 oz
Ground	US$4.89 / 0.6 oz
Fresh organic	US$1.99 / packet

- Singapore

Brand #1	S$3.91 / 5 g
Brand #2	S$6.95 / 23 g
Brand #3	S$3.80 / 11 g
Fresh leaves from Malaysia	S$3.99 / 20 g

Savory

Satureja montana

English	*lemon savory* ***S.biflora,*** *Browne's savory S. brownei, Oregon tea* ***S douglasii****, summer savory* ***S. hortensis,*** *winter savory* ***S. montana,*** *Jamaican savory* ***S. viminea***
France	*poivre d'ane* (donkey's pepper)
German	*pfeffer kraut* (pepper herb), *Bohnen Kraut*
Netherlands	*boonen kniid* (bean herb)

Description
Related to the mint family.

S.hortensis, the annual, and ***S.montana***, the perennial, are the two most commonly varieties commercialised.

Use
Savory has an aroma and flavour that is a cross between thyme and mint. It has a sufficient peppery taste that it can be used as a substitute for pepper, hence its French and German common names.

Savory adds a piquant flavour to soups, meat, fish and especially bean dishes such as legume casseroles and lentil soups.

Is an ingredient in digestive liqueurs and tonic waters.

Very small quantities of the essential oil are used as a flavourer.

Savory - International
The only traded price observed was for product of Yugoslavian / Albanian origin with the New York spot price being US$2.13 /kg (1997), and US$2.42 /kg (1998).

International retail prices in September 1999 were:

New York: ground,	US$5.99 / 1.37oz
Singapore:summer savory	S$3.80/ 20g
Washington: organic	US$1.99 /packet

Sorrel

Rumex spp.

English — *Garden Sorrel **R.acetosa**, French sorrel **R.scutatus**, Belleville Sorrel, Sour Sorrel, Sour Grass, Dock Sorrel, Spinach Sorrel, Herb Patience Dock*

Description

Sorrel leaves are shaped much like those of spinach and range from pale to dark green in colour, *vide Rumes acetosa* Broad Leaf Sorrel. The more ovoid shaped leafs are ***R.scutatus*** Buckler Leaf Sorrel.

Belleville Sorrel is the most strongly flavoured of the sorrels and Dock Sorrel the most mild.

As sorrel matures it becomes more acidic. The leaf, that in spring is bland, is rich in vitamins.

Use

The more acidic sorrels are used to flavour cream soups, pureed as accompaniments for meats and vegetables or used in omelets and breads. In the spring, when at its youngest and mildest, sorrel is used in soups, salads or cooked as a vegetable.

Buckler Leaf Sorrel has a lemon piquancy.

Sorrel - Australia

Sorrel is not a common herb in Australia. Just the once, in Perth, was it sighted in either the fresh or dried form. Then, it was retailing for $0.99 / 10 g in the fresh form.

Star Anise

Illicium verum

China	*baht ghok*
English	*Japanese star anise* ***I.anisatum****, Chinese star anise* ***I.versum***
French	*anis de la Chine*
German	*sternanis*
Indian	*badian*
Indonesia	*bunga lawang*
Italian	*anice stellato*
Malay	*bunga lawang*
Thailand	*poy kak bua*
Vietnam	*hoi*

Description
An eight-pointed star shaped fruit of an evergreen tree native to China and belonging to the Magnolia family. It is slow to bear, taking about six years to first fruit. Once it bears, it remains productive for about a century.

Use
Star anise has an intense licorice flavour.

It is consumed in dried form either whole, in segments, or ground.

One of the major ingredients in the Chinese five-spice powder. In the ground form it is used in smoking mixtures.

Star anise - Australia
Star anise is available in Australia in the whole and ground form, albeit the whole form is the more popular.

Retail prices are pack-size dependent: $0.80 / 10g but $2.25 / 40g.

Tarragon

Artenisia dracunculus
The name appears to be derived from the Arabic word for "dragon" as the herb was associated with being a body purifier when diseases were epidemic.

English *estragon*

Description
Tarragon has a bitter-sweet taste with light anise-like flavour.

There are two types: "French" ***A.dracunculus*** var***. sativa,*** and "Russian" ***A.drancunculoides*** syn. ***A.drancunculus***, albeit both types originated in Russia. Because it is more savoury, "French" tarragon is the more highly sought.

Tarragon is high in vitamins A and C.

Use
Tarragon is consumed in the fresh and dried forms.

It is used primarily in European cooking, especially the sauces hollandaise, bearnaise, and tartare. It can pureed for bechamel sauce and serving with vegetables.

It is increasingly being incorporated in the whole form into "designer" oils and vinegars.

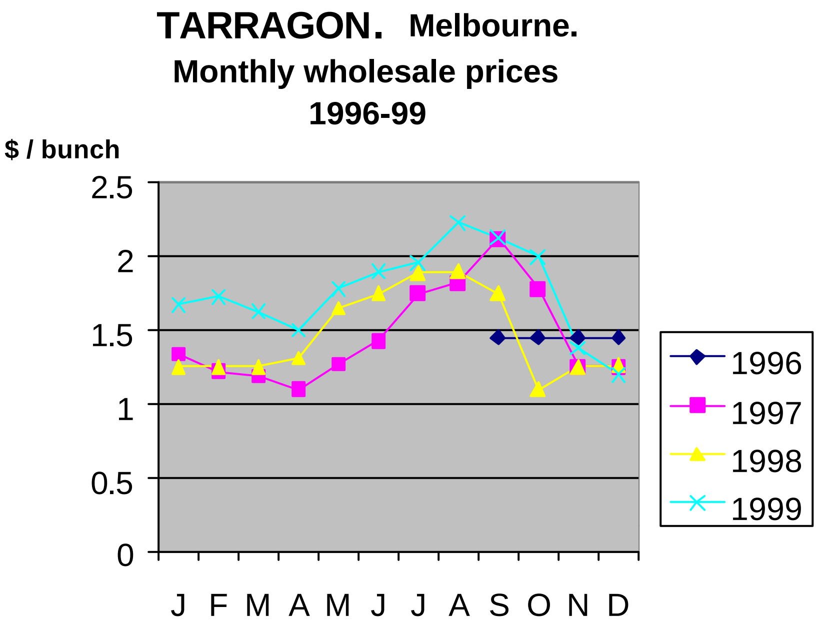
The leaves are believed to help stimulate the appetite and a tea made from tarragon has often been used as a tonic.

An essential oil is derived y steam distillation of the whole upper part of the plant. It is used as a flavouring for vinegar and liqueurs, in perfumery, and in the manufacture of scented toilet preparations.

Tarragon - Australia
Tarragon is sold in the fresh and dried forms.

In each of the four years for which data are available, intra-seasonal prices varied by over 50 percent: in some years it was greater than 100 percent.

Inter-seasonal prices show the same pattern, suggesting that in winter supplies dwindle significantly.



Source: Ausmarket Consultants

Tarragon - International
Price data was observed for United States and French product:

Tarragon. New York spot prices, 1997-99

	US Domestic US$ /kg	French US$ /kg
1997	15.98	16.53
1998	15.98	13.22
1999	15.98	13.22

Source: **USDA - FAS. Horticultural and Tropical Products Division**

Other randomly noted international retail prices in September 1999 were:

- New York:
  - Leaves US$5.29 / 0.37oz
  - Organic US$1.99 /packet
- Singapore
  - Leaves US$3.90 / 14g

Thyme

Thymus vulgaris
Thyme originates from the Greek word *thýmon* "courageous".

English *Azores Thyme* ***T.caespititius****, Conehead Thyme* ***T.capitatus****, Caraway Thyme* ***T.herba-barona,*** *Creeping Thyme Garden Thyme* ***T.vulgaris, T.praecox*** *Japanese Thyme* ***T.quinquecostatus****, Lavender Thyme* ***T.thracicus****, Lemon* **Thyme *T.×citriodorus****, Mastic Thyme* ***T.mastichina****, , Mother-of-Thyme,* ***T.serpyllum****, Spanish Thyme* ***T zygis,****Wooly Thyme* ***T.pseudolanuginosus****, Wild Thyme* ***T.pulegiodes/T.serpyllum,*** Golden thyme ***T.aureum***

Description
Thyme is a member of the mint family, thus related to basil, oregano, and marjoram. There are over 100 varieties of thyme. Wild, garden, and lemon thyme are the most commonly used.

Native to Mediterranean, it is a perennial cultivated as an annual.
Consumed in fresh and dried forms.

Use
Thyme has culinary, medicinal and decorative uses.

It is one of the most popular herbs used in European cooking, and is part of *Bouquet Garni* (along with parsley and bay leaves) a staple of modern European cuisine. Thyme is often used in stews, soups, meats and stuffings. It is also used in desserts like custards and cream.

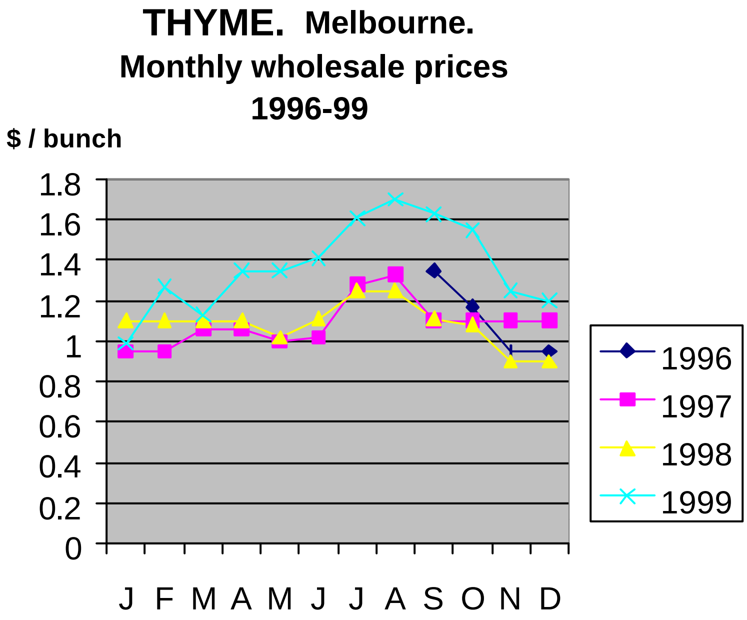
Honey made from Greek wild thyme is famous for its unique flavour.

Thyme is believed to strengthen the immune system. Thyme oil, distilled from the leaves, is high in thymol content giving the oil strong germicidal and antiseptic properties. It is used in tonics to treat depression, colds, and muscular pains. The fungicidal properties mean that the oil is used in anti-mildew preparations. The essential oil is also used in perfumery formulations, the manufacture of bath preparations, toothpastes and mothwashes.

Thyme - Australia
Australia has what is termed "native thyme". It is also called "native basil" which is an ***Ocimum*** specie. The flavour is such that it should be used sparingly.

Thyme is sold in the fresh and dried forms.

In the fresh forms there are intra-seasonal price variations but these tend to be less than those of most of the other fresh herbs.



Source: Ausmarkets Consultants

In Perth in August 1999, fresh thyme was retailing for $0.99 / 10 g.

In the dried form retail prices vary between $0.54 / 5 g pack to $0.80 / 12 g pack.

Thyme - International
The most common varieties traded are garden Thyme ***T.vulgaris*** and White Thyme ***T.zygis***.

Two sources of product were noted: Morocco and Spain. The latter has a price premium greater than 50 percent over the former.

Thyme. New York spot prices, 1997-99

	Morocco US$ /kg	**Spain[33] US$ /kg**
1997	1.52	3.03
1998	1.43	3.03
1999	1.30	3.03

Source: **USDA - FAS. Horticultural and Tropical Products Division**

33 Based on mid-point range of quoted prices.

Randomly recorded international retail prices in September 1999 were:

- New York

Brand #1 ground fancy	US$5.47 / 1.25oz
Brand #2 ground	US$3.75 / 0.37oz

- Singapore

Brand #1, ground	S$3.44 / 19g
Brand #2, ground	S$4.95 / 40g
Brand #3, ground	S$2.00 / 19g
Brand #4, ground	S$3.90 /60g
Fresh from Malaysia	S$3.99 / 20 oz

Japan imports about 13 t annually[34].

Detailed import data are available for Hong Kong and Singapore. However the reference - 0910 4000 - aggregates thyme and bay leaf. This is considered to render the data inoperative.

[34] Pers.com. Japan Herb Association.

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