

MARKET ANALYSIS OF CUMIN SEED

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Executive Summary

This paper investigates the current state of the international cumin market and explores the market opportunities for Australian cumin producers. It provides a baseline assessment of the global industry, using the limited information currently available, and identifies areas for further research. The study used secondary data sourced from credible databases including the Food and Agriculture Organization (FAO), World Trade Organization (WTO), United Nations International Trade Statistics Database (UN ComTrade) and the World Bank.

Cumin (*Cuminum cyminum*) is a small herb, belonging to the Apiaceae family. It produces aromatic dried fruit, which are marketed either whole or ground. Cumin seeds come in three colours: amber, white and black. Amber is the most widely available variety, but the black cumin has the most intense flavour.

Cumin is widely used as seasoning in cooking, particularly in the cuisines of Mexico, India and the Middle East. Powder and oil are the most common value-added products of cumin. It is also used in perfumery and flavouring liquors, as well as in medicinal products. Cumin is a good source of plant protein, monosaturated fats and dietary fibres, and the different biological and biomedical activities of cumin have been shown to assist in the treatment of indigestion and hypertension.

Currently about 91% of the world's cumin is produced from four countries: India, Syria, Turkey and the United Arab Emirates (UAE). While limited global production data is available, India is estimated to produce about 70% of the world's cumin, with approximately 800,000 hectares under cultivation and yielding 500,000 tonnes. In 2018, India exported about 187,000 tonnes of cumin at a net value of US\$438 million. The average trade value of Indian cumin on the international market is US\$ 2,344/tonne. In the US the domestic market price of cumin is approximately \$3000/tonnes (UN ComTrade, 2019, DASD, 2019, TurkStat, 2019).

The Australian domestic market for cumin is supplied by imports, with 1,080 tonnes imported in 2018, valued about US\$3.8M (UN ComTrade, 2019). The majority of the cumin was imported from India. The limited available data indicates there has been a continuous growth in the quantity of imported cumin, both in Australia and other international markets. The demand trend line indicates that by 2025 Australia will be importing more than 1,800 tonnes/year (Figure 12).

The trade price of cumin in Australia has been volatile over the last decade, with rates varying depending on the product origin and transport costs. In 2018 the price was US\$ 3,553/tonnes (UN ComTrade, 2019). Australia typically pays a higher than average trading value for cumin on the international market which suggests there is an opportunity for a new local cumin industry to target the higher values on offer within Australia, before scaling up production for international markets.

Suitability of Australian conditions for cumin production will be tested through the CRC for Developing Northern Australia 'Spicing Up the North' project. What is already known from the global supply chain is that cumin is cultivated mostly in tropical and subtropical regions (ideally within the 20° to 38° north latitudes) but requires low atmospheric humidity. It prefers loamy and medium-textured soils with good drainage. For maximum yield, the cumin plant requires a temperature range from 9°C to 26°C which is generally the winter season of the major cumin producing regions of India, Iran, Turkey, and Syria. It is sensitive to frost and both flower and seeds could be damaged with low temperatures (below 2°C). Australia has the opportunity to provide counter seasonal production to the major cumin producing countries in the northern hemisphere, which will potentially impact global price cycles. However, further assessment of this impact is required given that cumin can be dried and stored for long periods. The proximity of Australia to the largest market in Asia provides the greatest advantage for Australian cumin producers.



RESEARCH WITH IMPACT

Pending proof of its suitability to Australian environments, future research will be required to understand the supply chain infrastructure required to support a new industry, as well as the value chain structures that could support value-adding opportunities for medicinal products.

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Introduction – Study scope

This report presents findings of a preliminary market analysis and features information about the current global production and future demand for cumin. The report is based on the limited data and literature available through secondary, credible sources including the databases of the FAO, WTO, UN ComTrade and the World Bank.

The purpose of the report is to provide baseline information to the Australian cumin industry, farmers, marketers, processors, agronomy services and policy-makers, as it provides insights for greater understanding of the current production and future demand for cumin in domestic and international markets. As such, the report also includes an overview of Australian cumin market and scopes the potential for a future cumin industry in Australia.

This report does not provide a detailed value chain analysis of cumin products, but provides a description of potential uses of this spice and opportunities for value-adding cumin seed.

Analysis of the production stages, methods, and agronomic factors affecting seed quality will be provided in subsequent reports based on the field varietal trials being undertaken as part of this project.

Background – about cumin

Cumin (*Cuminum cyminum*) (also known as *Jeera/Zeera*) is a small herb, which produces aromatic dried fruit. It is used widely for cooking and seasoning. Cumin's unique flavour complexity has made it an integral spice in the cuisines of Mexico, India and the Middle East. It is also used in perfumery and flavouring liquors, as well as in medicinal products - it is considered as one of the most valuable medicinal herbs in the world.

It is believed that the origin of cumin is either Egypt or the south Mediterranean region (Kafi, 2006). The plant belongs to *Apiaceae* family. Cumin is marketed as whole or ground. Cumin seeds come in three colours: amber, white and black. Amber is the most widely available variety, but the black cumin has the most intense flavour.

The plant is semi-erect attaining a height of 20 to 30cm with a slender and smooth stem and compound leaves. The colour of the flower is generally pink (sometimes white), and the fruits are dry with an approximate length of 4mm (Gondalia et al., 2019). Cumin contains several vitamins and minerals (Parthasarathy & Kandiannan, 2007, Mohassel, 2006) (Table 1).

Table 1: Basic composition of cumin seeds

| Content | g/100 g | Content | mg/100 g | Vitamins | mg/100 g |
|--------------|---------|------------|----------|------------------------|----------|
| Moisture | 8.1 | Calcium | 931 | Vitamin B ₁ | 0.73 |
| Protein | 17.8 | Potassium | 1788 | Vitamin B ₂ | 0.38 |
| Fat | 22.3 | Phosphorus | 449 | Vitamin C | 17.20 |
| Carbohydrate | 44.2 | Sodium | 168 | Vitamin A | 175 IU |
| Fiber | 10.5 | Magnesium | 366 | Niacin | 2.5 |

Sources: Parthasarathy & Kandiannan, 2007, Kakhki & Mohassel, 2006

Cumin is cultivated mostly in tropical and subtropical regions (ideally within the 20° to 38° north latitudes) and it requires low atmospheric humidity (Kafi, 2006). Yields as high as 760 kg/ha were recorded in Turkey in 2008/09 and 663 kg/ha in India in 2011/12 and 2012/13 (Table 2). To achieve maximum yield, the cumin plant requires a temperature range from 9°C to 26°C which is generally the winter season of major cumin producing regions (India, Iran, Turkey, Syria and UAE). Though cumin is considered a winter crop in most cumin producing countries, it is sensitive to frost and both flower and seeds could be damaged by low temperatures (below 2°C). It is suggested that loamy and medium-textured soils with good drainage are most suitable for the growth of cumin (Parthasarathy &

Kandiannan, 2007). About 91% of world cumin is produced in four countries i.e., India, Syria, Turkey and UAE, and the remaining produced in other tropical or sub-tropical Asian and African countries.

Global cumin production

The exact total world production data for cumin is not available in the literature and hence approximate production percentages between countries are presented. India is the world's largest cumin producing country, contributing about 70% of total world output (Figure 1). The other major cumin-producing countries are Syria (13%), Turkey (5%), UAE (3%), and Iran (Gondalia et al., 2019). The area under cumin production in India is estimated at 800,000 ha, yielding 500,000 tonnes (Kumar, 2017), with production growing rapidly from 2009 to 2014.

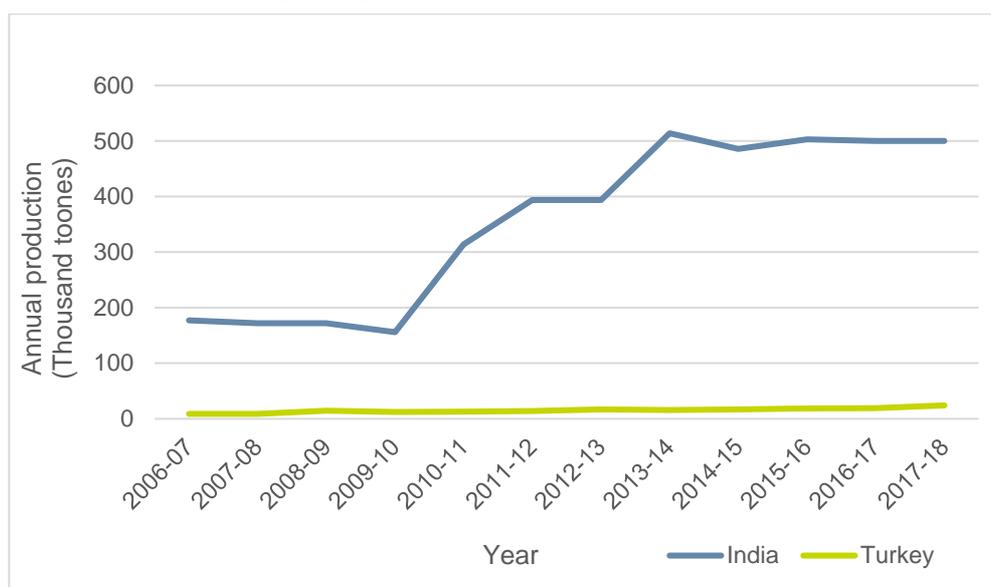


Figure 1: Annual production of cumin in India and Turkey (Data Source: DASD, 2019, TurkStat, 2019)

Cumin yields in both India and Turkey (Table 2), provide a benchmark against which performance can be measured.

Table 2: Area under cumin production and yield produced in India and Turkey

| Year | India | | Turkey | |
|---------|--------------------------|------------------|--------------------------|------------------|
| | Area (thousand ha) | Yield (kg/ha) | Area (thousand ha) | Yield (kg/ha) |
| 2006-07 | 409 | 432 | 18.3 | 500 |
| 2007-08 | 429 | 402 | 18.4 | 480 |
| 2008-09 | 429 | 402 | 19.0 | 760 |
| 2009-10 | 377 | 415 | 17.1 | 740 |
| 2010-11 | 508 | 619 | 20.0 | 660 |
| 2011-12 | 594 | 663 | 22.6 | 610 |
| 2012-13 | 594 | 663 | 24.7 | 690 |
| 2013-14 | 859 | 598 | 22.4 | 690 |
| 2014-15 | 890 | 546 | 27.0 | 630 |

| | | | | |
|------------------------|-----|-----|------|-----|
| 2015-16 | 808 | 623 | 26.9 | 690 |
| 2016-17 | 781 | 641 | 26.7 | 720 |
| 2017-18 (estimtaed) | 781 | 641 | 36.2 | 670 |

Source: DASD, 2019, TurkStat, 2019

Some discrete data is available in the literature regarding the production of cumin in Iran and Syria. The data indicates that Iran's cumin production was 15,000t in 2016 (Royalspice, 2019). Syria produced over 55,000t of cumin in 2004 (Hamwi, 2006) but its production fell to 25,000-28,000t in 2015 (Royalspice, 2019) due to its civil war.

Cumin exporting countries

India is the largest cumin exporter and data from UN Com Trade indicates that in 2018 India exported about 187,000 tonnes around the world with a net value of about US\$438 million. According to UN Com Trade, the UAE was the second-largest cumin exporter in the year 2018. The UAE does not produce much cumin locally, but is the second largest cumin exporting country by indirect import from Syria and Iran. No data regarding Syrian cumin production and trade was found from the UN Com Trade, while Hamwi (2006) indicated that Syria was the second largest cumin producer and exporter for several years. The world's export value of cumin was US\$ 519million in 2018, approximately 34% higher than in 2016 (Table 3).

Table 3: Major cumin exporting countries in 2016 and 2018

| | 2016 (source: www.trademap.org) | | 2018 (Source: ComTrade) | |
|------|--|------------------|-------------------------|------------------|
| Rank | Country | Value ('000 USD) | Country | Value ('000 USD) |
| 1 | India | 274,807 | India | 438,082 |
| 2 | Syria | 51,109 | United Arab Emirates | 16,527 |
| 3 | Turkey | 20,003 | Turkey | 21,374 |
| 4 | UAE | 10,860 | Spain | 6,684 |
| 5 | Ethiopia | 4,635 | Netherlands | 6,114 |
| 6 | Iran | 3,026 | Czechia | 1,647 |
| 7 | Lithuania | 2,834 | Lithuania | 1,550 |
| 8 | Czech | 2,436 | France | 2,964 |
| 9 | Sri Lanka | 2,172 | Egypt | 2,214 |
| 10 | United Kingdom | 2,154 | United Kingdom | 3,838 |
| 11 | Other | 14,268 | Other | 18,372 |
| | World Total | 388,304 | World Total | 519,365 |

India:

India exports cumin to 150 countries with its three major markets being Vietnam, Bangladesh and USA (Figure 2). The unit price of cumin based on the trade value available in the UN Comtrade database indicates that the highest prices are achieved in the United Kingdom, followed by the USA.

The average trade value of Indian cumin is US\$ 2,344/tonnes, compared to the trade value per tonne in the USA and UAE of US\$ 3,000/tonne (Calculated from total trading value, Source: UN ComTrade, 2019).

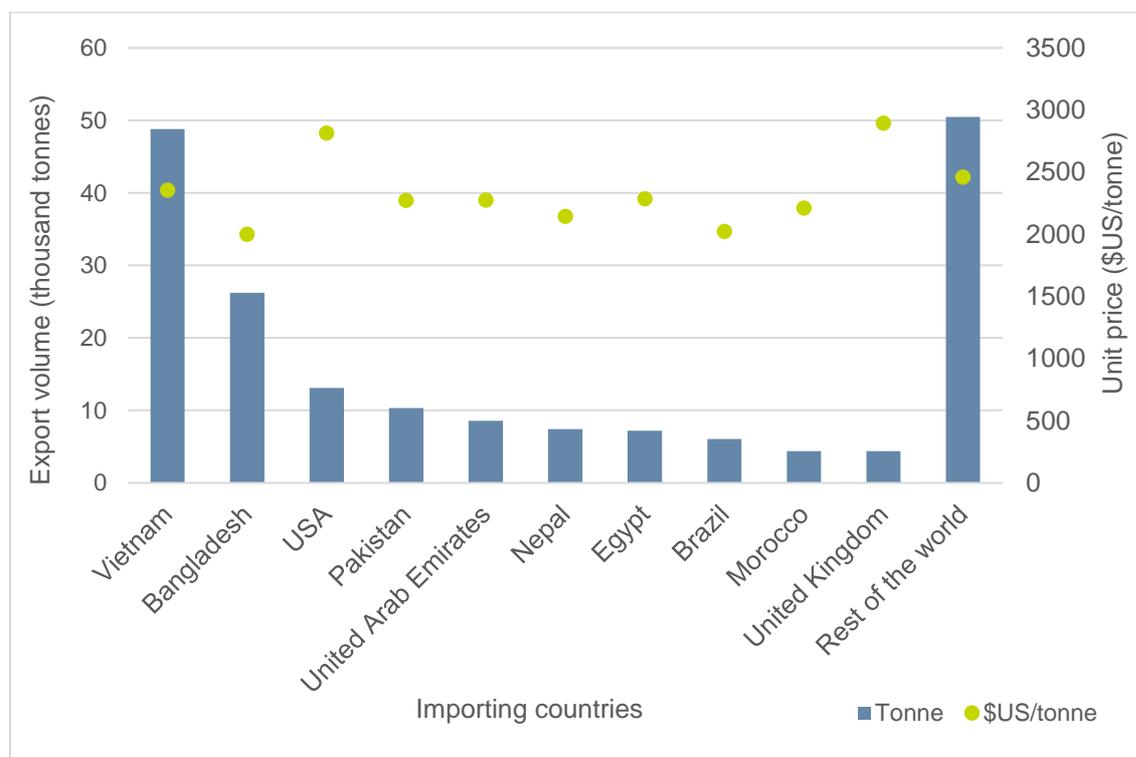


Figure 2: Top 10 export destination of Indian cumin (Data source: UN ComTrade, 2019)

India also exports value-added cumin products such as powder and oil (Table 4).

Table 4: Export percentage of value-added cumin products relative to the percentage of cumin exported as seed.

| | Form of cumin | Quantity (tonnes) | % |
|--------------|---|-------------------|-------|
| India (2016) | Black cumin seeds | 9693 | 7.52 |
| | Cumin seeds (other than black cumin seed) | 112885 | 87.61 |
| | Powder | 6213 | 4.82 |
| | Oil & Oleoresins | 55 | 0.04 |

Source: (Gondalia et al. 2019)

Turkey:

About 80 countries import cumin from Turkey. In 2018, Turkey exported over 7000 tonnes of cumin, the top export destination was Bangladesh taking 35% of Turkey's export volume. Some 14.7% of cumin was exported from Turkey to so-called 'free zones' in 2018. 'Free Zones' belong to the geographical and economic territory of a country but not to its customs territory. Free zones can be commercial free zones (duty-free shops) or industrial free zones (UNStats, 2019).

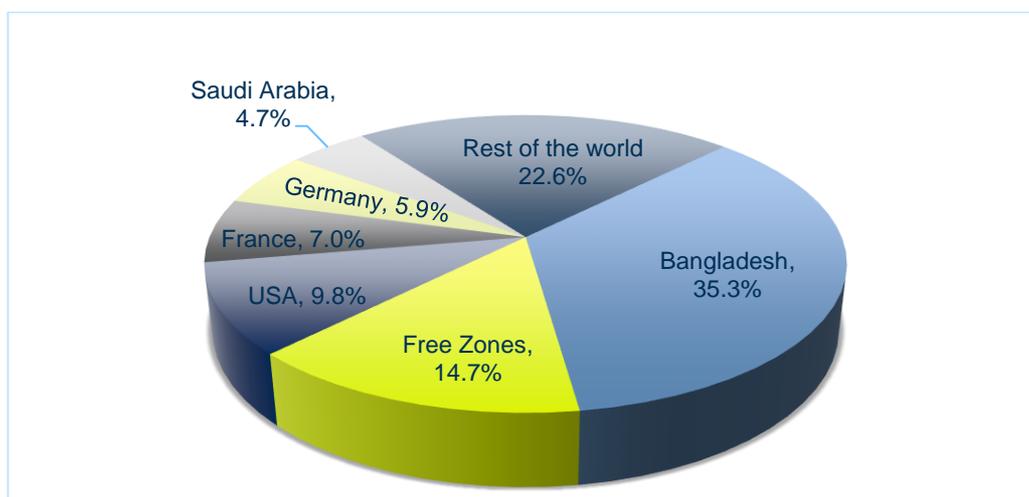


Figure 3: Top export destination of Turkish cumin (Source: (UN Stats, 2019)

The average trading price of Turkish cumin is US\$3,015/tonnes, which is higher than the trading price of Indian cumin (calculated from total trading value, Source: UN ComTrade, 2019). The higher price is due to the quality of Turkish cumin which produce targeted products for Europe. Most of the European countries and Australia paid a higher than average price for Turkish cumin, with trading prices for these countries exceeding US\$4,000/tonnes (Calculated from total trading value, Source: UN ComTrade, 2019).

Quality of cumin seeds are described by cumin seed grades. These quality standards are grouped into European quality cumin seeds, Gulf quality cumin seeds and Singapore quality cumin seeds. Seed quality parameters include purity, process, volatile oil contents, level of admixture in the seeds, seed moisture content and origin of production (<http://www.indiacuminseed.com/cumin-seed-grades/>). The standards for cumin (CXS 327-2017) under international food standards are published by FAO-WHO (http://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B327-2017%252FCXS_327e.pdf)

Syria:

Syria was the second largest cumin producer and exporter in the world before the civil war interrupted output and the availability of accurate production data. Trade data for Syrian cumin was extracted from UN ComTrade database, which indicated that in 2018, Syria exported about 16,000 tonnes of cumin (Figure 4), with the majority destined for the Middle East – over 50% of Syrian cumin is exported to Saudi Arabia and Egypt (UN ComTrade, 2019) (Figure 5). Some European countries, including the Netherlands, Spain and Germany are also major buyers of Syrian cumin (UN ComTrade, 2019).

Cumin importing countries

Cumin is one of the most used spices in Asian countries, so it is not surprising that Asian nations are among the leading international markets (Table 5). In 2018, about US\$ 415M worth of cumin was imported by different countries with Vietnam taking the lion's share with 27.7%.

The average import price of cumin was US\$ 2,440/tonne in 2018. However, it should be noted that there are variations in the quality of available data regarding the import value of cumin.

Table 5: Top ten cumin importing countries

| Rank | Country | Import quantity (thousand tonnes) | Import value (million USD) |
|------|----------------------|-----------------------------------|----------------------------|
| 1 | Vietnam | 48.89 | 115.07 |
| 2 | Bangladesh | 29.44 | 61.28 |
| 3 | United States | 15.95 | 47.94 |
| 4 | United Arab Emirates | 8.66 | 19.70 |
| 5 | Egypt | 6.04 | 19.14 |
| 6 | Nepal | 7.39 | 15.83 |
| 7 | United Kingdom | 4.42 | 13.97 |
| 8 | Saudi Arabia | 6.23 | 12.89 |
| 9 | Afghanistan | 3.87 | 9.62 |
| 10 | Malaysia | 3.07 | 7.53 |

Data source: Tridge, 2019

Vietnam:

In 2018, Vietnam imported about 49,000 tonnes of cumin (Table 5), with almost all of it imported from India. In the past, Vietnam imported cumin from other countries including Turkey, Iran and Syria. There is a large variation in import data of cumin in Vietnam (Figure 6) but the trend line indicates future growth in demand. The predicted demand for imported cumin in Vietnam is 60,000 tonnes by 2025.

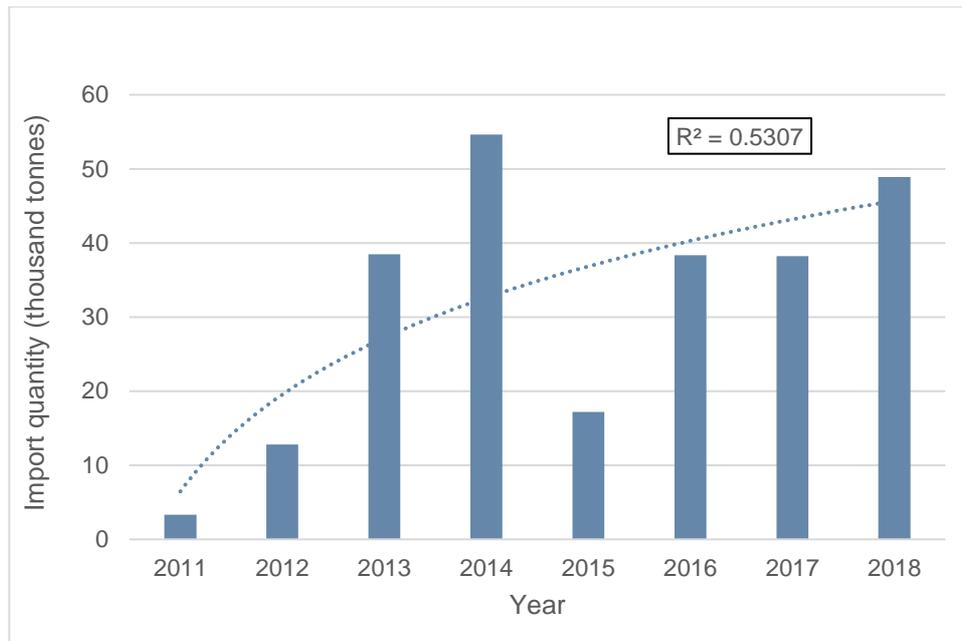


Figure 6: Quantity of cumin imported by Vietnam. (Data source: UN ComTrade, 2019)

Bangladesh:

In 2018, Bangladesh imported cumin predominantly from India and Turkey (Figure 7). The total import value was about US\$ 61M, while the import quantity was about 30,000 tonnes (Figure8) (UN ComTrade, 2019).

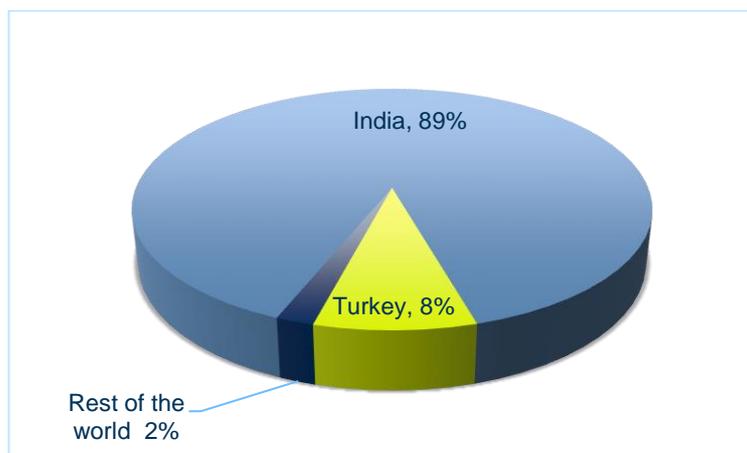


Figure 7: Origin of imported cumin in Bangladesh (Data source: UN Stat, 2019)

The amount of imported cumin in Bangladesh in recent years indicates a tripling in demand between 2015 and 2018 (Figure 8). Following this trend, the demand for cumin in Bangladesh will reach 105,000t by 2025.

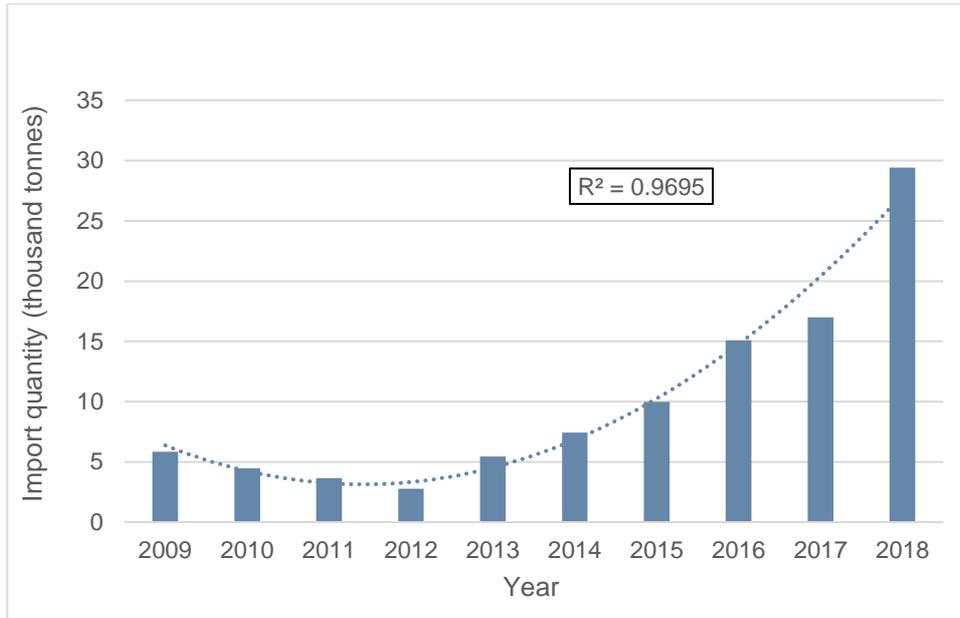


Figure 8: Quantity of imported cumin in Bangladesh. (Data source: UN ComTrade, 2019)

USA:

The USA is the third-largest cumin importer in the world, importing 16,000 tonnes, which equates to US\$48 million worth in 2018 (Figure 10). India is the main cumin exporter to USA and they hold about 82% of market share (Figure 9).

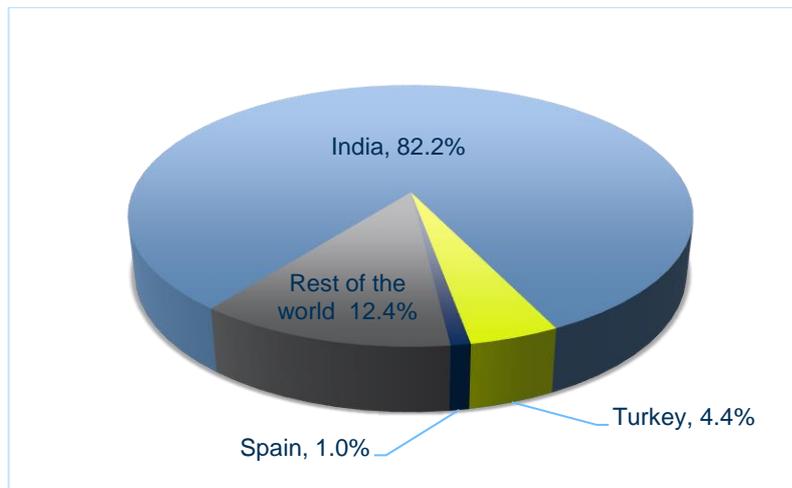


Figure 9: Origin of imported cumin in USA. (Data source: UN Stat, 2019)

The growth in demand for cumin in the USA was steady during the last decade (Figure 10). However, the unit trading price of cumin fluctuated during the same period. The average trading price of cumin for the last four years was about US\$ 3,000/tonnes. The trend line indicates that the annual demand for cumin will reach about 21,000 tonnes by 2025.

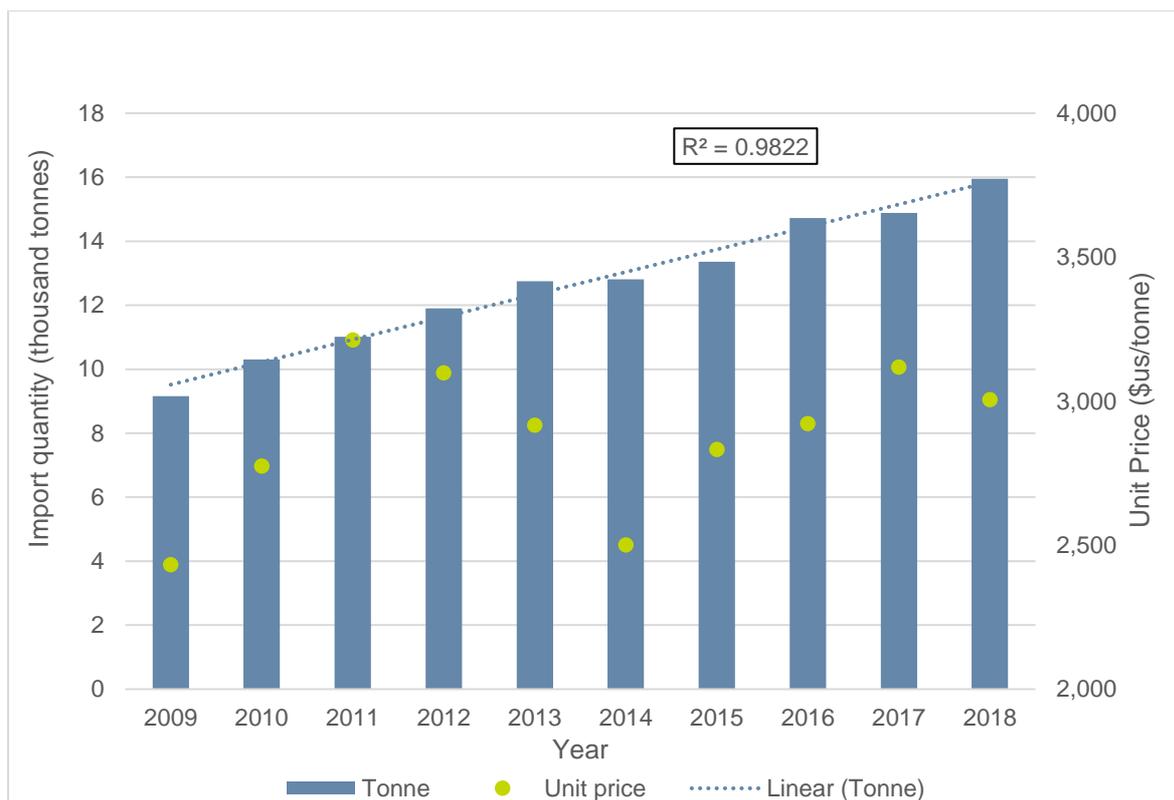


Figure 10: Cumin importing trend in USA. (Data source: UN ComTrade, 2019)

Australian cumin market

Australia’s domestic market for cumin is entirely supplied through imports (Figure 11). In 2018, Australia imported about 1,080 tonnes of cumin, worth about US\$3.8 million.

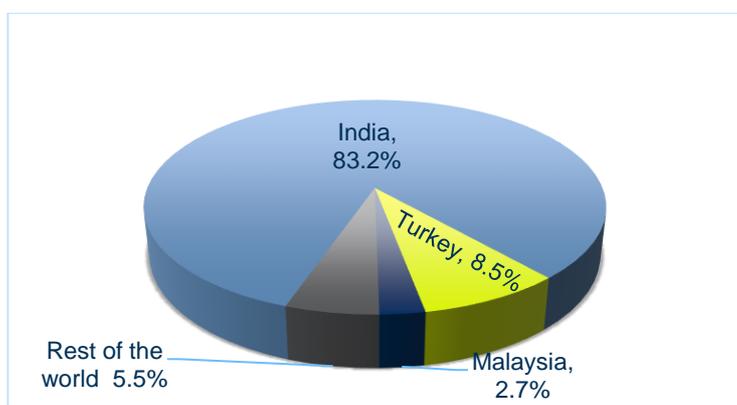


Figure 11: Countries from Australia import cumin (Data source: UN Stat, 2019)

Available data indicates a continuous growth in the quantity of imported cumin, which also refers to the increasing demand for cumin in Australia. The trend line (Figure 12) indicates that by 2025 the demand for cumin in Australia will exceed 1,800 tonnes/year.

The unit trade price of cumin was volatile over the last decade. However, in 2018, the price was US\$3,553/tonnes (UN ComTrade, 2019). Given the unit value and the size of the market, it is likely that any local industry in Australia will initially target the domestic market before scaling up for international markets. For farmers and processors seeking to establish a domestic cumin industry, it is noted that there are already several trading companies in Australia importing, distributing and wholesaling cumin and cumin products.

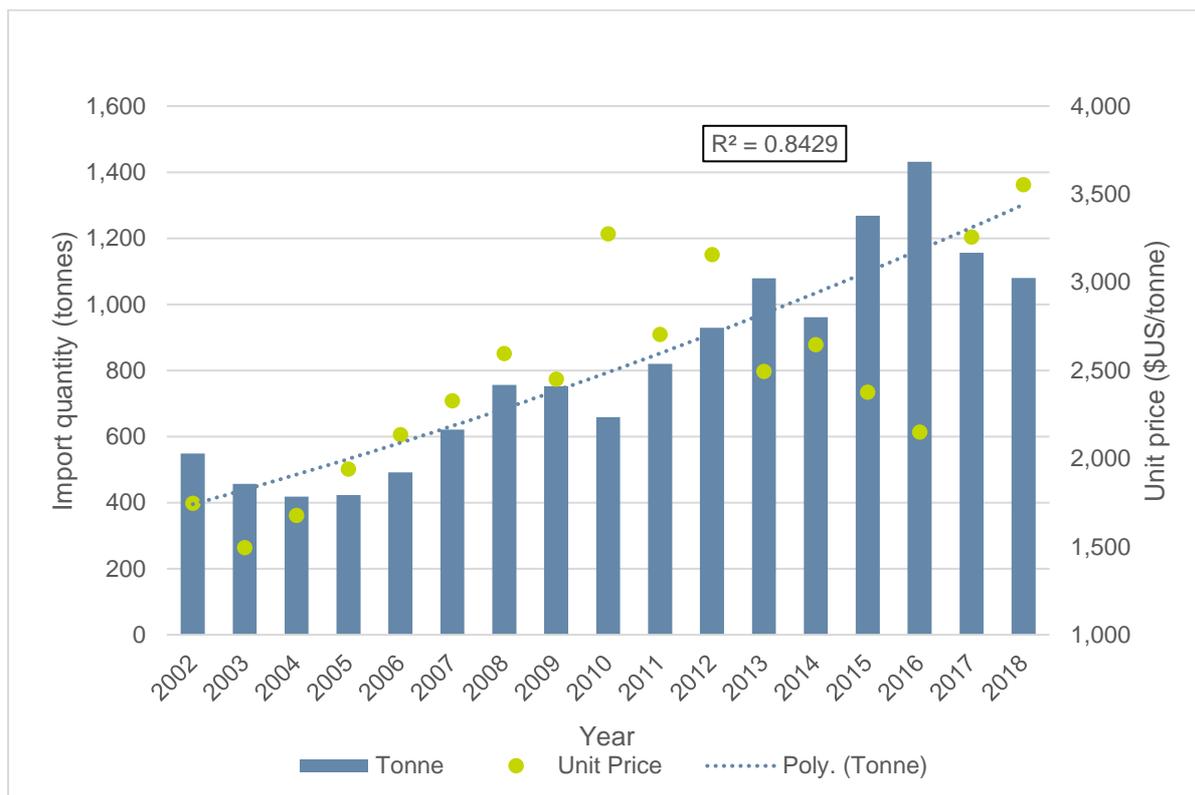


Figure 12: Trend of cumin trade in Australia (Data source: UN ComTrade, 2019)

Value-added cumin products

Cumin is mostly used for cooking and seasoning, with cumin powder and cumin oil the most common value-added products for the food market. Potentially for a number of reasons, such as desirable flavour or health purposes, cumin-flavoured drinks, such as cumin tea, Jeera water, tonic water and cumin-flavoured energy drinks, are some of the more recent and innovative value-added food products. Cumin cake, cumin ice cream, cumin additives in breads and rotis, and cumin sorbets are also being more frequently found on supermarket shelves.

As well as flavour, cumin also appeals to food consumers as a good source of plant protein, monosaturated fats and dietary fibres, which have different health benefits. Cumin is commonly used in traditional medicines. Literature indicates different biological and biomedical activities of cumin (Mnif & Aifa, 2015). Cumin can be used for the treatment of indigestion and hypertension (Kalaivani et al., 2013). Researchers have even studied the effect of cumin on colon cancer (Nalini et al., 2006). Srinivasan (2018) has summarised different usages of cumin in his review paper and graphically presented the medicinal properties of cumin (Figure 13).

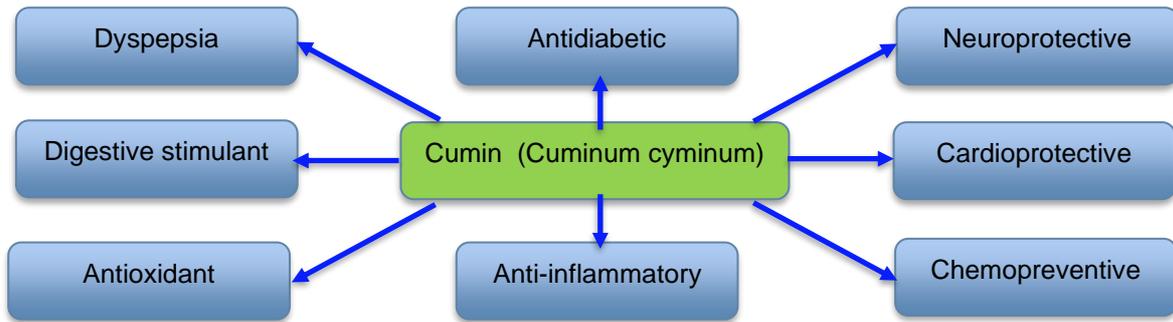


Figure 13: Medicinal usage of cumin. (adapted from Srinivasan, 2018)

The vast array of applications of cumin in value-added products warrants further and more detailed investigation of value-adding opportunities in the event that an Australian supply chain can be established.

Conclusion

Cumin production and consumer demand around the world have both increased during the last decade. The demand for cumin is predicted to continue to increase due to increasing population, changing food consumption behaviour, and increasing demand for value-added products such as oil and powder.

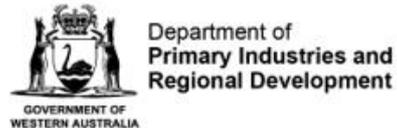
Australia has the potential to enter into the commercial production of cumin by first targeting the domestic market, which has a current value of around US\$4 million. A more accurate assessment of potential market value for domestic crops will depend on the quality of the cumin seeds. This needs to be ascertained through trial production before production is assessed on a commercial scale.

The current CRCNA ‘Spicing up the North’ project is designed to provide a baseline of information on cumin varietal performance and environmental suitability, which will go some way to addressing these questions. The project will also assess the gross margins of cumin production in Australian conditions during the verification and commercialisation phases.

Further research will be required to consolidate on this establishment phase and address questions including:

- Precise agronomic recommendations for pest, disease and weed control, need to be investigated through trial production.
- A detailed supply and value chain analysis to investigate factors including logistics (storage, segregation, transport etc), product processing infrastructure, consumer preference and the viability of value-added products.

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