Tahitian Lime *(Citrus latifolia)*

1. Offer Analysis

Description & Market Trends

Tahitian lime, a citrus fruit cherished for its distinctive taste and aroma, is a significant agricultural product in the Pacific region. Originating from Southeast Asia, Tahitian lime has adapted well to the Pacific's tropical climate, contributing to the diversity of the region's agricultural sector.

In the Pacific, the cultivation of Tahitian lime benefits from ideal climate conditions for citrus growth. These limes thrive in the warm, humid environments that are abundant across the Pacific Islands. The growing season typically commences in the warmer months, with the plants benefiting from the region's sunny and rainy periods. The fruits are grown by a mix of small-scale local farmers and larger agricultural enterprises, demonstrating the fruit's broad appeal. These farms are often situated in areas with fertile soil and adequate rainfall, essential for producing high-quality limes. The farming practices range from traditional, organic methods to more modern, technologically-aided cultivation, catering to various market demands.

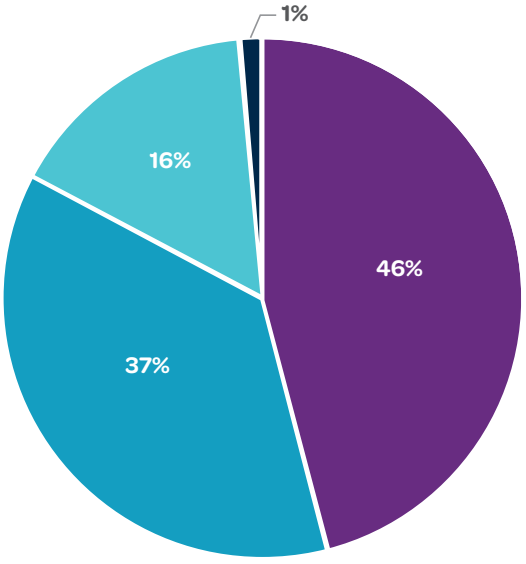
Renowned for their high vitamin content and antioxidants, Tahitian limes are a healthy addition to the local diet. Their unique flavour makes them a favourite in culinary circles, used fresh in a variety of dishes. The juice of Tahitian limes is a key ingredient in many Asian dishes.

Beyond their use in food and beverages, Tahitian limes have diversified applications. The lime oil, extracted from these fruits, is prized in the cosmetics and fragrance industries. Additionally, lime-based products like flavoured salts and garnishes are gaining popularity, opening new avenues for economic growth.

LIME NUTRITIONAL CONTENT

Nutrient	Amount (per 100g)
Energy	30 kcal
Protein	0.7g
Total Fat	0.2g
Carbohydrate	10.5g
Dietary Fiber	2.8g
Sugars	1.7g
Calcium	33mg
Iron	0.6mg
Magnesium	6mg
Phosphorus	18mg
Potassium	102mg
Sodium	2mg
Vitamin C	29.1mg
Vitamin A	50 IU
Vitamin B-6	0.04mg

Table 1: Lime nutritional content (Source: U.S. Department of Agriculture. FoodData Central. Published 2019)



Lime Market Share in New Zealand in 2023 (%)

- Lime Juice
- Lime Fresh or Dried
- Concentrated Lime Juice
- Lime Essential Oil

PRODUCT	2022	2023	Percentage change
Lime Juice	219 Tonnes	444 Tonnes	+102%
Lime Fresh or Dried	175 Tonnes	231 Tonnes	+32%
Concentrated Lime Juice	75 Tonnes	118 Tonnes	+57%
Lime Essential Oil	7 Tonnes	2 Tonnes	-71%

Table 2: Percentage change of tonnes of Lime products sold in New Zealand, 2022-2023

1.2 Uses & Benefits

Here is a showcase of the various value-added products that can be created from Tahitian Lime. Underlined below have been identified as top market trends or high potential by assessing the offerings of leading retailers across New Zealand.

Processed Products

- Juice and Concentrates: Pure lime juice is a staple in domestic and commercial kitchens as a flavour booster for food and beverages. Bottled concentrated lime juice offers a longer shelf life and can be more convenient for repeated use.
- Dried Lime: Lime zest or whole dried limes are used as spices in Middle Eastern cuisines and for infusions.
- Preserves: Lime marmalade, a tangy spread for breads and desserts. Lime-based jams and jellies are used in confectioneries and pastries.
- Pickles and Chutneys: Lime pickles are a popular condiment in Indian cuisine. Chutneys feature lime as a key souring agent.
- Flavoured Syrups: Lime-infused simple syrups for cocktails and desserts.

Convenience and Ready-to-Eat Options

- Fresh Lime Segments: Pre-cut lime wedges or slices for immediate use in beverages or as garnishes.
- Candied Lime: Candied lime peels as a snack or dessert garnish.
- Lime-Flavored Snacks: Lime-infused chips or crisps for a tangy snacking option.

Other Value-Added Products

- Lime-Infused Cooking Ingredients: Lime-infused salts and sugars for culinary use. Lime-flavored oils and vinegar for dressings and marinades.
- Beverage Products: Lime-flavored alcoholic beverages like lime liqueurs. Non-alcoholic beverages like lime-infused soft drinks.
- Essential Oil: Lime essential oil extracted from the peel, used in aromatherapy and flavouring.
- Health and Wellness Products: Lime-based supplements or detox products. Lime-infused beauty products, including skincare and hair care.
- Household Products: Lime-scented cleaning products and air fresheners. Lime oil in candles and diffusers for home fragrance.

1.3 Overall Market Insights

Table 3: Imports of Tahitian lime fresh or dried in value to New Zealand

	2020		2021		2022		2023	
	Value (NZD)	% Total	Value (NZD)	% Total	Value (NZD)	% Total	Value (NZD)	% Total
Vietnam	$14,020	0.84%	$21,049	1.63%	$60,681	3.08%	$584,807	44.86%
United States	$1,157,185	69.29%	$1,024,540	79.11%	$1,596,165	81.05%	$548,379	42.06%
Australia	$288,002	17.25%	$43,506	3.36%	$138,878	7.05%	$94,166	7.22%
Vanuatu	$7,232	0.43%		0.00%		0.00%	$72,906	5.59%
New Caledonia	$203,582	12.19%	$205,968	15.90%	$173,519	8.81%	$3,423	0.26%
Grand Total	**$1,670,021**	**100.00%**	**$1,295,063**	**100.00%**	**$1,969,243**	**100.00%**	**$1,303,681**	**100.00%**

(The grand total includes all countries importing to New Zealand. Only the Top 5 countries are displayed above. *Some countries may not have an IHS, and small quantities may appear in this table. This represents sample size commodities recorded at the border.)

Figure 2: Imports of Tahitian lime fresh or dried in value to New Zealand

(Only the Top 5 countries are displayed.)

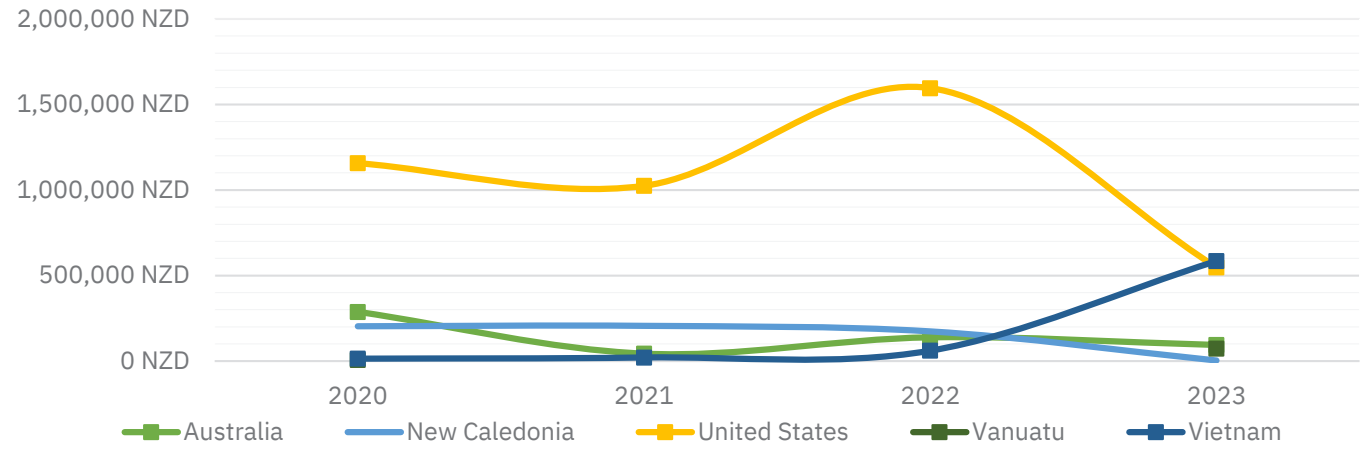


Table 4: Imports of Tahitian lime fresh or dried in volume to New Zealand

	2020		2021		2022		2023	
	Quantity (Kg)	% Total	Quantity (Kg)	% Total	Quantity (Kg)	% Total	Quantity (Kg)	% Total
Vietnam	1,430	0.8%	3,190	2.2%	5,453	3.1%	154,079	66.9%
United States	115,339	66.1%	117,270	80.0%	142,865	81.7%	61,404	26.7%
Australia	34,800	19.9%	3,780	2.6%	10,332	5.9%	9,003	3.9%
Vanuatu	1,365	0.8%		0.0%		0.0%	5,101	2.2%
New Caledonia	21,650	12.4%	22,385	15.3%	16,240	9.3%	770	0.3%
Grand Total	**174,584**	**100.0%**	**146,625**	**100.0%**	**174,890**	**100.0%**	**230,357**	**100.0%**

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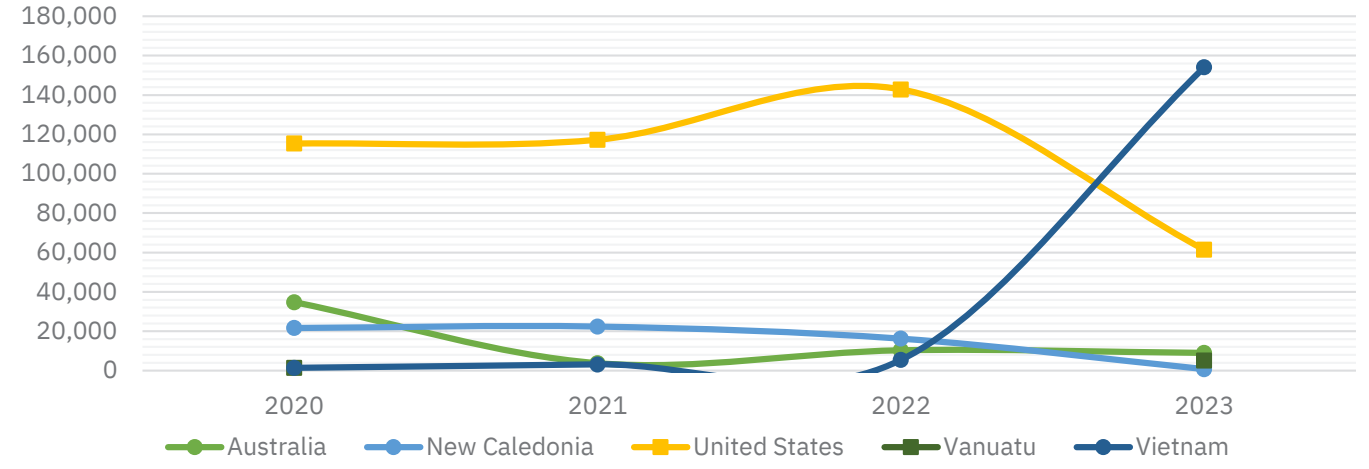

Table 5: Average price per kg of Tahitian lime fresh or dried imported to New Zealand

	2020	2021	2022	2023	Grand Total
Australia	8.28 NZD	11.51 NZD	13.44 NZD	10.46 NZD	43.69 NZD
Egypt		9.48 NZD			9.48 NZD
Fiji			7.81 NZD		7.81 NZD
Iran				6.17 NZD	6.17 NZD
Mexico	19.82 NZD	11.62 NZD	14.16 NZD		45.60 NZD
New Caledonia	9.40 NZD	9.20 NZD	10.68 NZD	4.45 NZD	33.73 NZD
Thailand			25.19 NZD	14.93 NZD	40.12 NZD
United Arab Emirates	15.21 NZD				15.21 NZD
United States	10.03 NZD	8.74 NZD	11.17 NZD	8.93 NZD	38.87 NZD
Vanuatu	5.30 NZD			14.29 NZD	19.59 NZD
Vietnam	9.80 NZD	6.60 NZD	11.13 NZD	3.80 NZD	31.33 NZD

Figure 4: Average price per kg of fresh or dried Tahitian Lime as declared at New Zealand's border

(Only the Top 5 countries are displayed.)

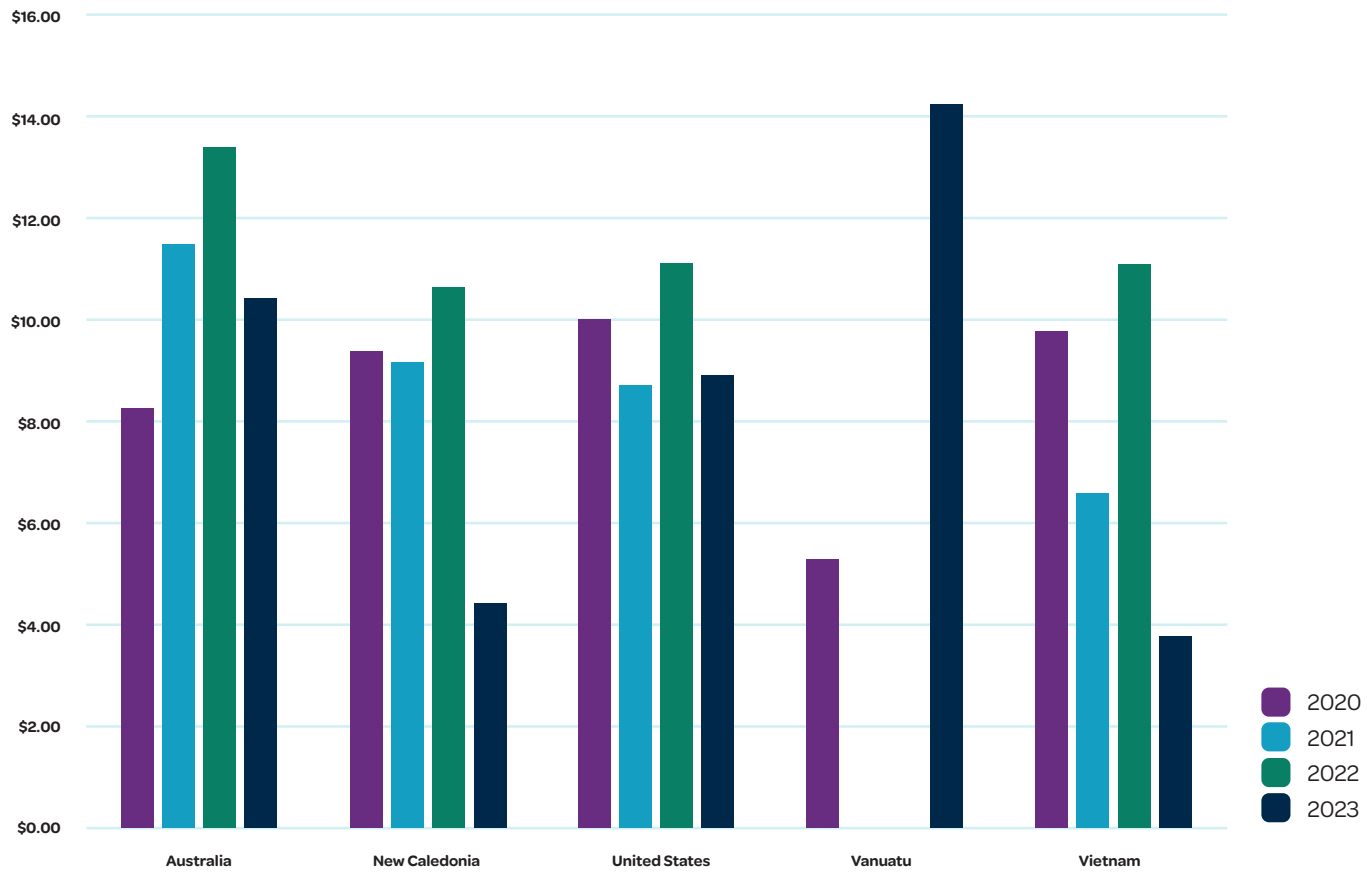

Table 6: Imports of Tahitian lime concentrated juice in value to New Zealand

	2020		2021		2022		2023	
	Value (NZD)	% Total	Value (NZD)	% Total	Value (NZD)	% Total	Value (NZD)	% Total
Vietnam		0.00%		0.00%		0.00%	$144,043	44.08%
Mexico	$325,060	78.28%	$420,765	83.48%	$174,233	82.29%	$109,968	33.65%
Brazil	$33,167	7.99%		0.00%	$29,816	14.08%	$60,715	18.58%
Italy	$23,896	5.75%	$9,055	1.80%	$7,689	3.63%	$9,821	3.01%
Australia	$33,120	7.98%	$74,200	14.72%		0.00%	$2,252	0.69%
Grand Total	**$415,243**	**100.00%**	**$504,020**	**100.00%**	**$211,738**	**100.00%**	**$326,799**	**100.00%**

(The grand total includes all countries importing to New Zealand. Only the Top 5 countries are displayed above. *Some countries may not have an IHS, and small quantities may appear in this table. This represents sample size commodities recorded at the border.)

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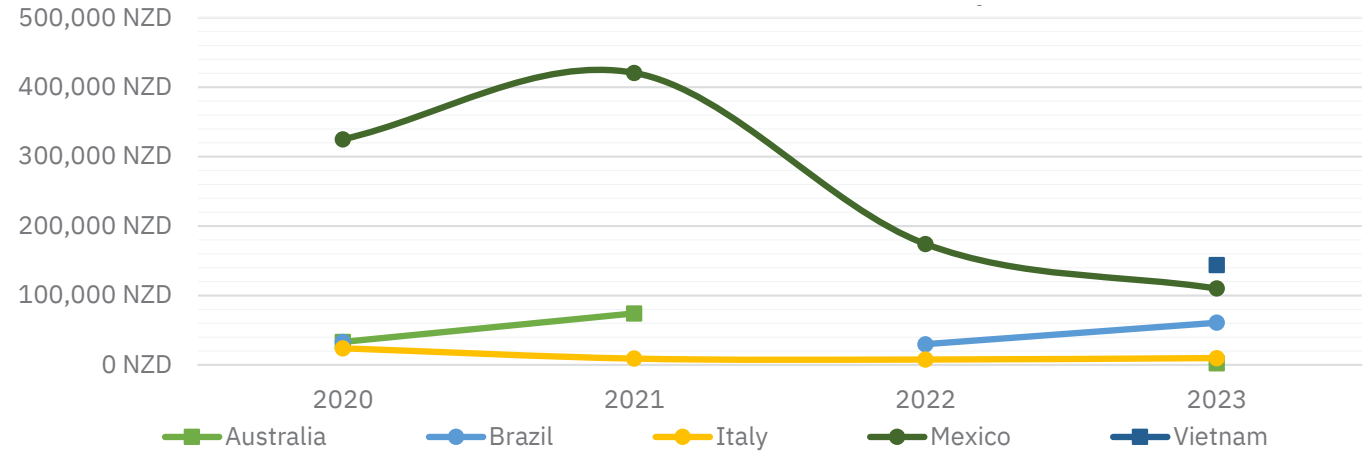

Table 7: Imports of Tahitian lime concentrated juice in volume to New Zealand

	2020		2021		2022		2023	
	Quantity (Kg)	% Total	Quantity (Kg)	% Total	Quantity (Kg)	% Total	Quantity (Kg)	% Total
Vietnam		0.0%		0.0%		0.0%	41,760	36.0%
Brazil	22,587	5.4%		0.0%	23,400	31.9%	31,360	27.1%
Mexico	383,359	91.3%	220,240	100.0%	49,894	68.1%	24,901	21.5%
United States		0.0%		0.0%		0.0%	17,820	15.4%
Switzerland	13,860	3.3%		0.0%		0.0%		0.0%
Grand Total	**419,806**	**100.0%**	**220,240**	**100.0%**	**73,294**	**100.0%**	**115,841**	**100.0%**

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Figure 6: Imports of Tahitian lime concentrated juice in volume to New Zealand

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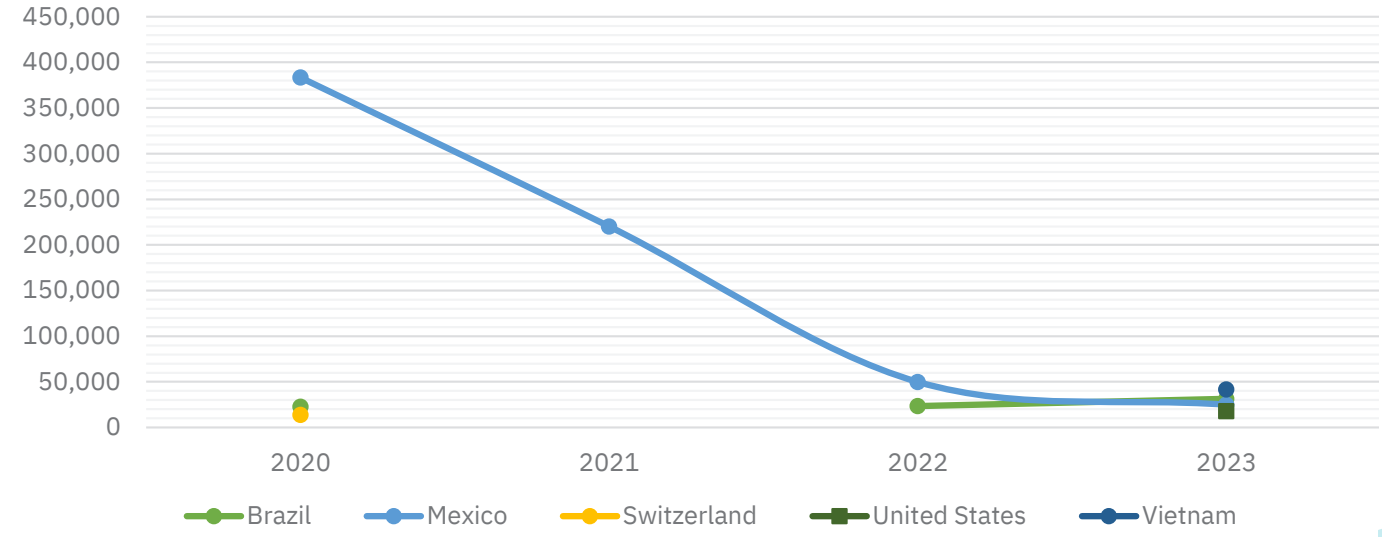

Table 8: Average price per kg of Tahitian lime concentrated juice imported to New Zealand

	2020	2021	2022	2023	Grand Total
Australia	3.51 NZD	180.98 NZD		2.27 NZD	186.76 NZD
Brazil	4.10 NZD		1.27 NZD	1.94 NZD	7.31 NZD
Germany	8.03 NZD	8.17 NZD	9.22 NZD		25.42 NZD
Iran			3.17 NZD		3.17 NZD
Italy	13.83 NZD	11.07 NZD	9.61 NZD	11.99 NZD	46.50 NZD
Japan	8.83 NZD				8.83 NZD
Mexico	0.85 NZD	1.91 NZD	3.49 NZD	4.42 NZD	10.67 NZD
Pakistan			2.01 NZD		2.01 NZD
Peru			14.18 NZD		14.18 NZD
Philippines		24.33 NZD			24.33 NZD
Switzerland	1.99 NZD				1.99 NZD
Thailand	3.25 NZD	1.16 NZD	1.41 NZD	1.57 NZD	7.39 NZD
United Arab Emirates			2.50 NZD		2.50 NZD
United States				1.48 NZD	1.48 NZD
Vietnam				3.45 NZD	3.45 NZD

Figure 7: Average price per kg of Tahitian Lime concentrated juice as declared at New Zealand's border

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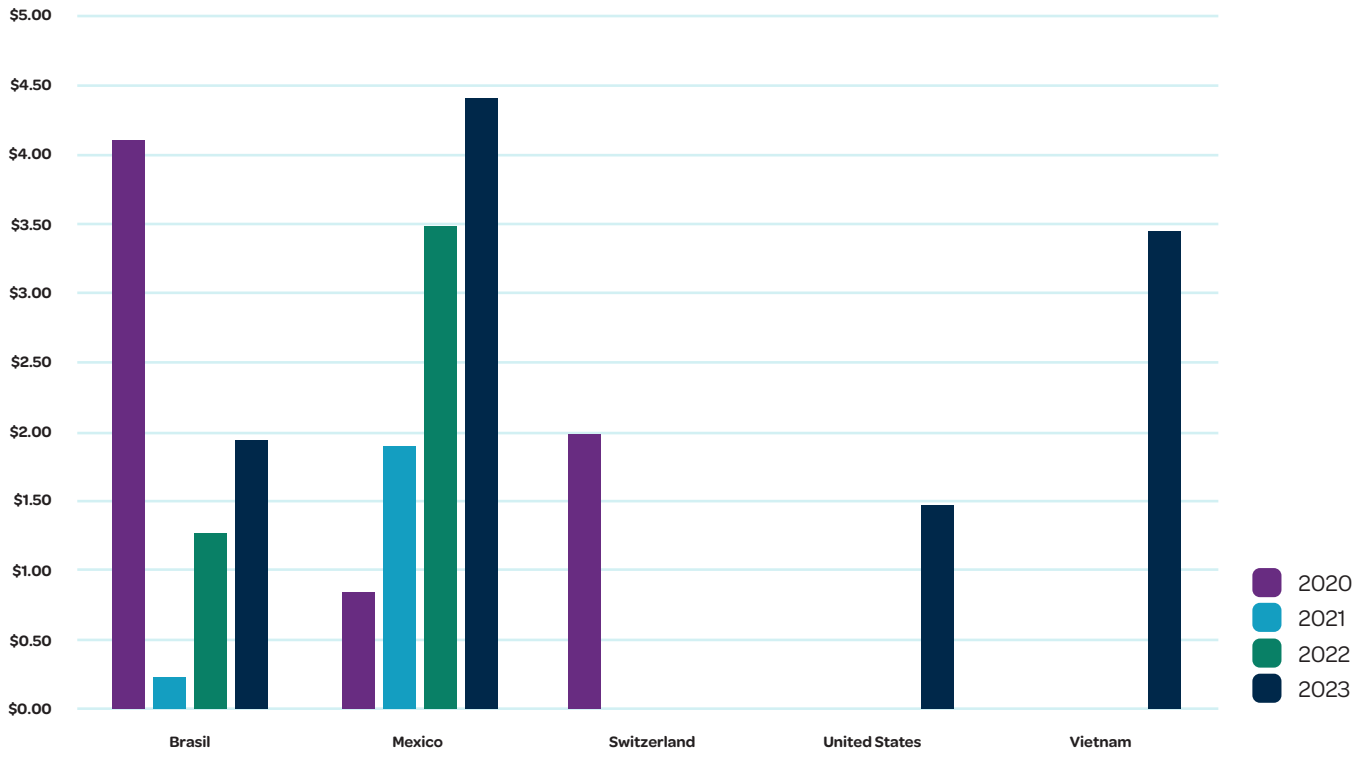

Table 9: Imports of Tahitian lime juice in value to New Zealand

	2020		2021		2022		2023	
	Value (NZD)	% Total	Value (NZD)	% Total	Value (NZD)	% Total	Value (NZD)	% Total
Brazil		0.00%	$116,729	17.47%	$22,024	3.67%	$355,145	33.80%
Italy	$157,501	33.58%	$173,478	25.96%	$256,593	42.76%	$322,611	30.70%
Mexico	$193,347	41.22%	$282,486	42.28%	$118,753	19.79%	$187,056	17.80%
Australia	$117,634	25.08%	$95,270	14.26%	$162,337	27.05%	$121,599	11.57%
United States	$590	0.13%	$180	0.03%	$40,425	6.74%	$64,438	6.13%
Grand Total	**$469,072**	**100.00%**	**$668,143**	**100.00%**	**$600,132**	**100.00%**	**$1,050,849**	**100.00%**

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Figure 8: Imports of Tahitian lime juice in value to New Zealand

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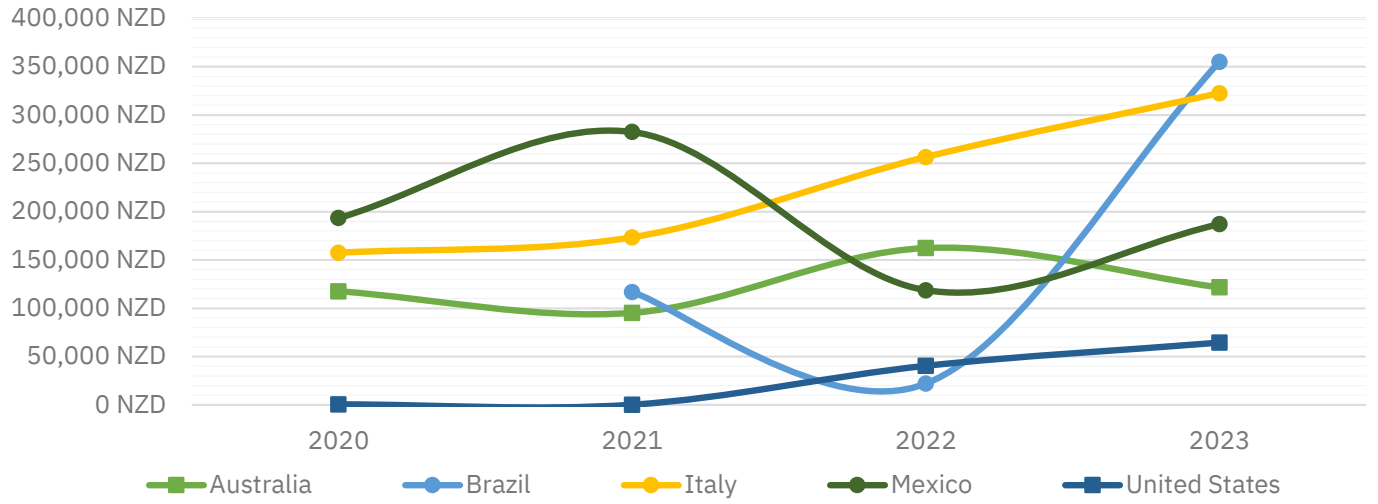

Table 10: Imports of Tahitian lime juice in volume to New Zealand

	2020		2021		2022		2023	
	Quantity (Kg)	% Total	Quantity (Kg)	% Total	Quantity (Kg)	% Total	Quantity (Kg)	% Total
Brazil		0.0%	122,400	27.7%	26,000	12.7%	212,640	53.3%
Italy	66,891	27.2%	70,651	16.0%	87,755	42.9%	84,591	21.2%
Mexico	123,426	50.3%	199,232	45.1%	25,045	12.2%	45,794	11.5%
Australia	46,638	19.0%	32,214	7.3%	52,038	25.4%	37,447	9.4%
Thailand	8,527	3.5%	17,226	3.9%	13,804	6.7%	18,654	4.7%
Grand Total	**245,482**	**100.0%**	**441,723**	**100.0%**	**204,642**	**100.0%**	**399,126**	**100.0%**

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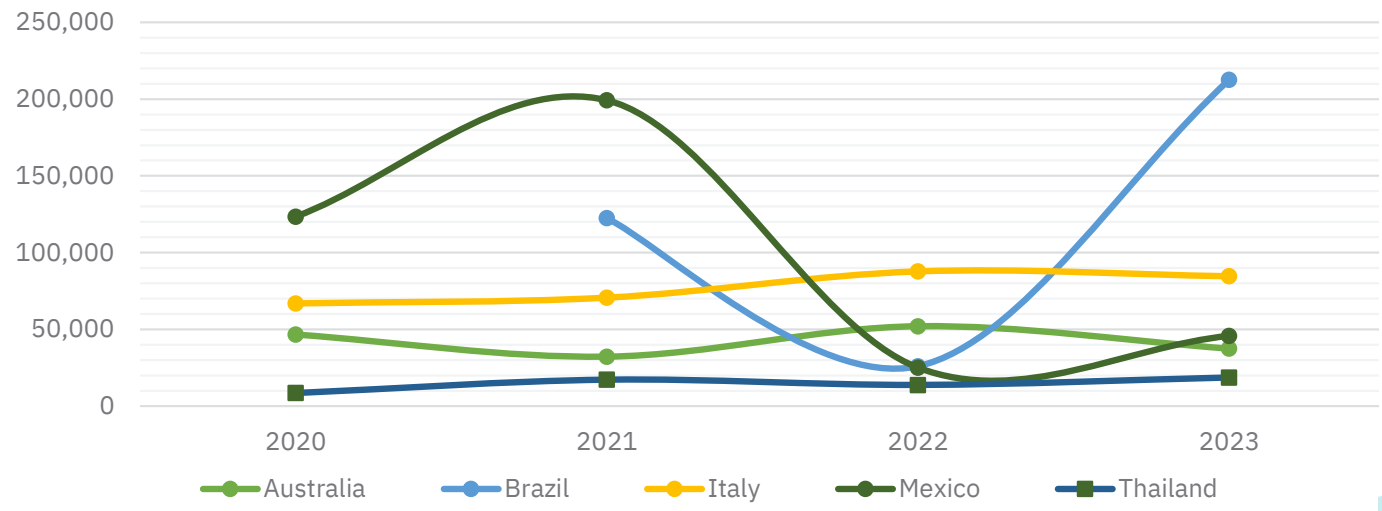

Table 11: Average price per kg of Tahitian lime juice imported to New Zealand

	2020	2021	2022	2023	Grand Total
Argentina		3.80 NZD			3.80 NZD
Australia	5.01 NZD	77.07 NZD	9.50 NZD	3.25 NZD	94.83 NZD
Brazil		0.95 NZD	0.85 NZD	1.67 NZD	3.47 NZD
Canada			7.31 NZD		7.31 NZD
Chile				2.08 NZD	2.08 NZD
China	1.33 NZD			0.35 NZD	1.68 NZD
France		4.41 NZD			4.41 NZD
Germany		19.65 NZD	4.83 NZD	15.02 NZD	39.50 NZD
India			4.43 NZD	4.60 NZD	9.03 NZD
Iran	3.14 NZD		3.02 NZD	3.44 NZD	9.60 NZD
Italy	4.23 NZD	4.69 NZD	5.22 NZD	6.51 NZD	20.65 NZD
Malaysia	3.00 NZD		33.71 NZD		36.71 NZD
Mexico	1.57 NZD	7.63 NZD	10.48 NZD	4.08 NZD	23.76 NZD
Myanmar			3.74 NZD		3.74 NZD
Philippines		3.33 NZD		22.60 NZD	25.93 NZD
Samoa (Western)	18.83 NZD				18.83 NZD
Thailand	2.83 NZD	2.82 NZD	3.42 NZD	3.08 NZD	12.15 NZD
United Arab Emirates	3.31 NZD	2.22 NZD	15.08 NZD	2.66 NZD	23.27 NZD
United Kingdom	12.42 NZD	6.25 NZD	7.16 NZD		25.83 NZD
United States	29.50 NZD	5.45 NZD	19.10 NZD	7.43 NZD	61.48 NZD

Figure 10: Average price per kg of Tahitian Lime juice as declared at New Zealand's border

(Only the Top 5 countries are displayed.)

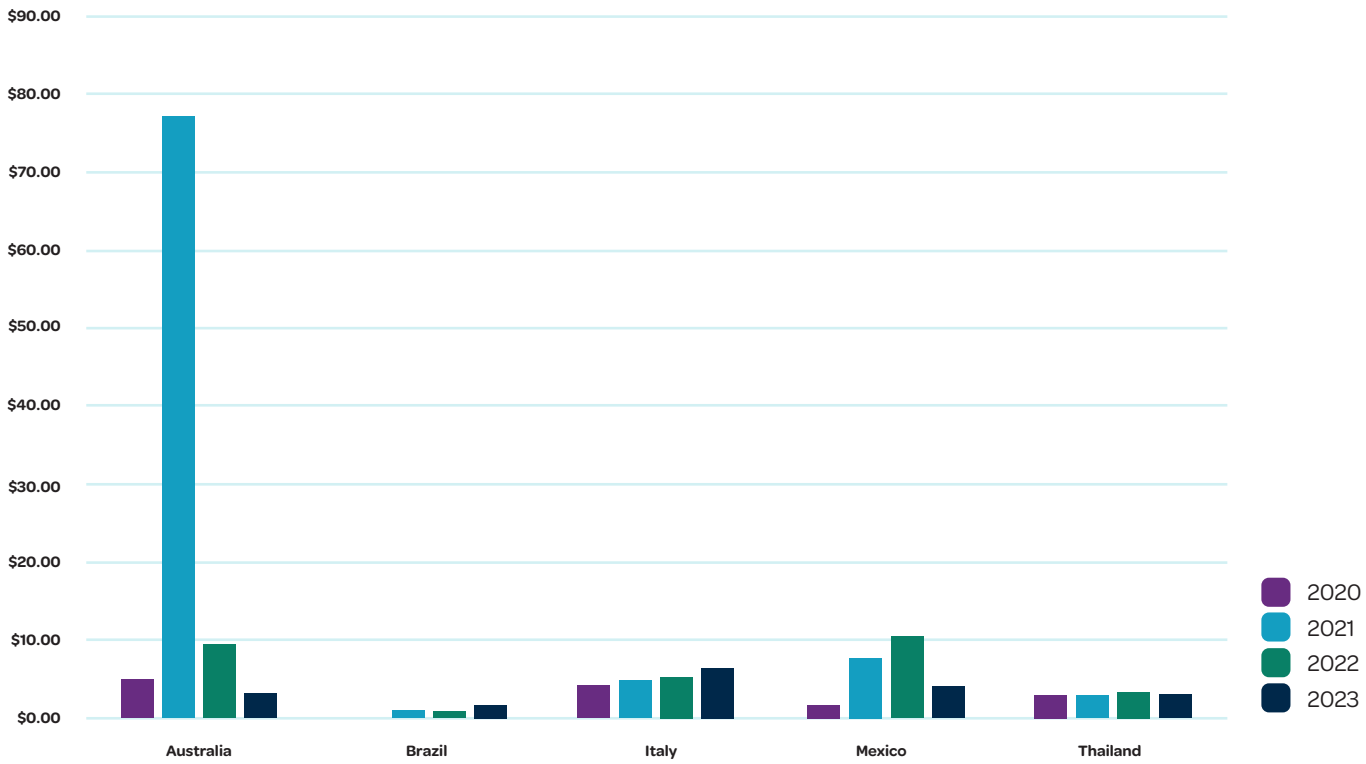

Table 12: Imports of Tahitian lime essential oil in value to New Zealand

	2020		2021		2022		2023	
	Value (NZD)	% Total	Value (NZD)	% Total	Value (NZD)	% Total	Value (NZD)	% Total
United Kingdom	$66,383	23.24%	$83,263	20.45%	$55,183	19.38%	$117,079	43.86%
United States	$82,522	28.89%	$143,235	35.18%	$123,496	43.36%	$116,415	43.61%
Australia	$112,968	39.54%	$80,033	19.66%	$56,316	19.78%	$32,470	12.16%
India	$12,951	4.53%	$14,499	3.56%	$7,788	2.73%	$997	0.37%
Italy	$10,861	3.80%	$86,158	21.16%	$42,000	14.75%		0.00%
Grand Total	**$285,685**	**100.00%**	**$407,188**	**100.00%**	**$284,783**	**100.00%**	**$266,961**	**100.00%**

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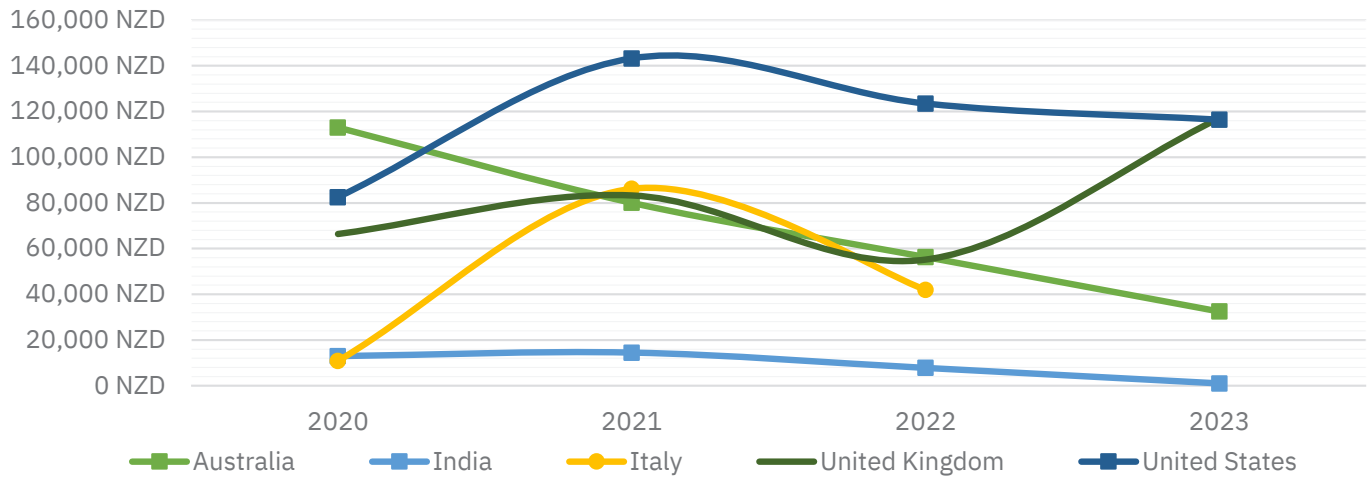

Table 13: Imports of Tahitian lime essential oil in volume to New Zealand

	2020		2021		2022		2023	
	Quantity (Kg)	% Total	Quantity (Kg)	% Total	Quantity (Kg)	% Total	Quantity (Kg)	% Total
United States	845	23.7%	2,105	18.4%	1,471	20.6%	1,046	66.6%
Australia	1,321	37.1%	955	8.3%	806	11.3%	308	19.6%
United Kingdom	396	11.1%	368	3.2%	201	2.8%	197	12.5%
India	822	23.1%	6,591	57.5%	3,949	55.3%	20	1.3%
Italy	180	5.1%	1,440	12.6%	720	10.1%		0.0%
Grand Total	**3,564**	**100.0%**	**11,459**	**100.0%**	**7,147**	**100.0%**	**1,571**	**100.0%**

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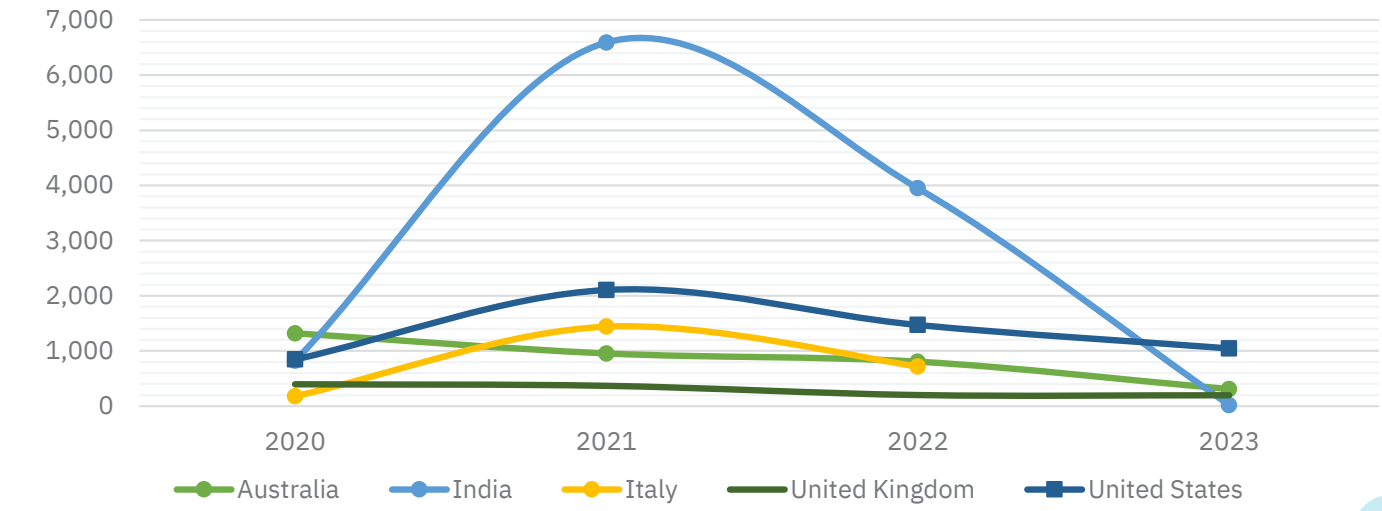
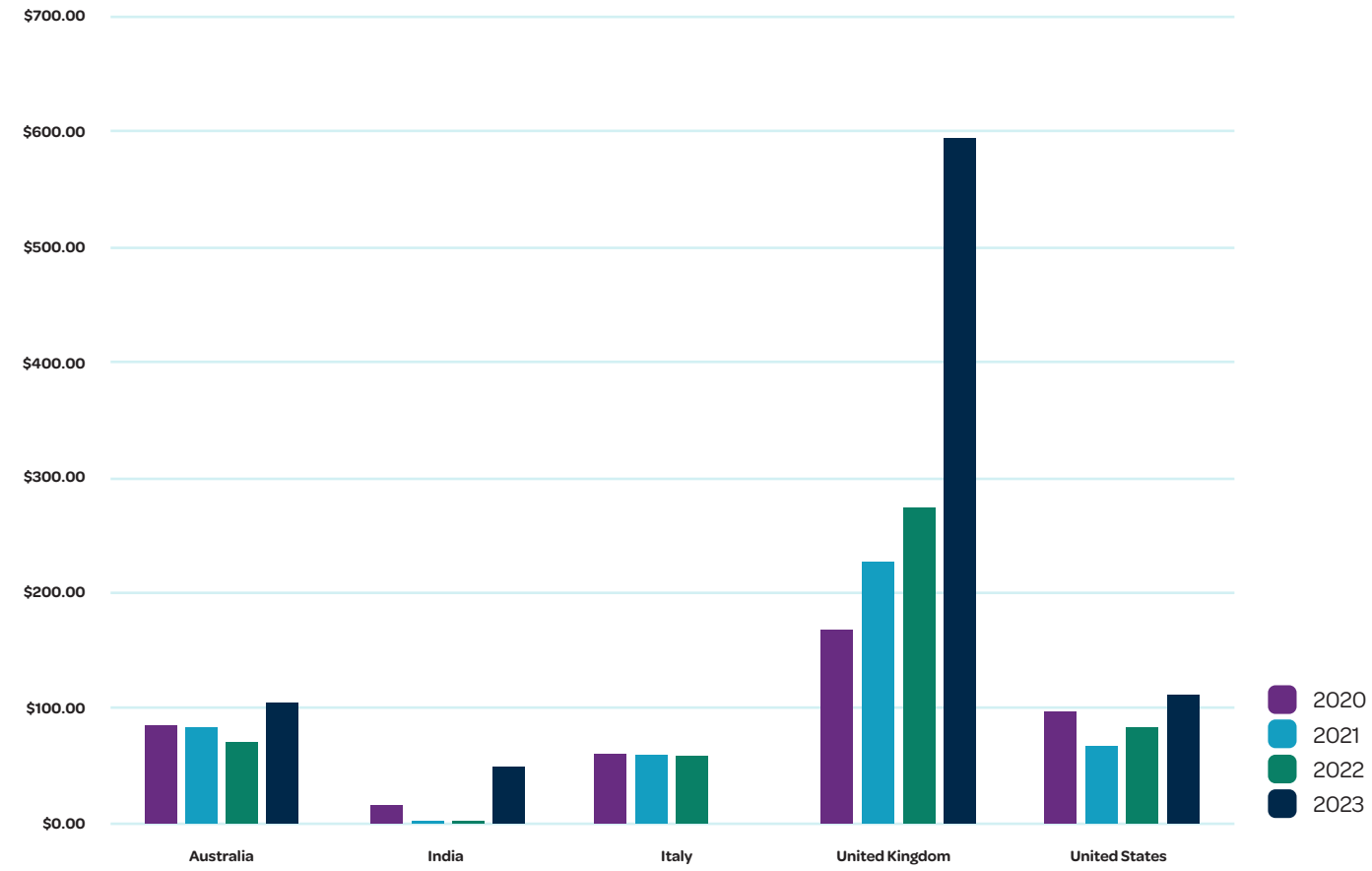


Table 14: Average price per kg of Tahitian lime essential oil imported to New Zealand

	2020	2021	2022	2023	Grand Total
Australia	85.52 NZD	83.80 NZD	69.87 NZD	105.42 NZD	344.61 NZD
Canada		83.07 NZD		41.23 NZD	124.30 NZD
France	168.60 NZD			98.00 NZD	266.60 NZD
India	15.76 NZD	2.20 NZD	1.97 NZD	49.85 NZD	69.78 NZD
Indonesia				767.00 NZD	767.00 NZD
Italy	60.34 NZD	59.83 NZD	58.33 NZD		178.50 NZD
Mexico		100.35 NZD	98.25 NZD	168.66 NZD	367.26 NZD
Peru				175.47 NZD	175.47 NZD
Singapore	47.00 NZD	63.00 NZD			110.00 NZD
Spain		84.90 NZD			84.90 NZD
Thailand			3.83 NZD		3.83 NZD
United Kingdom	167.63 NZD	226.26 NZD	274.54 NZD	594.31 NZD	1,262.74 NZD
United States	97.66 NZD	68.05 NZD	83.95 NZD	111.30 NZD	360.96 NZD

Figure 13: Average price per kg of Tahitian Lime essential oil as declared at New Zealand's border

(Only the Top 5 countries are displayed.)



2. Market Access

2.1 Biosecurity Requirements and Advice

Fresh Tahitian Lime imported into New Zealand from any country must have an Import Health Standard (IHS). The Tahitian lime IHS can be found Fresh Tahitian Lime (Citrus latifolia) for Human Consumption (mpi.govt.nz) which outlines the specific conditions that must be satisfied before a product can be brought into the country. The complete list of fresh fruits, herbs, and vegetables authorised by countries for import into New Zealand is available via this link: Importation and Clearance of Fresh Fruit and Vegetables 152 02 (mpi.govt.nz)

When Tahitian Lime is authorised to be imported to New Zealand from your country, there are particular quarantine requirements that exporters from Pacific Island countries must comply with before shipping.

These requirements include:

- ✓ The fruit may have the calyx attached but not the stem, leaves or other plant parts.
- ✓ Tahitian Lime must be grown following commercial production requirements specified by New Zealand Ministry for Primary Industries (MPI).
- ✓ Control measures must be **implemented** to target pests of economic importance (regulated) to New Zealand.
- ✓ Consignments of Tahitian lime must:
  - o be washed and brushed in the packhouse prior to export.
  - o be considered to be free from contamination, regulated pests and other extraneous material.
  - o be packaged in clean and either new or refurbished material.
  - o be secured in a manner to prevent contamination.
- ✓ Inspection by the exporting country's quarantine/ biosecurity agency to ensure the **absence of regulated pests**.
- ✓ A valid and **completed Phytosanitary Certificate** issued by the exporting country's NPPO (quarantine/biosecurity agency) in line with International Plant Protection Convention (IPPC) standards, verifying compliance with the relevant import health standard.

Importers must follow **the clearance process diligently**, as failure to comply at any stage can result in refusal to enter the New Zealand border. Non-compliance reduces the willingness of New Zealand importers to source commodities from the Pacific and has financial implications for exporters.

2.2 Biosecurity Clearance in New Zealand for imported Tahitian Lime

Countries approved to export fresh Tahitian Lime to New Zealand can be found via the PIER Search tool.

STEP 1: Provision of Documents

- ✓ Importers must submit detailed information to MPI before goods arrive.
- ✓ Electronically issued phytosanitary certificates are sent to MPI.
- ✓ MPI reviews all accompanying documents for compliance with Import Health Standards (IHS).

STEP 2: Non-compliant Documentation

- ✓ Clearance is refused for consignments without valid phytosanitary certificates and those detected with regulated pests.
- ✓ Correct documentation must be provided within 48 hours if missing.
- ✓ Consignments detected with regulated pests are treated before they are released.
- ✓ A consignment may fail clearance if:
  - the number of goods exceeds those stated on the phytosanitary certificate (within reason)
  - the consignment contains unmanifested goods

STEP 3: Transit Requirements

- ✓ Consignments that are shipped in phases (short-shipped) must comply with the IHS.
- ✓ Transit consignments must meet requirements for importing into transit countries.

STEP 4: Transport to Approved Inspection Facility

- ✓ Consignments are transported to an approved transitional facility under an MPI inspector's direction, using pest-proof containers for inspection.

STEP 5: Phytosanitary Security Before and After Inspection

- ✓ Phytosanitary security should be maintained at all times.
- ✓ Non-compliant consignments are securely stored until biosecurity requirements have been satisfied.

STEP 6: Inspection

- ✓ MPI conducts risk profiling activities before or upon arrival.
- ✓ Visual inspections verify the absence of pests or contaminants and compliance with the IHS.
- ✓ Sampling plans determine inspection quantity based on lot size.
- ✓ Biosecurity clearance is granted when all IHS requirements are met.

STEP 7: Reconciliation

- ✓ Compliance checks validate phytosanitary certificates.

2.3 Food Safety Requirement

In New Zealand, food safety regulations are primarily governed by the Food Act 2014, the Food Regulations 2015, and the Australia New Zealand Food Standards Code. These regulations apply to all foods sold in New Zealand, including imported foods like Tahitian Lime.

General Requirements

- **Traceability**: Businesses must be able to trace where their food products came from and demonstrate how they are going to ensure that any products that are found to be unsafe can be quickly removed from sale. (Section 110 of New Zealand Food Act 2014)

- **Hygiene**: All aspects of food handling, from production to harvesting, processing, storage, and sale, must adhere to strict hygiene standards. (Food Hygiene Regulations 1974)

- **Labelling**: Food items must be correctly labelled, including ingredients and allergens, and may need to have nutritional information displayed. (Sections 11, 12, 227, 228 of New Zealand Food Act 2014)

Please note that this information may be subject to change; it is crucial to consult New Zealand's Ministry for Primary Industries | NZ Government (mpi.govt.nz) or similar authorities for the most current guidelines. They are country-specific and product-specific. ** Failure to adhere to these regulations can result in rejection at the New Zealand border, additional treatment costs, fines, or other penalties.*

2.4 Pharmaceuticals and Cosmetic Requirements

In extracting essential oils like Lime Essential Oil (LEO), pharmaceutical industries often favour CO2 extraction to obtain high-quality extracts. This method is advantageous for LEO due to its high purity, selectivity, and ability to operate at lower temperatures, which is crucial in preserving LEO's unique blend of active components. Unlike steam distillation, CO2 extraction can effectively capture a wide range of phytochemicals in LEO, including heat-sensitive compounds, ensuring a fuller representation of the oil's properties. However, this technique requires specialised equipment capable of maintaining high pressures and temperatures, representing a significant investment.

The safety and maximum permissible levels of LEO in various products are paramount. For instance, the typical acceptable concentrations of LEO in detergents, soaps, fragrances, creams and lotions might be set at specific thresholds, aligning with safety regulations for fragrant materials. Furthermore, as an additive, LEO must comply with the classification and labelling standards set by regulatory bodies such as the ECHA (European Chemical Agency), which might include classifications like an aspiratory toxin, skin irritant, or allergic skin reaction, depending on the compound's properties.

Moreover, LEO must adhere to all relevant regulations. This includes meeting the food safety standards for nutraceuticals or cosmetic regulations for cosmetic applications, depending on their intended use. In New Zealand, compliance with Good Manufacturing Practices (GMP) and criteria set by the New Zealand Medicines and Medical Devices Safety Authority (Medsafe) is typically required. For products targeting the U.S. market, adherence to standards set by authorities like the Food and Drug Administration (FDA) is also necessary.

2.5 Overview of the export process from the Pacific Islands to New Zealand

3. NZ Buyers' Requirements

3.1 Quality

Quality needs may vary between importers, so exporters and growers of Lime (fresh and processed) should be aware of any importer specifications regarding size, colour, and general quality of the commodity. Contact your relevant biosecurity and food safety authorities for further information on market specifications.

Lime Fresh or Dried: For fresh limes, New Zealand buyers typically expect the fruit to be firm, bright in colour, and free from blemishes or signs of decay. The size and appearance of the fruit can also be important, depending on the market segment. Dried limes should be well-preserved, retaining their flavour and aroma. They should be free from mould and excess moisture. Organic and sustainably sourced limes can be more appealing in specific market segments. Buyers of fresh Tahitian Lime require a light green to green skin with pale green flesh, round to slightly oval. Firm with smooth, thin peel, juicy flesh with strong tangy flavour. Usually, it is expected to have a minimum diameter of 40mm up to 60mm, with a juice content compared to the mass > 30%.

Lime Juice: In New Zealand, buyers often look for lime juice that is 100% pure, without added sugars, colours, or preservatives. The juice should be of high quality, fresh and natural taste. The packaging should comply with New Zealand's food safety standards, often requiring clear labelling of ingredients, nutritional information, expiration date, and storage instructions. Organic certification can be a plus, as New Zealand has a growing market for organic products.

Concentrated Lime Juice: Buyers in New Zealand would look for concentrated lime juice that retains lime's natural flavour and aroma without artificial additives. The concentration level should be consistent and clearly labelled. The product should meet New Zealand's food safety standards, including proper ingredients' labelling, nutritional content, and any allergen information. As with other lime products, organic certification can be preferred.

Lime Essential Oil: The quality requirements for lime essential oil in New Zealand focus on purity and extraction methods. Scientifically, the purity of an essential oil refers to its composition being entirely comprised of volatile compounds extracted from the plant without any synthetic additives or dilution with carrier oils. However, the notion of purity doesn't necessarily exclude the presence of naturally occurring impurities or adulterants that can be introduced during farming or processing. The oil should be packaged in small, dark glass bottles to prevent light degradation. Labels should provide clear information about the oil's origin, extraction method, and suggested uses. The New Zealand Environmental Protection Authority (EPA) and other relevant bodies would enforce these regulations, requiring clear labelling about the oil's origin, extraction method, and composition. Furthermore, a Safety Data Sheet (SDS), previously known as a Material Safety Data Sheet (MSDS), should accompany the product as it provides comprehensive information about the dangers and properties of the substance.

3.2 Certifications

Several certification standards could be considered for the New Zealand market:

a) **HACCP (Hazard Analysis and Critical Control Points)** is a systematic approach to food safety that identifies, evaluates, and controls potential hazards in food production. It is a preventive system that identifies critical points in food production where hazards can be controlled or eliminated. It aims to ensure the safety of food products by identifying and managing potential risks at critical stages of production.

b) **New Zealand GAP (Good Agricultural Practices)** is a set of voluntary standards that focus on agricultural and aquacultural practices to ensure the safety and sustainability of food production. These requirements cover various aspects, such as environmental conservation, worker welfare, and food safety. Essentially, Global GAP aims to establish and maintain standardised farming and food production practices to meet quality and safety standards for global markets.

c) **Organic Certification**, while not mandatory, organic certification can be an important credential for essential oils in New Zealand. Certified organic essential oils must meet specific standards for organic farming and processing. Common certifications include BioGro New Zealand, the largest and best-known certifier for organic products, ensuring compliance with international organic standards.

d) **ISO Certification:** Some suppliers may also choose to obtain ISO certifications, such as ISO 9001 for quality management systems or ISO 17025, which applies to testing and calibration laboratories. These certifications aren't specific to essential oils but indicate compliance with high operational standards.

3.3 Volume

The volume requirements for lime-related products vary based on the market segment and distribution scale. For lime juice and concentrated lime juice, commercial buyers typically seek large volumes, often in bulk packaging, to cater to food service industries or for further processing. In contrast, retail markets prefer smaller, consumer-friendly packaging sizes. For fresh or dried limes, volume requirements are influenced by seasonal demand and retail strategy, with larger volumes favoured during peak seasons. Lime essential oil, being highly concentrated, is usually traded in smaller volumes but with consistent demand throughout the year. Overall, volume requirements are dictated by the balance of demand in various sectors, ranging from hospitality and food processing to retail and aromatherapy markets.

3.4 Packaging

Tahitian lime should be packaged appropriately, taking care of biosecurity and food safety requirements. Packaging must include proper labelling that complies with the New Zealand Food Standards Code. MPI has made available a guide to retail food labelling, which provides all the information you need regarding your product packaging labelling, depending on its presentation.

Lime juice: Lime juice, a perishable liquid, typically requires packaging that preserves its freshness and prevents oxidation. Glass bottles or plastic containers are commonly used, often with an airtight seal and sometimes metal cans (it is crucial that the cans are appropriately lined to prevent the acidic juice from reacting with the metal)[1]. The packaging should be light-resistant to maintain the quality of the juice. In some cases, preservatives might be added to extend shelf life. The packaging should also include labelling that indicates the date of manufacture, expiration date, storage instructions, and nutritional information.

Lime fresh: Fresh limes are typically sold loose or in mesh bags to facilitate air circulation and enable easy visual inspection of the fruit. These packaging methods help prevent moisture buildup, which can lead to mould and spoilage. Biosecurity and pest management during transportation and storage are essential, requiring regular inspections and proper ventilation to avoid the introduction and spread of pests and diseases. This ensures the limes remain fresh from the point of sale to the consumer.

Lime dried: Dried limes are packaged in airtight containers or sealed plastic bags to prevent moisture re-entry and extend shelf life. This type of packaging protects the limes from external contaminants and pest infestations. Labels on these packages provide essential information such as the drying method, packaging date, and preservatives used, which is crucial for ensuring consumer safety and satisfaction. Ensuring that the drying and packaging facilities adhere to strict biosecurity measures is critical to avoid contamination and maintain the quality of the dried limes.

Concentrated lime juice: Concentrated lime juice, being more shelf-stable than fresh juice, still requires packaging that protects it from air and light to prevent degradation of flavour and nutrients. Packaging options include glass or plastic bottles. These containers are usually sealed tightly to prevent contamination and extend shelf life. The packaging should include information on dilution ratios, storage conditions, expiration date, and any added ingredients.

Lime essential oil: Lime essential oil is highly concentrated and volatile, necessitating secure and protective packaging. Small dark glass bottles are typically used to prevent light degradation. The bottles should have a tight cap, often with a dropper for easy use. The packaging should be robust to prevent breakage and leakage. Information on the extraction method (like cold-pressed or steam-distilled), purity of the oil, suggested uses and storage instructions should be included on the label. The essential oil regulation falls under the Hazardous Substances and New Organisms Act 1996 (HSNO). New Zealand Environmental Protection Authority (EPA) and other relevant bodies would enforce these regulations, requiring clear labelling about the oil's origin, extraction method, and composition. Furthermore, a Safety Data Sheet (SDS), previously known as a Material Safety Data Sheet (MSDS), should accompany the product as it provides comprehensive information about the dangers and properties of the substance.

3.5 Transport recommended and precautions

Tahitian Lime should be transported using conditions that minimise contamination risks for biosecurity and food safety requirements.

Sea Freight: This is the most common method for importing Tahitian lime, especially in bulk quantities. It's cost-effective for large shipments but can take longer than air freight. Major ports of entry in New Zealand include Auckland, Tauranga, Lyttelton, and Wellington.

Air Freight: Faster but more expensive. Suitable for smaller quantities or when the Tahitian lime needs to be in New Zealand quickly. Major airports are in Auckland, Wellington, and Christchurch.

Storage during Transport: Tahitian lime should be stored in cool and well-ventilated conditions during transport. Maintaining a temperature of around 7-10°C is ideal to preserve freshness. Tahitian lime does not require freezing but should be kept away from direct sunlight and moisture to prevent spoilage.

Transport Regulations for Essential Oils: *Lime Essential Oil falls in the dangerous goods category. The transport of dangerous goods by road or rail in New Zealand is regulated by the Land Transport Rule: Dangerous Goods 2005. This rule outlines the requirements for packaging, labeling, and handling dangerous goods to ensure safety on roads and railways. For sea transport, New Zealand adheres to the Maritime Transport Act 1994, which incorporates the International Maritime Dangerous Goods (IMDG) code by reference. This act governs the carriage of dangerous goods by sea around New Zealand, ensuring they are transported in a manner that minimises risk to ships, crew, and the environment. Air transport of dangerous goods is regulated under the Civil Aviation Act 1990 and the Civil Aviation Rules Part 92 – Carriage of Dangerous Goods. These rules align closely with international standards set by the International Civil Aviation Organization (ICAO). Packaging should be tightly sealed to prevent liquid or vapour loss. A free space of 5% to 10% in the container is advisable to accommodate temperature changes during transit. Tahitian lime essential oil has a distinct, citrusy odour, so it should not be stored near food or other sensitive products. With proper guidelines and robust containers, the risk of loss or damage is minimal.*

[1] R.E. Berry, in Encyclopedia of Food Sciences and Nutrition (Second Edition), p.1369 Limes, 2003

4. Buyers/Distributors

Pharmaceuticals/Skin Care industry: Buyers and manufacturers such as Pure Ingredients or Shieling Laboratories require high-quality lime for the cosmetic sector, production and distribution of essential oils.

Beverage industry: Companies such as Hakanoa, or Redshoots (Lemon Fresh Lime Juice 245ml) Processed Food industry: For integration into preparations with companies such as Lisa's Jalapeno & Lime Hummus, Genevieve's Lime & Parmesan Dressing, Rose's Lime Marmalade.

Fresh Lime Buyers

Large commercial & wholesalers: Foodstuff (Gilmours, Trents Wholesale), Foodstuffs (New World, Pak'n Save, Four Square), Woolworth (New Zealand Grocery Wholesalers) Bidfood New Zealand, Moore Wilson's Wholesale. Buying for supermarkets or restaurants.

Specialty shops: Moshims, Naturally Organic, Eco Organic, Huckleberry Farms, Commonsense Organics, Kerikeri Organic

Volumes of Tahitian lime sourced from New Caledonia and Vanuatu, by New Zealand Importers, 2021

	New Caledonia		Vanuatu		Total Quantity (Kg)	Total % Total
	Quantity (Kg)	% Total	Quantity (Kg)	% Total		
TURNERS AND GROWERS FRESH LTD	14,813	64.52%		0.00%	14,813	57.43%
FRESH DIRECT	8,145	35.48%	1,365	48.15%	9,510	36.87%
THE PRODUCE COMPANY		0.00%	1,470	51.85%	1,470	5.70%
Grand Total	**22,958**	**100.00%**	**2,835**	**100.00%**	**25,793**	**100.00%**

5. Key Success Factors

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