



GLOBAL ORGANIZATION FOR EPA AND DHA OMEGA-3

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2024 GLOBAL EPA & DHA OMEGA-3 INGREDIENT MARKET REPORT



2022–2023
DATA AND FORECASTS
THROUGH 2026

CONTENTS

EXECUTIVE SUMMARY 4

SCOPE AND METHODOLOGY 12

OMEGA-3 OIL SOURCES* 16

- Concentrates 17
- Common Refined Oils 22
- Algae Oil 26
- Tuna Oil 30
- Miscellaneous Pet Food Oil 34
- Krill Oil 36
- Salmon Oil 38
- Cod Liver Oil 41
- Menhaden Oil 42
- Green-Lipped Mussel Oil 47
- Squid Oil 49
- Calanus Oil 52
- Pollock Oil 54
- Hoki Oil 55

OMEGA-3 OIL REGIONS* 57

- United States 58
- Europe 62
- China 66

Asia-Pacific 70

Japan 74

Canada 78

Rest of Asia 81

South America 84

Rest of the World 87

Australasia 90

Mexico 93

OMEGA-3 OIL APPLICATIONS* 96

- Dietary Supplements 97
- Pharmaceuticals 101
- Infant Formula 104
- Pet Nutrition 108
- Food and Beverage 112
- Clinical Nutrition/Medical Food 116

INDUSTRY SUMMARY 119

ACKNOWLEDGMENTS 122

APPENDIX 123

*Presented in order of descending value.

EXECUTIVE SUMMARY

The EPA and DHA omega-3 market is large and dynamic, and characterized by steady demand. While the raw ingredients used are diverse and come from almost every region of the world, the omega-3 category is heavily dependent on the Peruvian anchovy fishery. In 2023 a strong El Niño event resulted in reduced production in this fishery, lower raw material production and historically high fish oil prices. The year was characterized by the effort of the entire industry, from fishing companies to brands, to adjust to scarcity and high prices, and to continue feeding a globally growing demand.

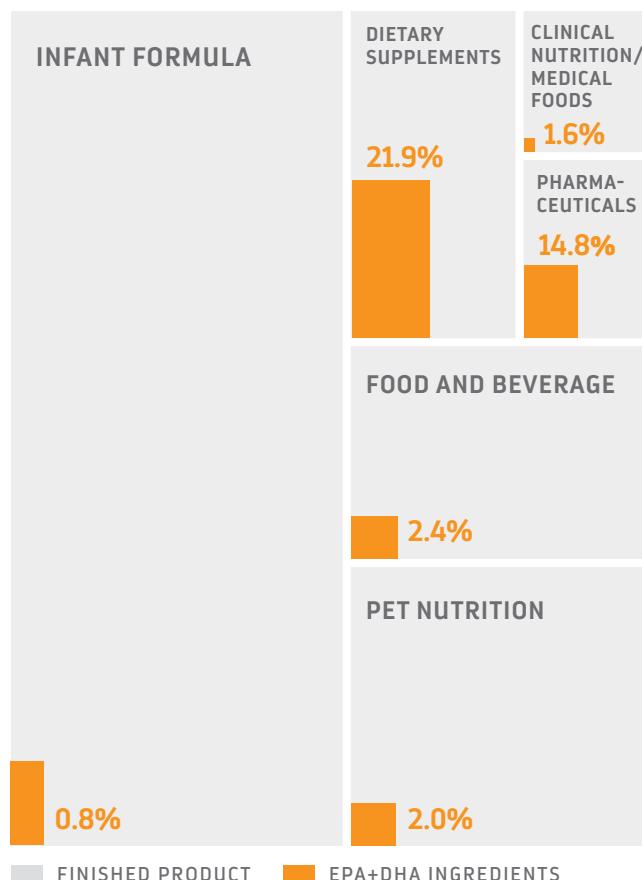
The omega-3s EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) are long-chain polyunsaturated fatty acids that are abundant in fish, shellfish and some microalgae and genetically engineered plants. The human body needs EPA and DHA during development and to function optimally in every stage of life. EPA and DHA have been linked to favorable pregnancy outcomes, healthy baby and child development, as well as to heart, eye, brain and joint health in adults, and the body of scientific evidence supporting these benefits is robust. In addition, there is a thriving segment of pet foods and supplements containing EPA and DHA.



The objective of this report is to provide a detailed description of the volume and value of the omega-3 ingredient oils used in consumer products. For purposes of this document, an omega-3 oil is an oil containing EPA and/or DHA and used as an ingredient for inclusion in a consumer product. This specifically excludes oils used as ingredients for feed in aquaculture or livestock/poultry production, as well as products that contain only alpha-linolenic acid (ALA), an omega-3 fatty acid derived from plant sources. The market estimates in the report cover omega-3 oils only, and do not include other omega-3 delivery formats such as seafood or the fishmeal used as a source of both protein and omega-3s in some pet foods.

EPA and DHA-containing consumer products are used in a variety of applications. This report covers the volume and value of the omega-3 oils used in six dif-

Percentage of Total Finished Product Value Represented by Value of EPA+DHA Ingredients, by Application



The total volume of omega-3 ingredients used globally in 2023 was **124,480 metric tons (mT)**, representing a 1.4% increase from the 122,782 mT used in 2022.

The total market value of these ingredients was **US\$2,093.9 MM**, up 22.5% from the value in 2022 (US\$1,709.5 MM).

ferent categories—dietary supplements, fortified foods and beverages, infant formula, pharmaceuticals, medical foods/clinical nutrition and pet nutrition (foods and supplements). A separate biennial [report](#), released by GOED in May 2024, details the value at the point of sale of these finished products.

The amount of EPA and/or DHA in a particular finished product application varies greatly depending on the category. For some applications, like dietary supplements and pharmaceuticals, for which omega-3 oils are the main active ingredient, the proportion is very high. For others, where other ingredients surpass omega-3 in value (like infant formula or fortified foods and beverages), the proportion is much smaller.

The growth in value in 2023 vastly surpassed the growth in volume. The global production of crude oil has remained stable for years, and the omega-3 industry relies on a relatively small but increasing share of this volume. However, the omega-3 market has historically depended on crude oils from only some specific sources, which makes it vulnerable to the variability in production volumes that is typical of natural ingredient sources.

In both 2022 and 2023, the Peruvian anchovy (*Engraulis ringens*) fishery, the largest contributor of crude oils for both aquaculture and omega-3 ingredients, was affected by climate-driven declines in catches and crude oil production was significantly lower than in the previous few years. This, combined with higher demand from aquaculture and the dietary supplement market, resulted in inventories being depleted and dramatic increases in prices. In addition to the Peruvian anchovy fishery, the price increases extended to several alternate sources as well.

Peruvian Production of Crude Oil



Source: Peru Ministry of Production (PRODUCE) and IFFO

It is important to point out that the increase in ingredient prices did not result in increased profits for the omega-3 industry in general, and ingredient manufacturers in particular. Most participants in the value chain saw the cost of doing business increased and reacted as needed to keep their businesses viable. Omega-3 products are backed by strong science and consumers have high awareness of their health benefits, so demand remains healthy, and short-term shortages will not result in the entire category (or segments of it) being phased out. The industry was able to react through several measures, including price management, the use of alternative crude oil sources and the depletion of existing strategic inventories of ingredients and finished products, technical improvements resulting in increased yield and changes in the balance of the types of products being sold. These actions maintained the integrity of the omega-3 product supply chain, and

products were kept on shelves. However, the scarcity of raw material resulted in slower growth in volume than in previous post-pandemic years.

In Peru there are two fishing seasons per year in the (larger) North Central region. Climatic conditions have normalized, and the first season of 2024 was successful, bringing a return to a more normal supply situation, and the industry is working at establishing practices to be better prepared and more resilient when, inevitably, significant production disruptions happen again.

REGIONAL OVERVIEW

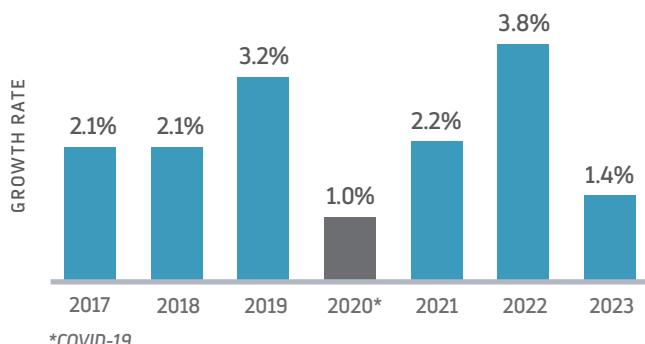
Some regions are home to a mature, stable market, while others continue to show strong growth potential. In terms of both volume and value, the largest markets are the USA, Europe, China and the Asia-Pacific region. These four markets combined represent 80.0% of the global volume and 80.1% of the value. The USA and Europe are well-established, mature markets and in a normal year only small changes in volume and value are to be expected, while the markets in China and the Asia-Pacific region are, while sophisticated, less established, so growth and changes in consumer preferences tend to be faster.

The US market by itself accounts for 35.2% of the volume and 39.1% of the global value. It remained flat in volume—in contrast, volume growth in 2022 was 4.4%—but due to higher ingredient prices, grew 22.2% in value. Growth in volume is expected to resume as oil availability returns to normal.

Europe (24.9% of the volume and 20.5% of the value) remained essentially flat in volume (0.2% contraction). A long-term trend of replacing the refined oils used in dietary supplements with concentrates and other higher-value ingredients was accelerated by ingredient shortages. The increase in value (25.3%) is almost solely explained by higher ingredient prices.

The Chinese market (11.4% of the global volume and 10.8% of the value) underwent rapid growth. Demand in China is driven by socioeconomic factors, including a rapid expansion of the affluent middle class, and an increase of women in the workforce. Several Chinese ingredient manufacturers had built important raw

Growth Rate Before and After COVID-19



*COVID-19

For a non-pandemic year, growth in 2023 was disappointing.

material inventories in preparation for a pharmaceutical expansion that has so far failed to materialize. This, combined with lesser dependency on Peruvian oils, left China better prepared to endure raw material shortages than other regions, and helped keep local ingredient prices more stable. In 2023, this market grew at 10.1% in volume and 25.3% in value. This is faster growth than in the previous two years, marking a return to normal economic growth, as the country emerged from a post-pandemic economic slowdown.

The Asia-Pacific region (8.6% of the volume and 9.7% of the global volume) contracted 4.4% in volume. The largest market in the region, South Korea, is home to a large and usually growing dietary supplement market, but economic challenges resulted in an important decline in demand. Higher prices resulted in a 12.3% increase in value.

The emerging economies of the Rest of Asia and Latin America and the Rest of the World continue to grow, while the omega-3 industry in Japan and Australasia grew more modestly in volume. All regions grew in value during 2023.

In terms of raw material sources, the largest volume continues to be attributed to common refined oils (31.9% of the total volume), followed by concentrates (20.9%), miscellaneous pet food oils (18.3%), menhaden (8.7%) and cod liver oil (5.5%). A larger share of the value (40.1%) is taken up by concentrates. Due to the additional processing required and their use in high-dose nutraceuticals and pharmaceuticals, these ingredients command a higher price. The following sources, in order of value, are refined oils (18.0%) algae (13.0%), tuna oil (6.8%) and miscellaneous pet food oils (5.7%).

The two largest ingredient categories, common refined and concentrated oils, which represent more

Forecasted Global Growth in Omega-3 Ingredient Volume to 2026 (in Metric Tons)



than half of the global volume demand, followed different dynamics during 2023. Refined oils are more directly affected by increased crude oil prices as there is less flexibility in their choice of raw materials and sales of refined oils, both as ingredients and finished products, produce lower margins. As a result, they declined globally in volume by 2.1%. Concentrates, more flexible and commanding higher margins, grew 2.4%. However, the price of refined oils followed more closely the prices of crude Peruvian oil, so these oils grew faster (56.0%) in global value than concentrates (17.1%). Additionally, pharmaceutical ingredients declined in price during 2023. These ingredients comprise a large part of the value of concentrates, and their price decline contributed to moderate the growth in value of these ingredients.

The largest share of the volume of omega-3 ingredient oils is used in dietary supplements (56.8%), followed by pet nutrition (29.4%) and infant formula (5.1%). Dietary supplements also command the largest share of the value (58.1%), but applications that require higher-value ingredients, like pharmaceuticals (13.8% of the value) and infant formula (10.6%), enjoy higher market share relative to their volume.

LOOKING AHEAD

If current demand trends were to persist and supply can meet them, the volume of ingredient oils used by the EPA and DHA omega-3 market could be expected to grow an additional 14.7% by 2026, at an average 4.7% annual growth rate.

However, because of a combination of increased competition, inflationary pressures and constraints in supply, the prices of several key oils have changed rapidly in the last few years, particularly during 2023. Production of the crude fish oils that comprise the major share of the raw ingredients is returning to normality, but it will take time to rebuild safe inventory levels, and prices remain volatile. The forecasts in this document assume that a sufficient volume of suitable crude fish oil will be produced in what remains of 2024 and the next two years, but whether this will be the case remains uncertain. If the tight supply situation is not resolved, these estimates will need considerable revision. Additional factors that may influence future growth include:

Fishery issues. As we have seen in the past—and was readily apparent during 2023—large changes in the production of any major fishery can slow the market. In the last few years, we have seen a lot of interest and development in sources that were not formerly used for

omega-3 oils, which lessens, but does not completely eliminate, this risk.

Regulatory changes. Regulatory actions can also have an effect on the accuracy of these forecasts.

Pharmaceutical approvals. The approval of omega-3 pharmaceutical products in China and the introduction of Vascepa in new geographies may alter the balance between supply and demand, although it is too soon to forecast how quickly a potential increase in demand will occur and whether the supply situation will impact the ability to fulfill the demand.

Pricing dynamics. High inflation and historically high prices for crude fish oils have resulted in higher ingredient prices and finished product brands have passed some of these price increases to the final consumer. Higher prices lead to lower discretionary spending, whose ultimate effect in dietary supplement demand remains unpredictable.

This section contains forward-looking estimates, and the volume forecasts presented throughout this report are based on the assumption that, except for corrections for foreseeable trends and events, annual growth rates for each market segment will remain more or less stable for the following three years. But unexpected events (and even some expected ones) can quickly modify these trends, and we are aware of several such events as noted above.

There is concern about whether supply will be able to meet demand in the short term. The first Peruvian anchovy

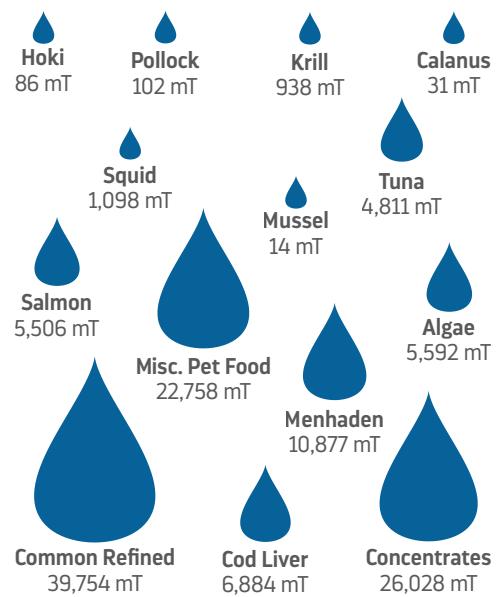
season of 2024 was normal, but existing inventories remain low, making adequate supply vulnerable. There is a real possibility that a low-production season in any important fishery may make it challenging for supply to meet demand, causing widespread, unpredictable changes in the market. Additionally, raw material prices are changing, which may affect the balance among ingredients.

Forecasts must always be interpreted with caution, but even more so under the current circumstances.

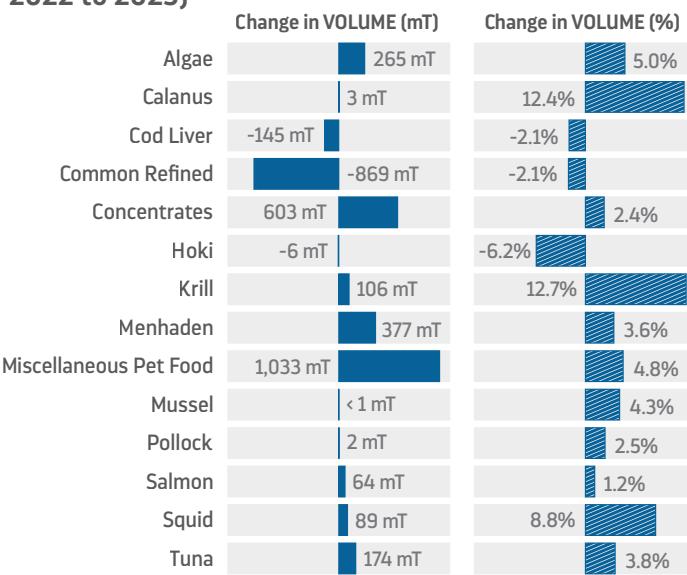
At a Glance: Omega-3 Oil Sources

The charts below detail all sources of omega-3 oil, by 2023 volume and value, as well as changes in volume and value, in absolute numbers and percentages, from 2022 to 2023.

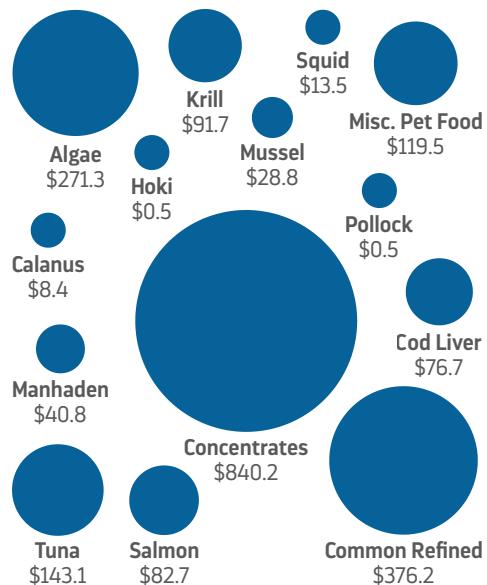
2023 Global Omega-3 Volume by Source (in Metric Tons)



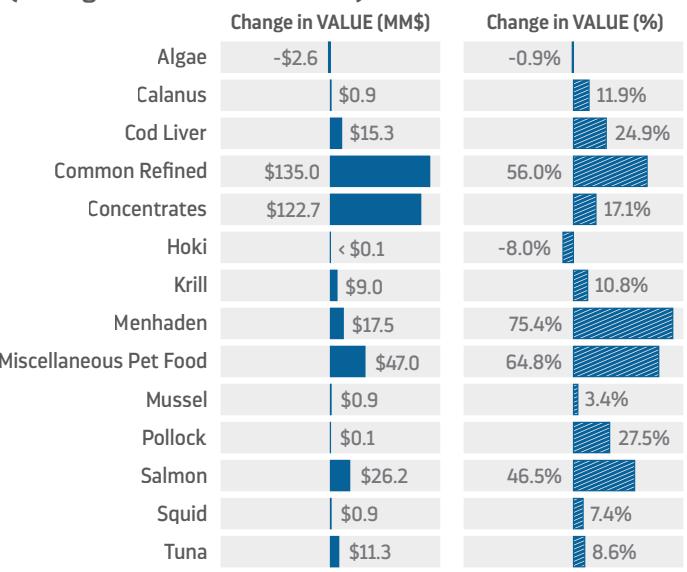
2023 Global Omega-3 Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)



2023 Global Omega-3 Value by Source (in Millions, U.S. Dollar)



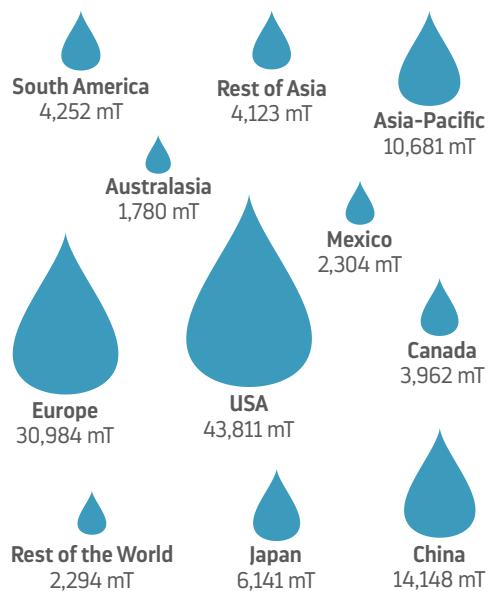
2023 Global Omega-3 Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)



At a Glance: Omega-3 Oil Regions

The charts below detail all regions where omega-3 oils are sold, by 2023 volume and value, as well as changes in volume and value, in absolute numbers and percentages, from 2022 to 2023.

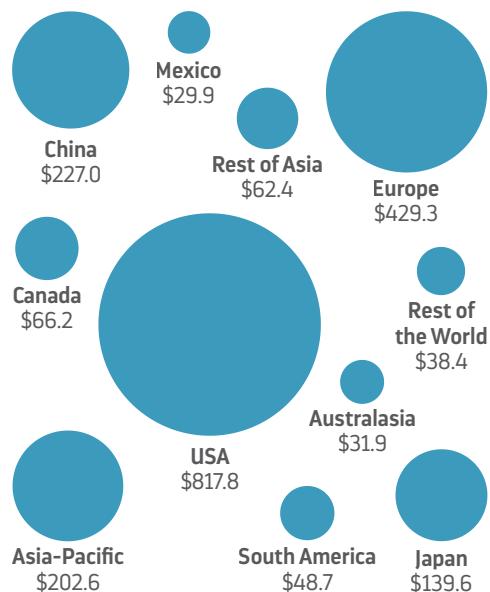
2023 Global Omega-3 Volume by Region (in Metric Tons)



2023 Global Omega-3 Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	-492 mT	-4.4%
Australasia	37 mT	2.1%
Canada	67 mT	1.7%
China	1,294 mT	10.1%
Europe	-73 mT	-0.2%
Japan	145 mT	2.4%
Mexico	68 mT	3.0%
Rest of Asia	285 mT	7.4%
Rest of the World	202 mT	9.7%
South America	127 mT	3.1%
USA	38 mT	< 0.1%

2023 Global Omega-3 Value by Region (in Millions, U.S. Dollar)



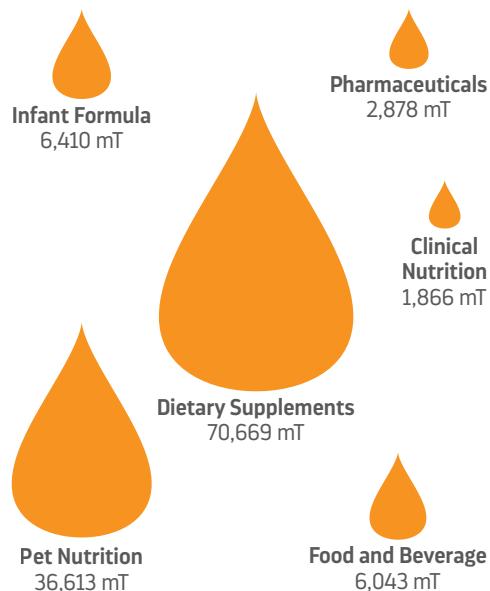
2023 Global Omega-3 Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	\$22.1	12.3%
Australasia	\$6.0	23.3%
Canada	\$15.8	31.3%
China	\$39.1	20.8%
Europe	\$86.8	25.3%
Japan	\$14.1	11.2%
Mexico	\$9.2	44.2%
Rest of Asia	\$16.8	36.8%
Rest of the World	\$9.2	31.2%
South America	\$16.5	51.2%
USA	\$148.8	22.2%

At a Glance: Omega-3 Oil Applications

The charts below detail all applications in which omega-3 oils are used, by 2023 volume and value, as well as changes in volume and value, in absolute numbers and percentages, from 2022 to 2023.

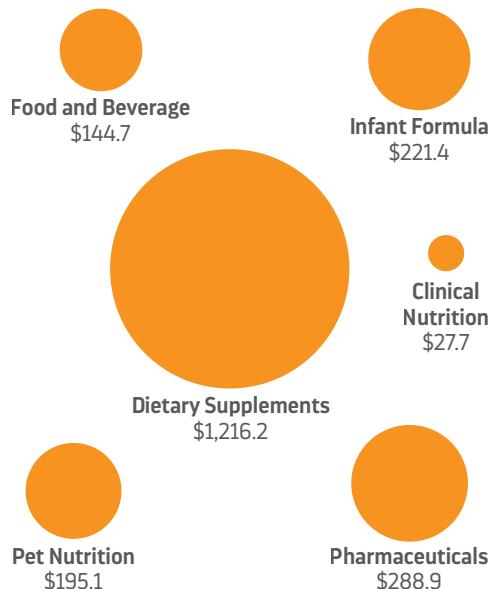
2023 Global Omega-3 Volume by Application (in Metric Tons)



2023 Global Omega-3 Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	79 mT	4.4%
Dietary Supplements	-191 mT	-0.3%
Food and Beverage	158 mT	2.7%
Infant Formula	248 mT	4.0%
Pet Nutrition	1,417 mT	4.0%
Pharmaceuticals	-12 mT	-0.4%

2023 Global Omega-3 Value by Application (in Millions, U.S. Dollar)



2023 Global Omega-3 Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	\$6.0	27.7%
Dietary Supplements	\$286.5	30.8%
Food and Beverage	\$13.0	9.9%
Infant Formula	\$10.1	4.8%
Pet Nutrition	\$77.4	65.8%
Pharmaceuticals	-\$8.7	-2.9%

REPORT SCOPE, METHODS AND DEFINITIONS

This section details the methodology used to gather data for this report as well as the covered sources and geographies.

For the purposes of this report, an omega-3 oil is an oil containing EPA and/or DHA, used as an ingredient for consumer products, including dietary supplements, food and beverage additives, pharmaceuticals, medical foods or pet food/supplements. This specifically excludes oils used for feed in aquaculture or livestock/poultry production.

This report provides a detailed description of the size and value of the global market for EPA (eicosapentaenoic acid) and/or DHA (docosahexaenoic acid) omega-3 oils. Volume figures are provided in metric tons (mT), values in millions of US dollars (US\$ MM). The years covered with historical data are 2022 and 2023, and data are separated by source and oil type, geographic region and application.

Forecasts for the years of 2024, 2025 and 2026 are also included.

A full list of tables including numbers for all regions, sources and applications is included in the Appendix and accompanying Excel spreadsheet. The Excel document also contains a forecast generator and a user interface for analyzing individual data points.

Sources of information:

- › International trade and customs data
- › National and international catch and production statistics—Bills of Lading
- › Financial statements of public companies
- › Company financial and credit data
- › Reports and databases from national and international agencies (Eurostat, FAO, NOAA, etc.)
- › Sales data
- › Business intelligence collected from GOED members
- › GOED member interviews and feedback

Data was gathered and categorized according to the following criteria:

- › Oil type (algae, krill, cod liver oil, etc.)
- › Product category: (refined, virgin, concentrate, etc.)
- › Form (ethyl ester, triglyceride), concentration
- › World region
- › Application

CHANGES FROM PREVIOUS REPORTS

While gathering data for this report, GOED interviewed member companies whose business intelligence and feedback have been fundamental to improve our estimates. More complete information resulted in a review and adjustments to some of the 2022 estimates reported in the last Ingredient Market Report. As a result, figures for 2022 in this and the last report may differ for some market segments. We are confident that the newer estimates are more accurate.

The terminology used to describe some segments, both in the report and the accompanying data file, has been modified to better reflect market changes, or for clarity:

OMEGA-3 OIL SOURCES

Algae oil. Oil obtained from any of several species of single cell organisms

Calanus oil. Oil extracted from calanus, the common name for several species in a genus of small crustaceans

Common refined oil. Crude oil from Peruvian anchoveta and other anchovy species that has been further processed or “refined”; this is often blended with sardine and/or mackerel oils as well

Cod liver oil. Oil extracted from the liver of the Atlantic cod and other European cod species

Concentrates. Oil obtained by chemical modification to increase the level of EPA and/or DHA in the resulting oil. Concentration is defined as the amount of EPA+DHA contained in the oil, expressed as a percentage of the mass

Green-lipped mussel oil. Oil obtained from green-lipped mussel, a mollusk

Hoki oil. Refined oil obtained from hoki (blue grenadier)

Krill oil. Virgin oil extracted from Antarctic krill

Menhaden oil. Oil (crude or refined) extracted from Gulf menhaden or Atlantic menhaden

Miscellaneous pet food oil. Oil obtained from various sources, often partially refined, used specifically for pet foods and pet supplements

Pollock oil. Refined or concentrated oil extracted from the liver of Alaska pollock

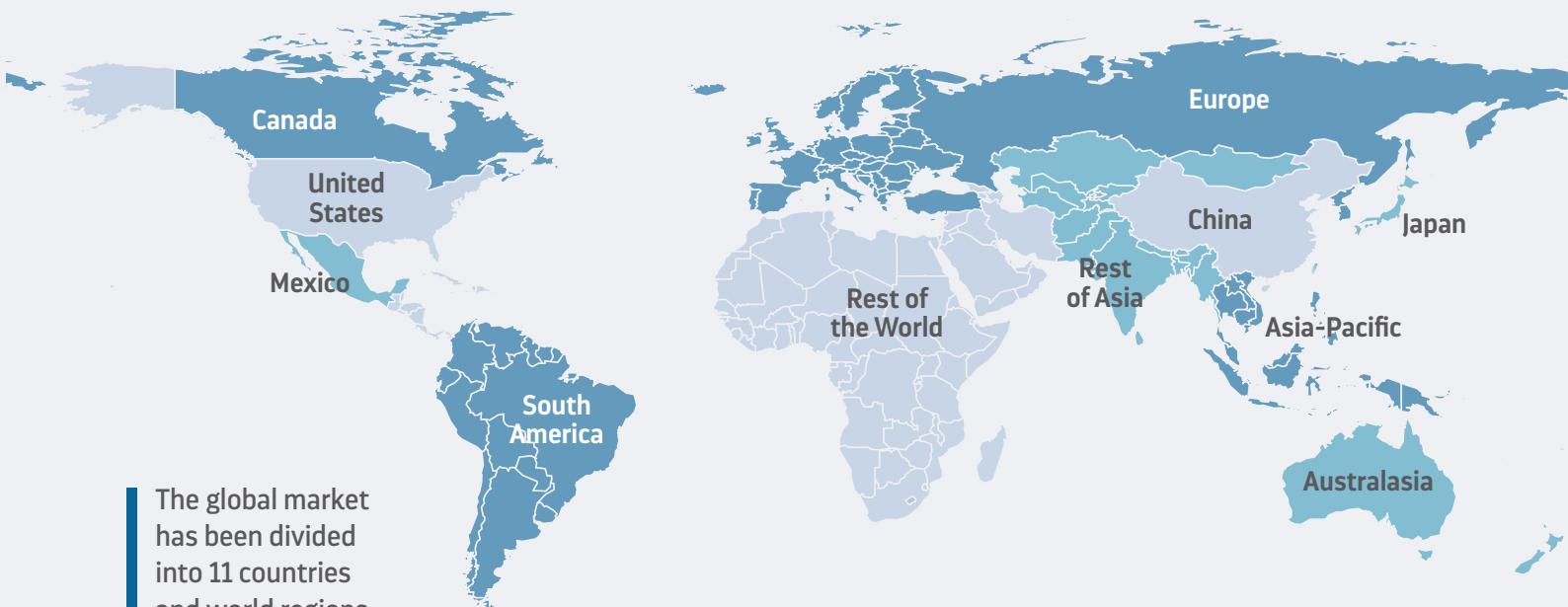
Salmon oil. Virgin or refined oil extracted from any of several species of salmon

Squid oil. Refined or concentrated oil obtained from any of several species of squid

Tuna oil. Refined oil extracted from any of several commercially caught species of tuna

- Reesterified triglycerides, a form of concentrates, were formerly described as *Triglycerides* (TG), creating confusion with the natural form of most refined oils. Starting this year, they are referred to as *Reesterified Triglycerides* (*r*TG).
- Historically, algal oils contained DHA but not EPA. The development of newer algal strains changed that, and these oils are now available in a wider range of compositions. The labelling of algal oils, formerly described as *Algal DHA Oil*, has been changed to Algal Oil, except those used for Infant Formula, an application that requires only DHA.
- The rapid growth of dietary supplements for pets makes it more appropriate to change the name of the application from *Pet Foods* to *Pet Nutrition*.

Geographic Regions



USA

Canada

Mexico

Europe

All European countries, both Eastern and Western, including Russia and Turkey

South America

All countries in South America

China

All regions under the current jurisdiction of the General Administration of Customs of the Peoples Republic of China and the China Food and Drug Administration, including Hong Kong and Macau

Japan

Asia Pacific

All Asian countries with a coast to the Pacific Ocean, except for Japan and China. Includes Korea, Vietnam, Indonesia, Malaysia, Thailand and Singapore

Rest of Asia

All Asian countries, except China, Japan, and the countries in the APAC region

Australasia

Australia and New Zealand

Rest of the World

All countries throughout the world not specifically addressed above

OMEGA-3 OIL SOURCES*

This section provides information about 14 sources of EPA and DHA omega-3 oil, as well as including an At a Glance section highlighting each source according to region and end use market, where applicable.

*Omega-3 oil sources presented in order of descending value.



CONCENTRATES

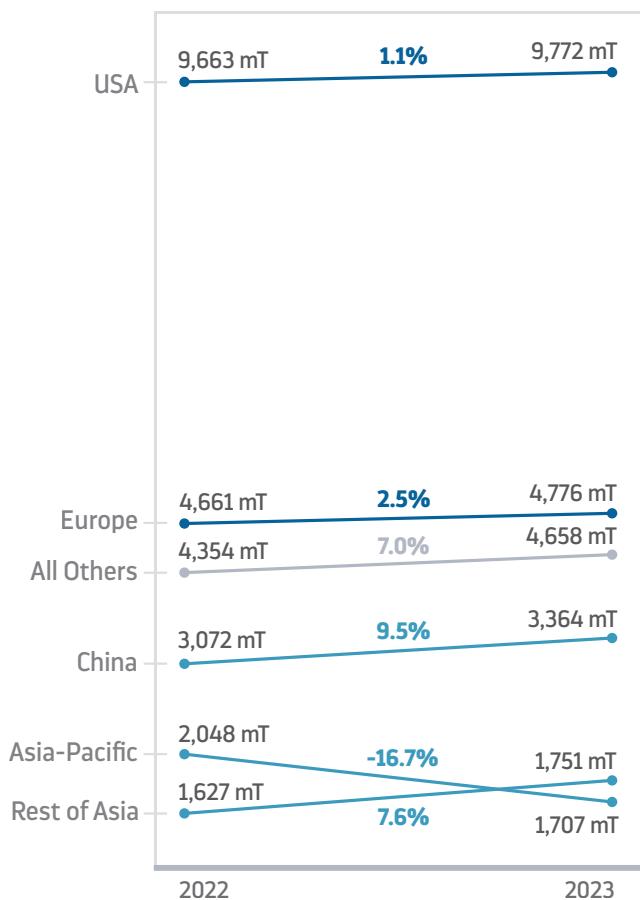
Concentrates are omega-3 oils obtained by chemical modification to increase the level of EPA and/or DHA. The starting point is usually anchovy oil, sardine oil, tuna oil and/or a mixture, although recent developments include the introduction of concentrates from sources such as algae, pollock and squid oils.

Concentrates are characterized by concentration and by form. Concentration is the amount of EPA+DHA contained in the oil, expressed as a percentage of the mass (mg/g or weight/weight). Concentrates are more commonly found in the form of ethyl esters (EE) or reesterified triglycerides (rTG), depending on the process

The total volume of concentrates in 2023 was **26,028 metric tons (mT)**, a 2.4% increase from 25,425 mT in 2022.

Value increased 17.1% to **US\$840.2 MM**.

Growth in Volume of Concentrates, by Geography (in Metric Tons)



Demand for concentrates grew in all markets, except for Asia-Pacific.

used for concentrating. Free fatty acids and other concentrate forms, sold in small volumes, are not covered in this report.

The ratio of EPA and DHA to volume can be adjusted as needed, which allows concentrates to be used in the development of applications that need either to conform to specific compositions or to deliver higher doses of EPA and DHA in fewer or smaller capsules. This makes them particularly in demand for dietary supplements and pharmaceuticals—concentrates are the only type of oil used for pharmaceutical ingredients.

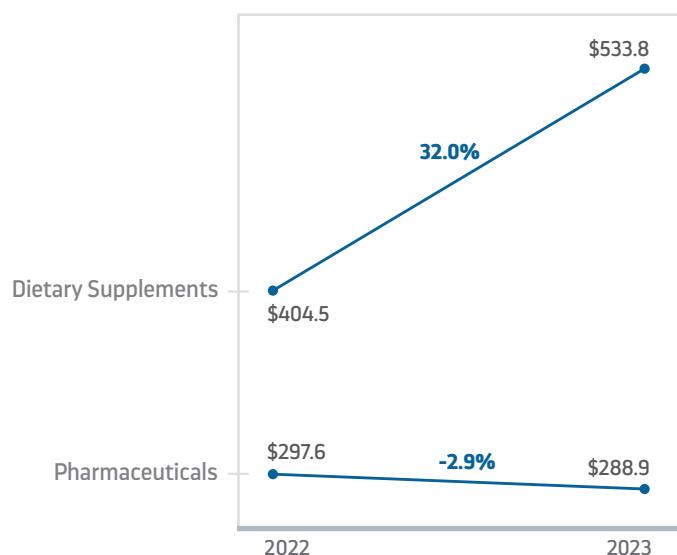
In most established markets, there is a long-term trend of switching from common refined oils to products that offer a different value proposition, particularly concentrates. The production of both refined oils and concentrates is heavily dependent on crude oils from reduction fisheries, particularly Peruvian anchovy. Both sources were affected by shortages in production and higher prices during 2023, and ingredient prices for both increased significantly. However, concentrate producers were better able to incorporate crude oils of different origins and to optimize production processes to better utilize the limited crude oil available. These changes often increased production costs, but concentrators were able to remain viable by raising prices less than refiners. Additionally, dietary supplements containing concentrates are sold with higher margins than those using

common refined oils, and brands in the largest markets, facing the possibility of shortages, often chose to protect their concentrate lines. This accelerated the transfer of market share from common refined oils to concentrates.

Demand for concentrates grew in both volume and value in all regions covered except for Asia-Pacific, whose dominant market, South Korea, was particularly affected by economic weakness during 2023.

The largest market for concentrates is the USA (37.5% of the global volume and 49.4% of the value). This market grew 1.1% in volume, as demand for dietary supplements to meet an enduring interest in natural prevention was slowed by limited supply. Due to higher prices, concentrates in the USA grew 15.8%, a lower rate than in other markets. Pharmaceuticals command a large portion of the value in this market. In previous years, growth in this segment was driven by increased demand of Vascepa. However, because of the effect of the introduction of Vascepa generics, the pharmaceutical sector in the USA contracted modestly in volume in 2023, and weakening demand and large inventories put downward pressure in ingredient pricing.

Growth in Value of Concentrates in Dietary Supplements and Pharmaceuticals (in Millions, U.S. Dollar)



Growing demand and higher pricing for dietary supplements and weakness in the pharmaceutical market are the main drivers of concentrate value.

Europe is the second largest market (18.4% of the volume and 16.6% of the value). The demand for concentrates in this market grew 2.5% in volume and 22.1% in value in 2023. These rates are lower than those observed in the previous year, but healthy for a well-established market. The growth observed in 2023 indicates that demand for concentrates in the European markets is likely driven by solid consumer interest, partially offset by a temporary correction to an abnormal supply situation.

In 2023, China (12.9% of the volume, 7.1% of the value), grew in volume at 9.5%. This is typically a fast-growing market, whose growth is fueled by socio-economic factors, the main of which is a rapid growth of an affluent middle class. This is faster than in 2022, when growth was dampened by economic uncertainty. Chinese ingredient producers built a significant inventory of raw materials, to prepare for a rapid expansion of the pharmaceutical sector that has still not materialized. As a result, China entered 2023 in a better position to face shortages than most other markets which, combined with its greater reliance on crude fish oil sources from geographies other than Peru, helped maintain this growth and kept prices more stable than in other regions. The Chinese concentrate segment grew 18.4% in value in 2023.

Concentrates in Japan, a stable market that relies on local sources and is therefore less vulnerable to fluctuations in production in other parts of the world, grew 1.5% in volume and 7.3% in value.

Demand for concentrates in the Asia-Pacific region contracted by 16.7% in volume and 7.6% in value. The dominant market in the region, South Korea, suffered economic challenges that significantly reduced its important dietary supplement category. Other markets in the region grew, but their smaller volumes were insufficient to offset the weakness in South Korea.

The developing markets all grew rapidly, particularly those of Latin America, but out of small volumes.

Most of the concentrate volume (85.0%) is used for dietary supplements, and most of the rest for pharmaceuticals, but because of their higher concentration and more precise composition specifications, ingredients

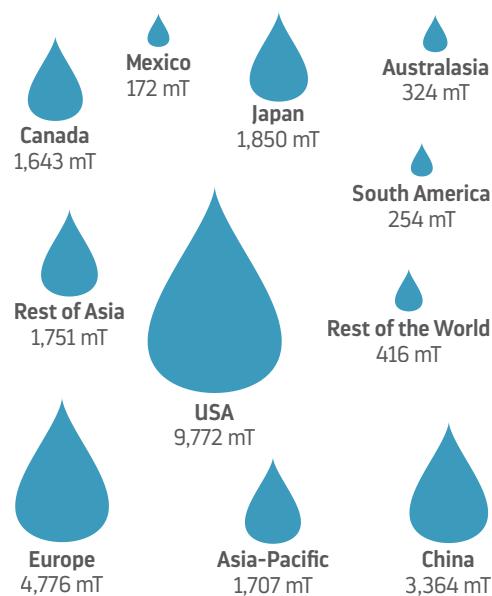
for the latter have higher prices. Dietary supplements command 63.5% of the global concentrate value, and pharmaceuticals 34.4%. Pharmaceuticals, particularly in the USA, which is the largest market, entered 2023 with sufficient inventory, and pharmaceutical ingredi-

ent prices did drop slightly during the year. Concentrates for dietary supplements grew 2.7% in volume and 32.0% in value, while concentrates for pharmaceuticals remained essentially flat (a 0.4% contraction) and declined 2.9% in value.

At a Glance: Concentrates Market

Below and on the next page are market figures for Concentrates by region and application.

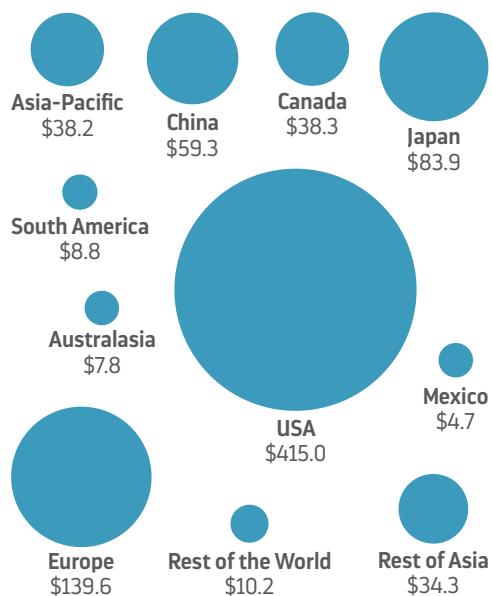
2023 Concentrates Market by Region (in Metric Tons)



Concentrates Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	-341 mT	-16.7%
Australasia	9 mT	2.9%
Canada	68 mT	4.3%
China	292 mT	9.5%
Europe	116 mT	2.5%
Japan	26 mT	1.5%
Mexico	68 mT	65.3%
Rest of Asia	124 mT	7.6%
Rest of the World	31 mT	8.1%
South America	102 mT	66.8%
USA	109 mT	1.1%

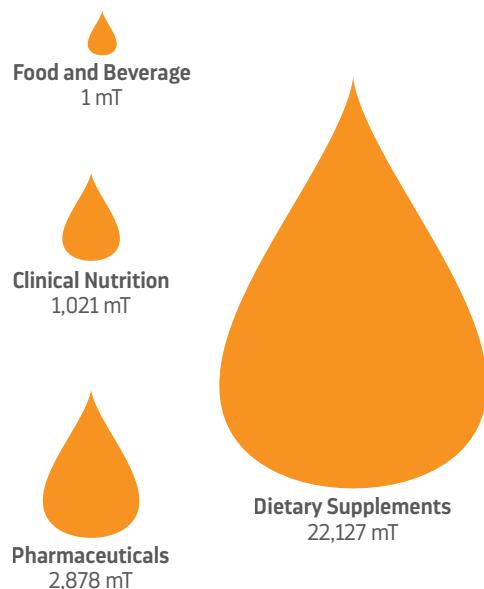
2023 Concentrates Market by Region (in Millions, U.S. Dollar)



Concentrates Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	-\$3.2	-7.6%
Australasia	\$1.9	31.2%
Canada	\$8.9	30.4%
China	\$9.2	18.4%
Europe	\$25.3	22.1%
Japan	\$5.7	7.3%
Mexico	\$2.0	73.7%
Rest of Asia	\$8.9	35.1%
Rest of the World	\$2.1	26.2%
South America	\$5.4	158.5%
USA	\$56.5	15.8%

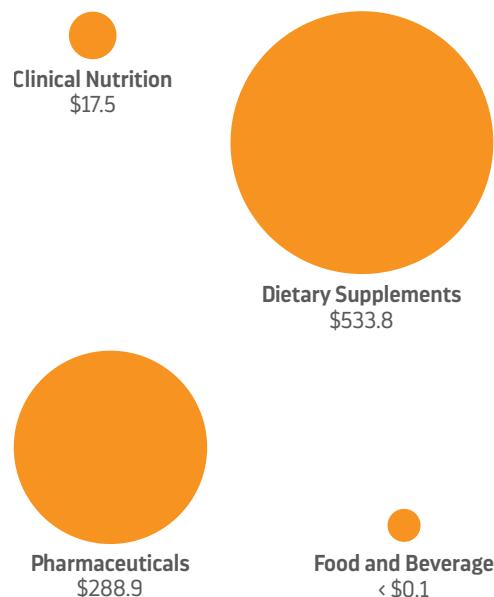
2023 Concentrates Market by Application (in Metric Tons)



Concentrates Market Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	41 mT	4.2%
Dietary Supplements	574 mT	2.7%
Food and Beverage	< 0.1 mT	-3.2%
Pharmaceuticals	-12 mT	-0.4%

2023 Concentrates Market by Application (in Millions, U.S. Dollar)



Concentrates Market Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

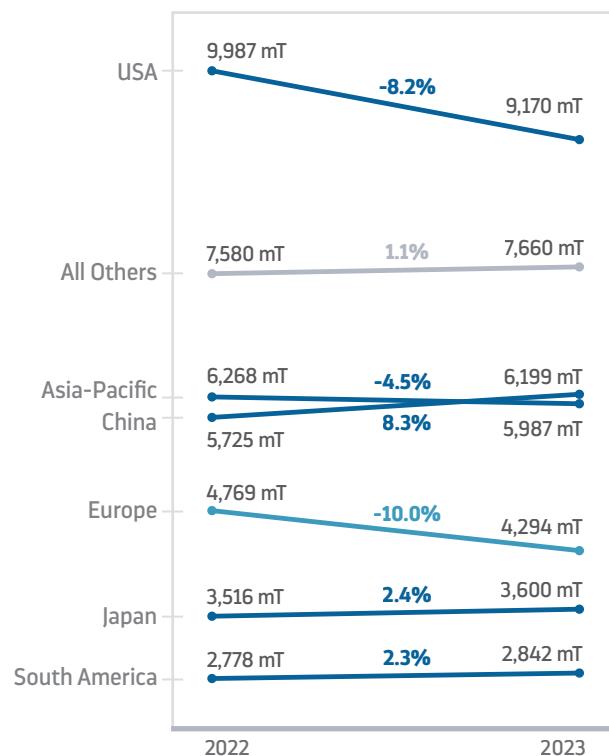
	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	\$2.1	13.9%
Dietary Supplements	\$129.3	32.0%
Food and Beverage	< \$0.1	< 0.1%
Pharmaceuticals	-\$8.7	-2.9%

COMMON REFINED OILS

Common refined oil is defined as crude oil from Peruvian anchoveta and other anchovy species that has been further processed or “refined”; this is often blended with sardine and/or mackerel oils, among others. The common refined oil market is the backbone of the omega-3 industry and is the starting raw material for many supplement products and fortified foods.

Common refined oils originally contained 18% EPA and 12% DHA but over the years, as fishing conditions and oil compositions have changed, this fatty acid profile has evolved and these oils are now blended to contain approximately 30% total EPA+DHA in varying ratios, except in countries where the precise ratio is required by law. Refined oils from reduction fisheries are also the primary starting point in the production of concentrates.

Growth by Region (in Metric Tons)



Common refined oils, used mainly for dietary supplements, either contracted or grew slowly in all markets, except for China, where they grew significantly.

The total volume of refined in 2023 was **39,754 metric tons (mT)**, a 2.1% decrease from 40,662 mT in 2022.

Value increased 56.0% to US\$376.2 MM.

The decline in volume and growth in value are attributable to the declines in crude oil production and availability triggered by low Peruvian anchovy catches during 2022 and 2023. Pricing for crude fish oils—the raw ingredient needed for producing refined oils—from reduction fisheries are correlated, and as the supply declined, the price of crude oils from multiple sources skyrocketed. Refiners were forced to pass part of their increased costs to their clients, resulting in increased value. The increase in value should not be understood to have resulted in record profits for ingredient producers. Instead, they reflect the actions taken by refiners to keep their businesses afloat during a challenging period.

Higher prices resulted in a contraction in the demand, in several important markets. Dietary supplement brands often found it necessary to prioritize the use of the scarce oils available for products with a higher profit margin, like concentrates, instead of refined oils. Consumer interest appears to be stable, and it is to be expected that normal growth will return when the supply situation returns to normal.

The majority (88.9% of the volume and 87.3% of the value) of refined oils are used in the dietary supplement sector, for which they constitute 50.0% of the volume and 26.9% of the value, making them the first and second most important sources in volume and value

respectively. In recent years, most of the growth has been concentrated in the emerging markets, particularly in Asia where economic expansion has resulted in the emergence of a growing middle class, with disposable income and positive sentiment toward omega-3s.

In 2023, the two largest Asian markets, China and the Asia-Pacific region behaved in opposite ways. China, which has extensive refining capacity, relies on crude oils from multiple sources and started the year with large inventories built in preparation for a possible expansion of the pharmaceutical market. Because of this the country was able to maintain a growth rate of 8.3% in volume. The Asia-Pacific region saw a contraction of 4.5% in volume, due to weakness in the important South Korean dietary supplement sector triggered by inflation and a cooling in economic growth.

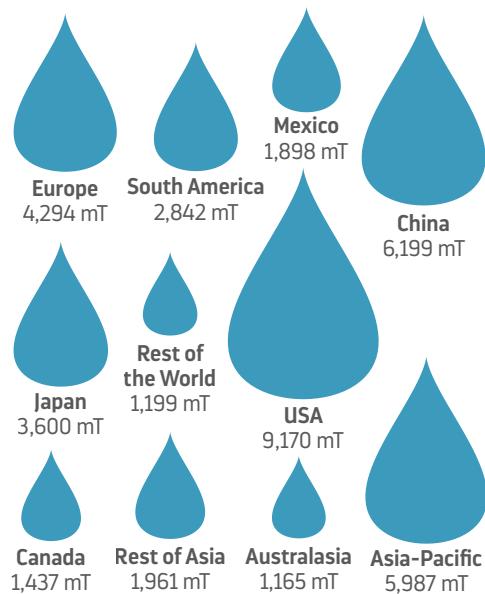
In the more established markets of the USA and Europe, the reduced supply accelerated the long-term trend of consumers transitioning from common refined oils to concentrates, resulting in contractions of 8.2% and 10.0%, respectively. Significantly higher ingredient prices resulted in important gains in value but, as mentioned previously, not in profits for ingredient manufacturers.

Canada and Australasia, two well established markets contracted slowly in volume (1.7% and 0.3% respectively). Japan, a market that depends largely on local fisheries, grew 2.4%. The emerging markets of Latin America, Rest of Asia and Rest of the World grew slowly in volume, unusual for these markets whose growth is usually faster, although out of comparatively small volumes.

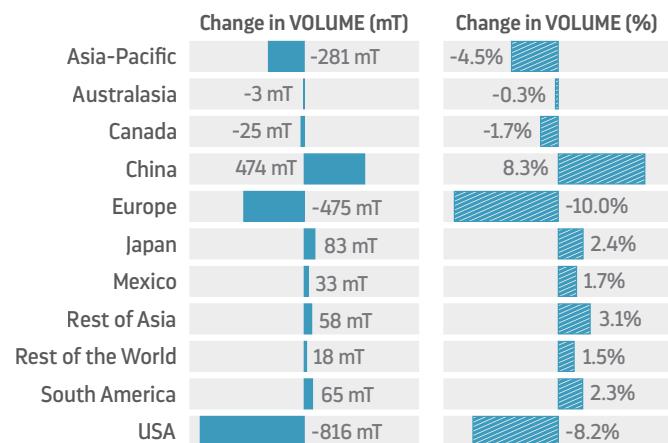
At a Glance: Common Refined Oils Market

Below and on the next page are market figures for Common Refined Oils by region and application.

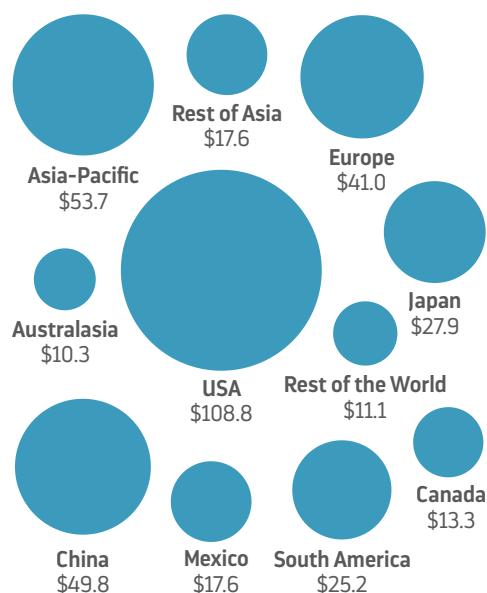
2023 Common Refined Oils Market by Region (in Metric Tons)



Common Refined Oils Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)



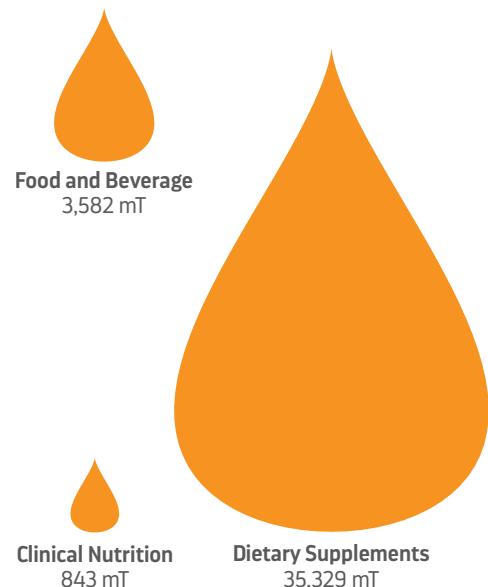
2023 Common Refined Oils Market by Region (in Millions, U.S. Dollar)



Common Refined Oils Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)



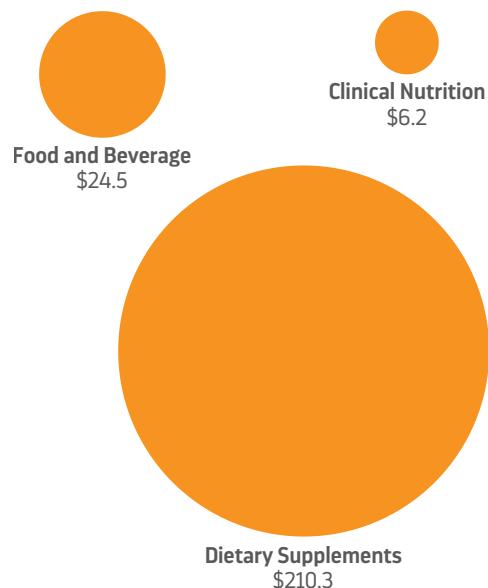
2023 Common Refined Oils Market by Application (in Metric Tons)



Common Refined Oils Market Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	37 mT	4.7%
Dietary Supplements	-979 mT	-2.7%
Food and Beverage	73 mT	2.1%

2023 Common Refined Oils Market by Application (in Millions, U.S. Dollar)



Common Refined Oils Market Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	\$3.9	62.7%
Dietary Supplements	\$118.2	56.2%
Food and Beverage	\$12.9	52.1%

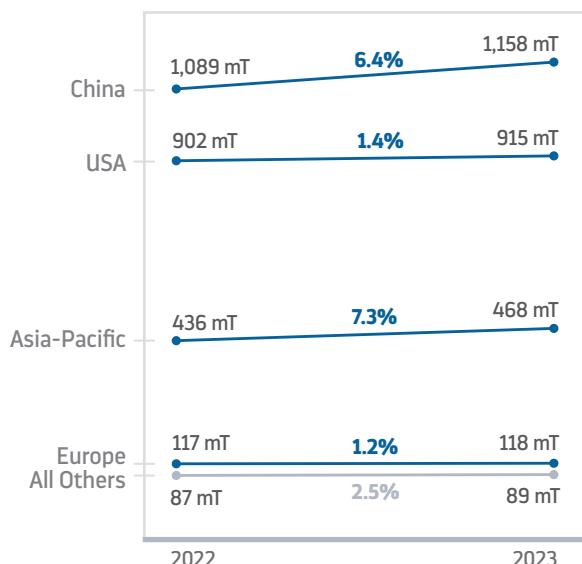
ALGAE OIL

Algal omega-3 oils are extracted from microalgal single cell organisms, which produce lipids within their cellular structure. These oils are produced mainly from *Schizochytrium*, *Cryptocodinium* and *Euglena* strains, as well as *Nannochloropsis*. Algae strains are optimized to produce a certain type of omega-3 (high EPA, high DHA, etc.), so even oils produced from the same species of algae can vary in composition. Algae can be grown in open ponds or fermented in tanks and both processes are used in the manufacture of omega-3 oils.

Because of their higher price, algal oils have historically been used for segments where the higher prices are justified: fortified infant formula and foods, and specialized dietary supplements. Until recently, interest in algal oils in dietary supplements had been restricted to specific groups of users (such as vegetarians and vegans, or people allergic to fish). However, increased production efficiency, a wider selection of algal oil options and increased consumer interest in plant-based nutrition, coupled with fish oil availability issues in 2023, have changed market dynamics for these oils.

Infant formula remains the largest application for

Growth of Algal Oil for Infant Formula (in Metric Tons)



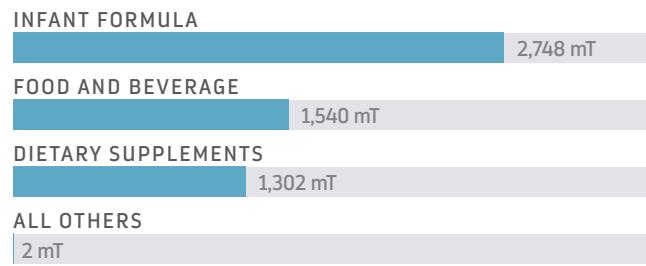
The demand for algal oils used in infant formula grew in all markets.

The total volume of algae in 2023 was **5,592 metric tons (mT)**, a 5.0% increase from 5,327 mT in 2022.

Value decreased 0.9% to US\$271.3 MM.

microalgal oils and uses 49.1% of algal oil volume, growing at an annual rate of 4.5%. Two markets that use large volumes of algal oil for infant formula are China and the Asia-Pacific region. These markets, despite declining birth rates, still have a growing infant formula segment and socioeconomic factors, including the growth of an affluent middle class and higher participation of women in the labor market, make it likely that growth will continue in the future. In recent years, algal oils have been steadily gaining market share from tuna oil, the only other source of DHA for infant formula, and it is likely that this trend will accelerate as Chinese algal oil producers enter the market. The next largest markets, the USA and Europe, where birth and breastfeeding rates are

Use of Algal Oil by Application (in Metric Tons)



The largest algal oil volume is used by infant formula, followed by food and beverage and dietary supplements.

stable, grew slowly. Demand for algal oils used for infant formula grew in all markets, but price pressures resulted in a small contraction in value.

Food and beverage, the next largest application, commands 27.5% of the global volume of algal oils, and grew 4.0% in 2023, driven in part by continued growth in the large European market, where typical products include milk and yogurt as well as spreads. An increased focus on prevention has resulted in the demand for healthy foods, including those fortified with omega-3s. Demand in the US market and the Asia-Pacific region also grew at a rapid pace, as did demand in the emerging markets of Latin America.

Algal oils have traditionally represented a small fraction of the oil volumes used in dietary supplements and have been used only for some specific market segments. In 2023, these oils comprised less than 2% of the volume (but a more significant 6.8% of the value) of omega-3

ingredients used in this sector. The major obstacle to larger representation has been their higher cost, but the introduction of more algal manufacturing capacity has led to some economies of scale and resulted in more competitive pricing. Additionally, consumer interest in plant-based ingredients and a growing variety of compositions have increased interest in algal oil dietary supplements.

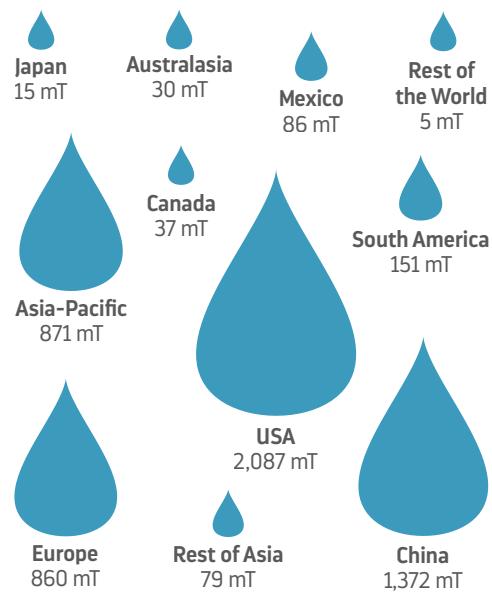
Additionally, the recent shortage and higher prices of crude fish oils have accelerated interest in finding alternative sources of EPA and DHA for human consumption. Algal oils are expected to play an increasingly important role once current production limitations ease and further cost reductions are implemented to make algal oils more competitive.

This sector grew 7.3% in volume during 2023. A long-term trend towards lower prices resulted global value remaining essentially flat.

At a Glance: Algae Oil Market

Below and on the next page are market figures for Algae Oil by region and application.

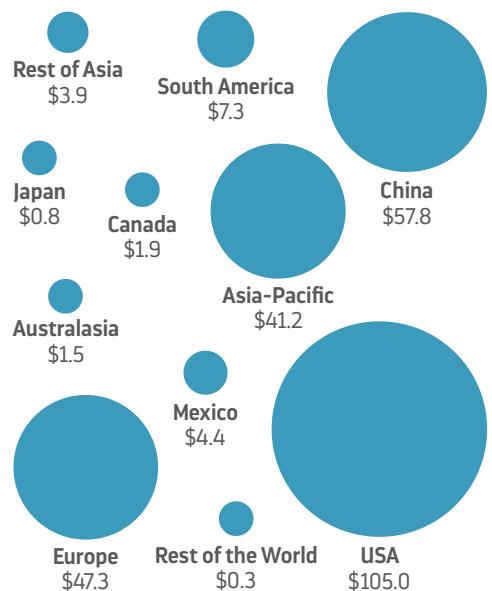
**2023 Algae Oil Market by Region
(in Metric Tons)**



Algae Oil Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	47 mT	5.7%
Australasia	< 1 mT	2.1%
Canada	2 mT	4.8%
China	79 mT	6.1%
Europe	39 mT	4.7%
Japan	< 0.1 mT	< 0.1%
Mexico	7 mT	8.3%
Rest of Asia	5 mT	6.8%
Rest of the World	< 0.1 mT	1.6%
South America	10 mT	7.1%
USA	77 mT	3.8%

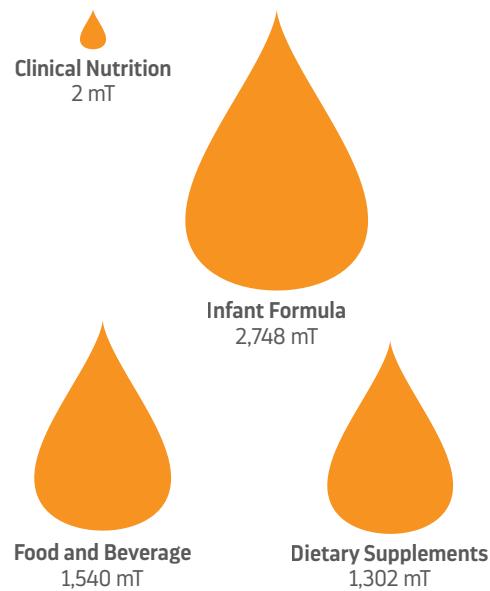
**2023 Algae Oil Market by Region
(in Millions, U.S. Dollar)**



Algae Oil Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	-\$0.3	-0.7%
Australasia	< \$0.1	-4.5%
Canada	< \$0.1	-2.1%
China	\$1.1	1.9%
Europe	-\$1.2	-2.5%
Japan	< \$0.1	-8.2%
Mexico	< \$0.1	0.5%
Rest of Asia	< \$0.1	-0.3%
Rest of the World	< \$0.1	-3.7%
South America	< \$0.1	0.5%
USA	-\$2.0	-1.9%

2023 Algae Oil Market by Application (in Metric Tons)



Algae Oil Market Volume Growth by Application (in Metric Tons) vs. Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	< 1 mT	5.8%
Dietary Supplements	89 mT	7.3%
Food and Beverage	59 mT	4.0%
Infant Formula	118 mT	4.5%

2023 Algae Oil Market by Application (in Millions, U.S. Dollar)



Algae Oil Market Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	< \$0.1	< 0.1%
Dietary Supplements	-\$0.8	-0.9%
Food and Beverage	-\$3.4	-4.1%
Infant Formula	\$1.5	1.4%

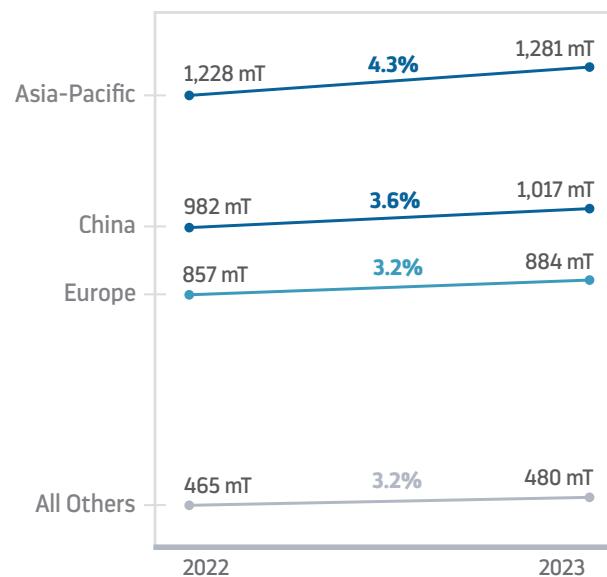
TUNA OIL

Tuna oil is extracted from the cuttings of the seafood industry, and sourced from multiple species, including skipjack, albacore and yellowfin tuna. It is a premium-priced omega-3 ingredient and typically higher in DHA than EPA.

Because of its high DHA content, tuna oil is primarily used for infant formula, which commands 76.1% of the global volume and grew 3.7% in volume. Despite concerns about Fukushima in China and the APAC region and an ongoing switch from tuna to algae in infant formula applications, demand for tuna oil grew in both volume and value in all regions covered by this report.

The two largest markets are China and Asia-Pacific, the two world regions with the highest demand for DHA-fortified infant formula. Asia-Pacific, which commands 29.6% of the global tuna oil volume, grew 4.1% in 2023. In China (25.5% of the global volume), as the country recovered from an 2022 spike in Covid cases and resulting economic challenges and a drop in

Grow in Tuna Oil Used in Infant Formula, by Region (in Metric Tons)



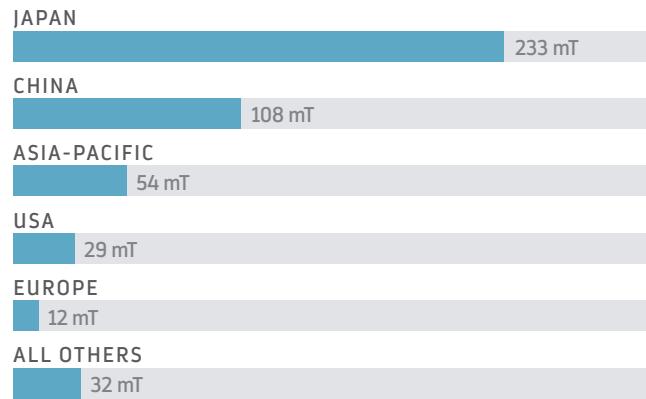
The demand for tuna oils used in infant formula increased in all markets.

The total volume of tuna oils in 2023 was **4,811 metric tons (mT)**, a 3.8% increase from 4,637 mT in 2022.

Value increased 8.6% to **US\$143.1 MM**.

consumer confidence, demand for tuna oil grew 3.8%, despite a decline in birthrates and a long-term increase of the share of algal oil in the infant nutrition segment. However, partially in response to the August 2023 release into the ocean of Fukushima wastewater, the Chinese government advised infant formula manufacturers to reconsider the use of tuna oil as a source of DHA. While this did not immediately affect consumer demand, it is likely that the market share of tuna oils in Chinese infant formula will decrease rapidly in the next few years.

Demand for Tuna Oil in Food and Beverage, by Region (in Metric Tons)



Tuna oil is an important ingredient in the fortification of foods and beverages, particularly in Asia.

In the next largest market, Europe (20.0% of the global volume of tuna oil), infant formula is almost universally fortified, and birth and breastfeeding rates are stable. Recent changes in regulations require higher levels of fortification, and the efforts of a few last brands to comply drove an increase in demand. As a result, the European market grew 3.0% in volume in 2023.

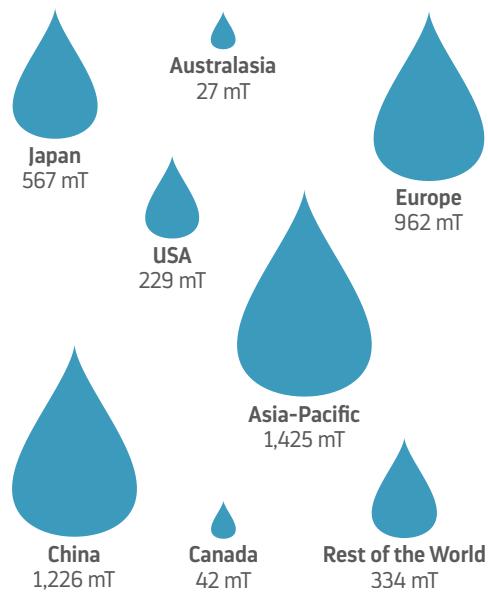
Besides infant formula, tuna oil is also as an ingre-

dient for fortified foods and beverages and dietary supplements, particularly in Asia, where tuna has the reputation of being a healthy food. Demand for tuna oil in the dietary supplements segment grew by 2.3% in volume, and demand for food and beverages grew by 6.4%. Most of this growth was achieved in Japan, the market with greater demand for tuna oils for both of these segments.

At a Glance: Tuna Oil Market

Below and on the next page are market figures for Tuna Oil by region and application.

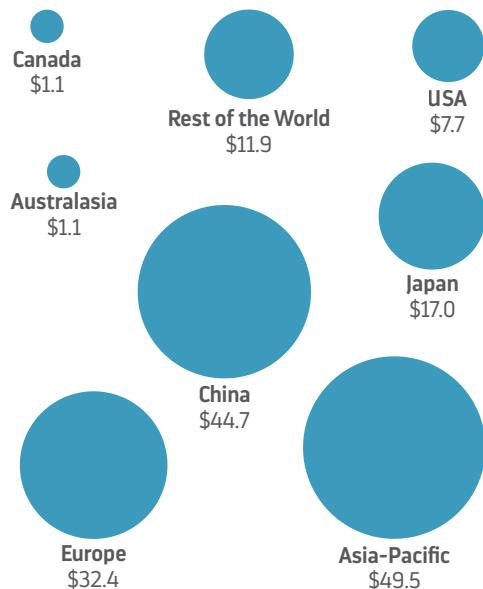
**2023 Tuna Oil Market by Region
(in Metric Tons)**



Tuna Oil Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	56 mT	4.1%
Australasia	< 1 mT	2.9%
Canada	1 mT	2.7%
China	45 mT	3.8%
Europe	28 mT	3.0%
Japan	28 mT	5.3%
Rest of the World	14 mT	4.3%
USA	< 1 mT	0.1%

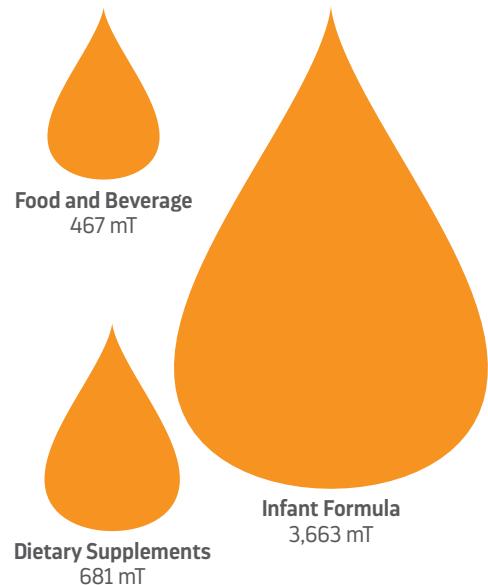
**2023 Tuna Oil Market by Region
(in Millions, U.S. Dollar)**



Tuna Oil Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	\$10.3	26.1%
Australasia	\$0.3	43.6%
Canada	\$0.3	45.9%
China	\$10.2	29.6%
Europe	\$6.1	23.0%
Japan	\$1.7	11.2%
Rest of the World	\$2.7	29.7%
USA	\$2.2	38.8%

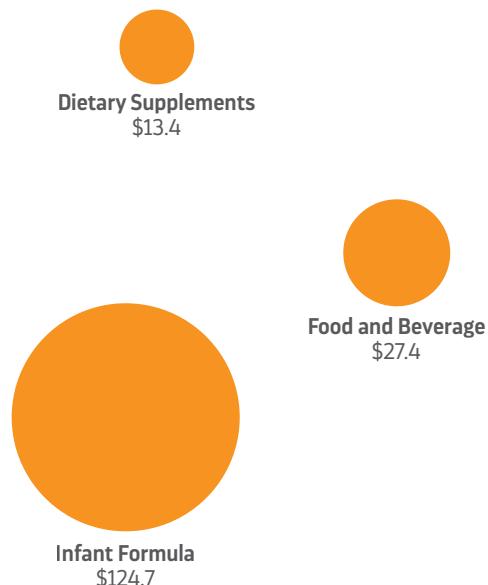
2023 Tuna Oil Market by Application (in Metric Tons)



Tuna Oil Market Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Dietary Supplements	15 mT	2.3%
Food and Beverage	28 mT	6.4%
Infant Formula	130 mT	3.7%

2023 Tuna Oil Market by Application (in Millions, U.S. Dollar)



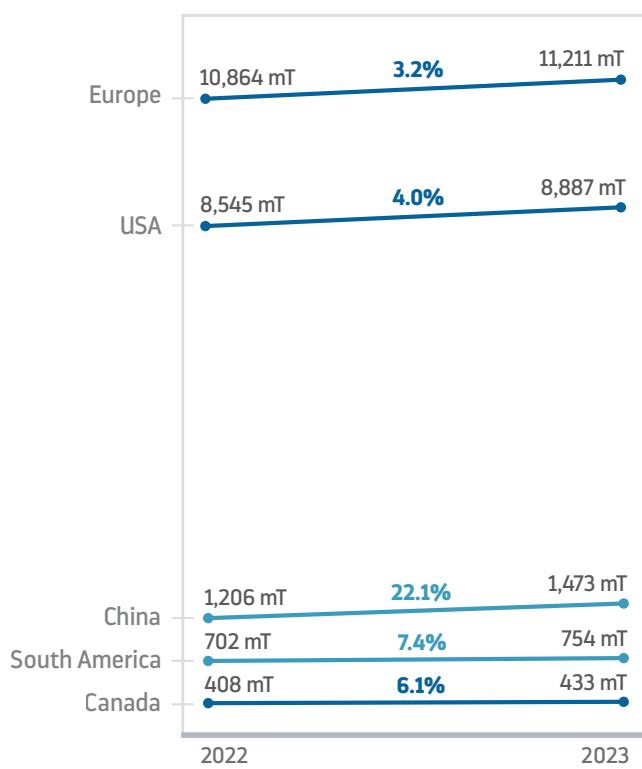
Tuna Oil Market Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Dietary Supplements	\$4.3	47.7%
Food and Beverage	\$7.6	38.3%
Infant Formula	\$21.9	21.3%

MISCELLANEOUS PET FOOD OIL

The global pet nutrition industry uses fish oils from multiple sources, including reduction fisheries or byproduct of the seafood industry. These oils are used in premium and super-premium pet foods and supplements, typically in semi-refined form. Pet product manufacturers are often more interested in the oil price, composition and quality rather than its source. Salmon and menhaden oil are also used for pet nutrition, but are covered elsewhere in this report.

**Growth in Miscellaneous Pet Food Oil by Region
(in Metric Tons)**



Demand grew in all regions, particularly in the emerging markets of China and South America.

The total volume of miscellaneous oils used for pet nutrition in 2023 was **22,758 metric tons (mT)**, a 4.8% increase from 21,725 mT in 2022. Value increased 64.8% to **US\$119.5 MM**.

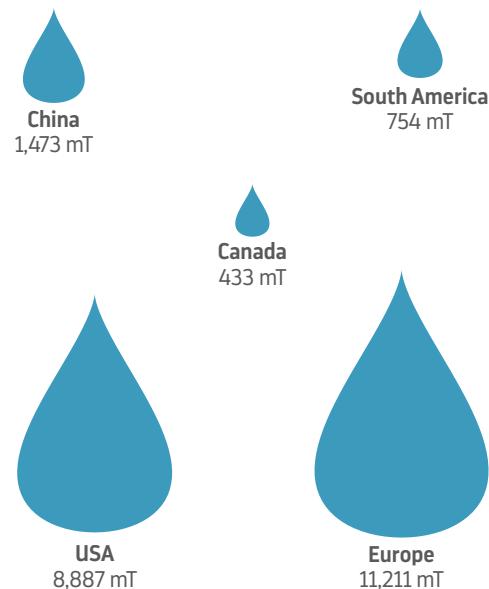
Most of the demand for these oils is concentrated in two markets, Europe (49.3% of the global volume demand) and the USA (39.0%). While the pet nutrition market is larger (and uses more oil) in the USA than in Europe, the USA relies on large volumes of menhaden oil, a local source, and is less reliant on miscellaneous oils. In Europe, the demand for miscellaneous pet food oils grew 3.2% in value, and in the USA, 4.0%.

Volume is growing rapidly in other markets, particularly Brazil and China, where the growth of an affluent middle class and increased urbanization drive the demand for pet nutrition products. However, while these markets are growing quickly, the growth comes from smaller volumes—pet food and supplement penetration in these markets is low, and fortification with EPA and DHA remains rare.

At a Glance: Miscellaneous Pet Food Oil

Below are market figures for Miscellaneous Pet Food Oil by region. In terms of applications, all oil is used by the pet food market.

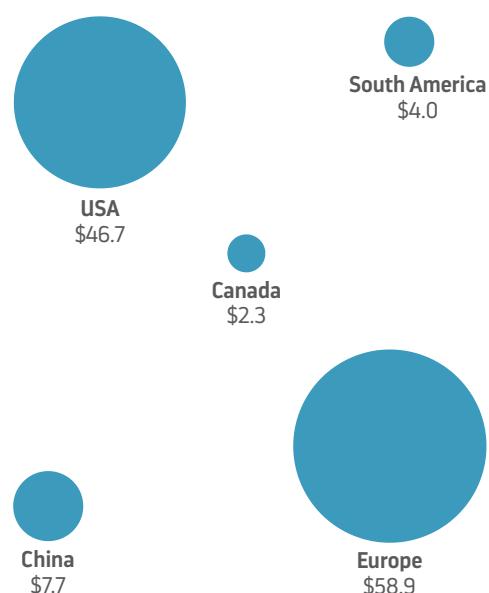
2023 Miscellaneous Pet Food Oil Market by Region (in Metric Tons)



Miscellaneous Pet Food Oil Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Canada	25 mT	6.1%
China	267 mT	22.1%
Europe	348 mT	3.2%
South America	52 mT	7.4%
USA	342 mT	4.0%

2023 Miscellaneous Pet Food Oil Market by Region (in Millions, U.S. Dollar)



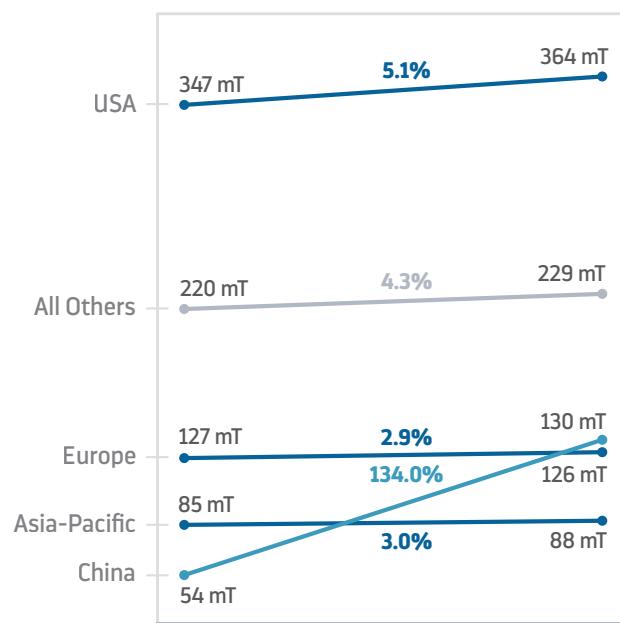
Miscellaneous Pet Food Oil Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Canada	\$0.9	66.9%
China	\$3.8	94.7%
Europe	\$22.6	62.2%
South America	\$1.6	69.2%
USA	\$18.1	63.4%

KRILL OIL

Krill is the common name for a group of zooplankton species harvested primarily off the coast of Antarctica, in an area with a dense biomass population. Krill oil is used exclusively for dietary supplement applications. The krill oil in the global market today has a unique natural lipid composition that provides EPA and DHA bound to phospholipids.

Krill Oil by Region (in Metric Tons)



Demand for krill oil grew in all markets, particularly China, where renewed interest in novel ingredients drove growth.

The total volume of krill oils in 2023 was **938 metric tons (mT)**, a 12.7% increase from 832 mT in 2022.

Value increased 10.8% to **US\$91.7 MM**.

Krill oil is used exclusively for dietary supplements, and the largest markets are the USA (38.9% of the global volume), Europe (13.9%), China (13.5%) and the Asia-Pacific region (9.4%).

Demand for krill oil grew in all regions, particularly in China, where improving economic conditions brought renewed interest in specialty ingredients for dietary supplements.

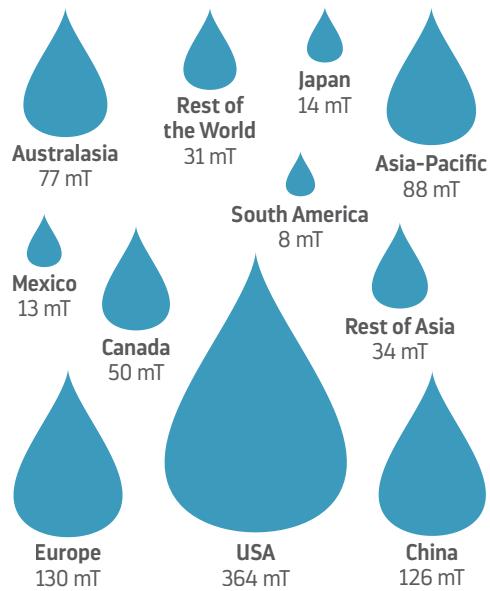
Demand in the Asia-Pacific region declined in 2020 and 2021 mostly due to a severe contraction in the South Korean market caused by regulatory action to ensure compliance with safety standards. With these issues now resolved, demand in 2023 increased by 3.0%.

In the USA, changes in demand have usually been linked to the prevalence of consumer marketing. In 2023, demand grew by 5.1% in volume.

At a Glance: Krill Oil Market

Below are market figures for Krill Oil by region. In terms of applications, krill oil is only used in dietary supplements.

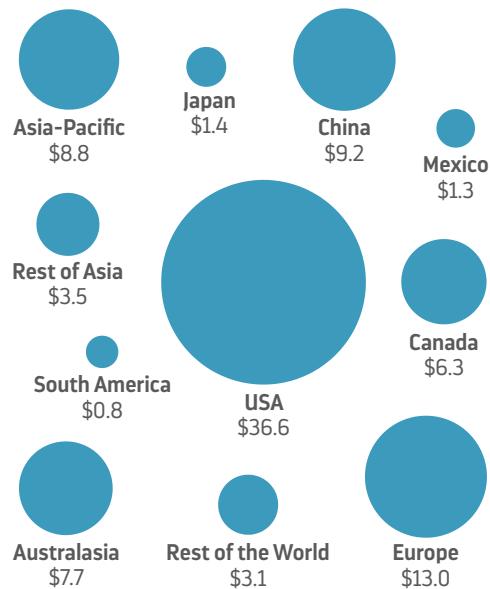
**2023 Krill Oil Market by Region
(in Metric Tons)**



Krill Oil Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	3 mT	3.0%
Australasia	2 mT	3.0%
Canada	< 1 mT	1.7%
China	72 mT	134.0%
Europe	4 mT	2.9%
Japan	< 1 mT	2.8%
Mexico	4 mT	42.5%
Rest of Asia	< 1 mT	1.3%
Rest of the World	1 mT	4.0%
South America	< 1 mT	4.2%
USA	18 mT	5.1%

**2023 Krill Oil Market by Region
(in Millions, U.S. Dollar)**



Krill Oil Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

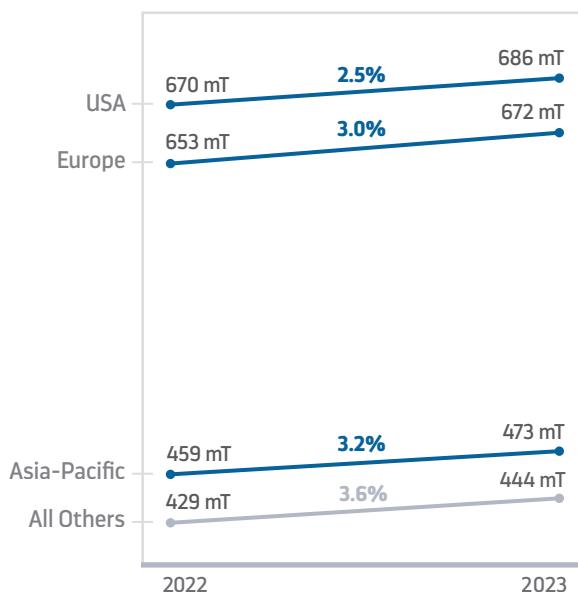
	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	\$0.3	3.0%
Australasia	\$0.2	3.0%
Canada	\$0.1	1.8%
China	\$5.6	158.0%
Europe	\$0.4	2.9%
Japan	< \$0.1	3.0%
Mexico	\$0.4	42.9%
Rest of Asia	< \$0.1	1.2%
Rest of the World	\$0.1	4.0%
South America	< \$0.1	3.8%
USA	\$1.8	5.1%

SALMON OIL

Salmon oil is extracted from cuttings of the seafood industry and sourced primarily from wild Alaskan and farmed Norwegian salmon, although the latter, due to lower omega-3 content, is mostly used for pet applications. There is also a small volume of oil extracted from salmon roe and sold as dietary supplements in Japan, but the volumes are minor and not included in our estimates.

Salmon oil is used in two forms: either as a refined oil (which covers three quarters of the global demand), or a minimally processed virgin oil that commands a higher price.

Salmon Oil for Human Consumption, by Region (in Metric Tons)



Most salmon oil used for human consumption comes from wild-caught Alaskan salmon and the volume is stable.

The total volume of salmon oil in 2023 was **5,506 metric tons (mT)**, a 1.2% increase from 5,442 mT in 2022.

Value increased 46.5% to **US\$82.7 MM**.

Minimally processed oils are mostly used in dietary supplements, which command 66.5% of their global volume. Refined salmon oils are primarily used for pet nutrition, in applications including pet food, supplements and flavorants (products that consumers add to pet food servings to make them more enticing). Pet nutrition accounts for 67.1% of the total volume of refined salmon oils.

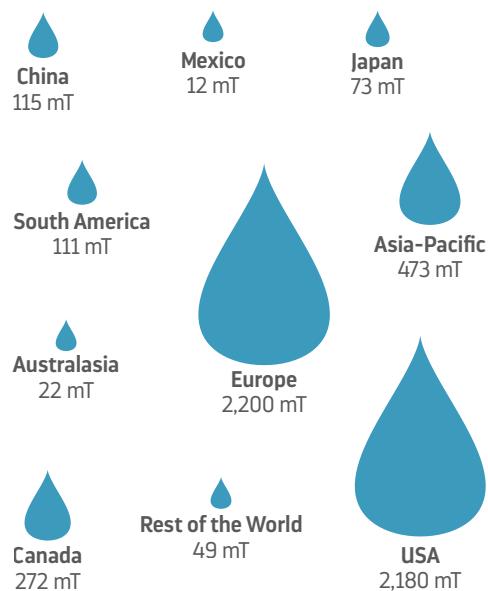
Most salmon oil used for human consumption is sourced from multiple species caught in Alaskan fisheries, which are sustainably managed, so their production is stable, within natural year-to-year variability. Supply is expected to remain essentially constant for the next few years.

The largest markets for salmon oil are the USA and Europe (both with 40.0% of the global volume), followed by the APAC region (8.6%).

At a Glance: Salmon Oil Market

Below and on the next page are market figures for Salmon Oil by region and application.

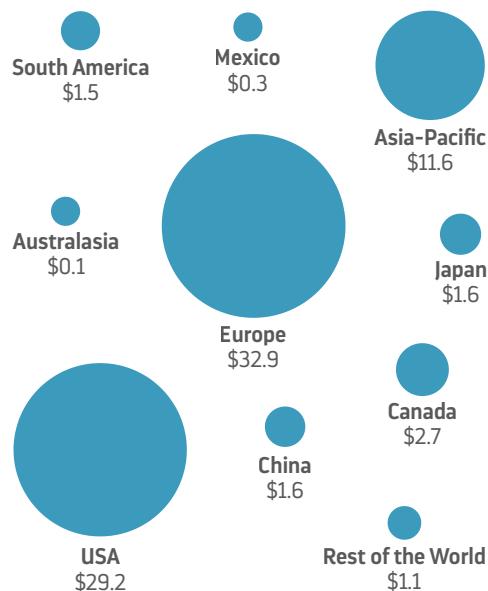
**2023 Salmon Oil Market by Region
(in Metric Tons)**



Salmon Oil Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	14 mT	3.2%
Australasia	< 1 mT	1.0%
Canada	5 mT	2.0%
China	6 mT	5.5%
Europe	24 mT	1.1%
Japan	2 mT	2.6%
Mexico	< 1 mT	2.8%
Rest of the World	1 mT	3.0%
South America	9 mT	8.5%
USA	2 mT	< 0.1%

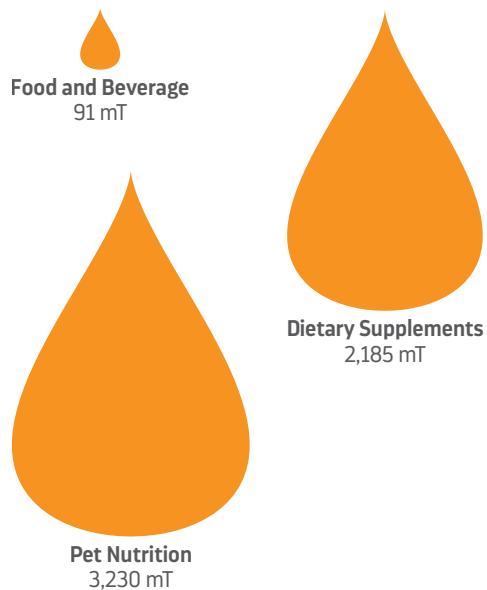
**2023 Salmon Oil Market by Region
(in Millions, U.S. Dollar)**



Salmon Oil Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	\$3.2	38.1%
Australasia	< \$0.1	40.0%
Canada	\$0.8	43.2%
China	\$0.5	44.5%
Europe	\$10.7	48.3%
Japan	\$0.4	37.5%
Mexico	< \$0.1	40.0%
Rest of the World	\$0.3	37.5%
South America	\$0.6	73.3%
USA	\$9.5	48.3%

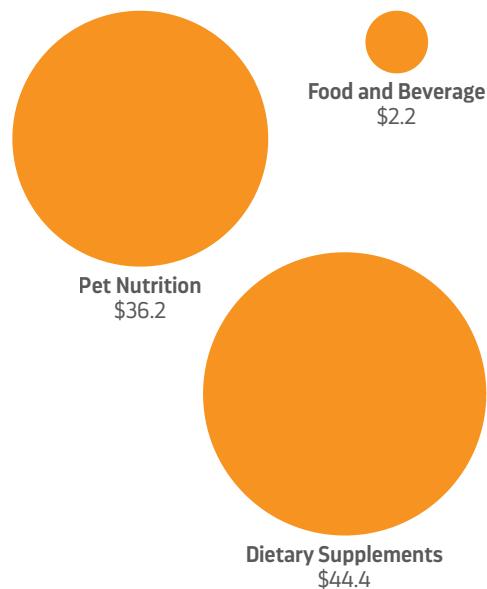
2023 Salmon Oil Market by Application (in Metric Tons)



Salmon Oil Market Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Dietary Supplements	64 mT	3.0%
Food and Beverage	2 mT	1.8%
Pet Nutrition	-2 mT	< 0.1%

2023 Salmon Oil Market by Application (in Millions, U.S. Dollar)



Salmon Oil Market Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

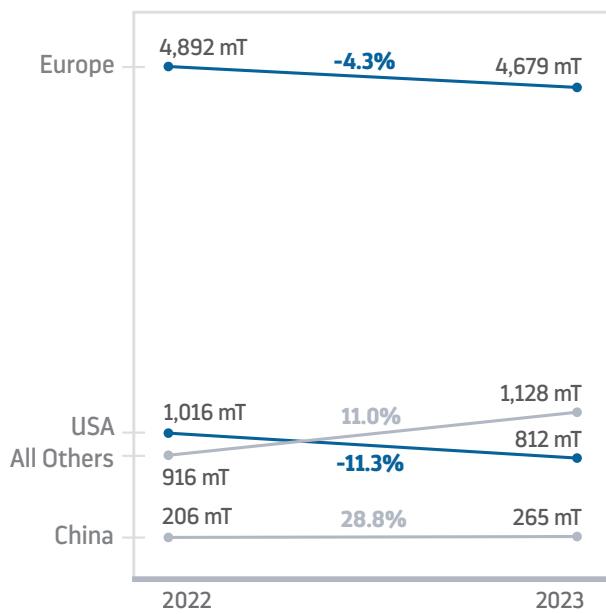
	Change in VALUE (MM\$)	Change in VALUE (%)
Dietary Supplements	\$12.2	38.1%
Food and Beverage	\$0.6	35.6%
Pet Nutrition	\$13.4	59.1%

COD LIVER OIL

Cod liver oil is extracted from the Atlantic cod (*Gadus morhua*) and other related species. It is an oil with a long history of use, particularly in Scandinavia and the United Kingdom. Cod is caught for seafood, and the oil is extracted from the liver, the fattiest cutting.

Most cod liver oil goes into dietary supplements, which accounts for 6,710 mT, or 97.5% of the global volume. The only other application, food and beverage, uses less than 200 mT, in Europe and the USA.

Cod Liver Oil by Region (in Metric Tons)



Volume declined both in Europe and the USA, the two larger markets, as consumers gradually move away from legacy products into more novel ingredients, but increased demand from other regions kept this segment stable.

The total volume of cod liver oil in 2023 was **6,884 metric tons (mT)**, a 2.1% decrease from 7,029 mT in 2022.

Value increased 24.9% to **US\$76.7 MM**.

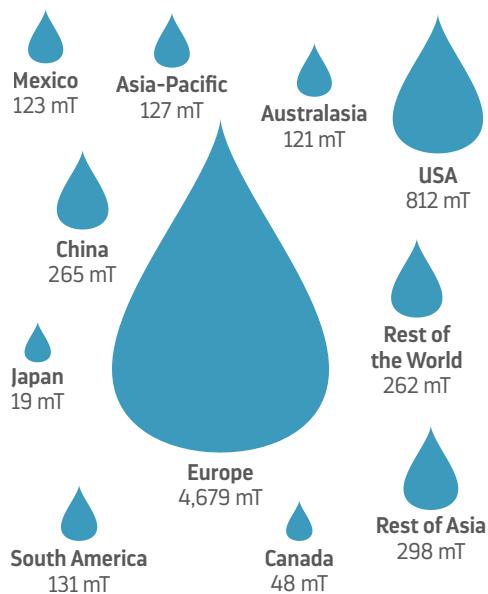
The largest cod liver oil market is Europe, which in 2023 used 68.0% of the global cod liver oil volume. This represents a 4.3% decline from the previous year. The US market (11.8% of the volume) contracted by 11.3%. Declines in both markets appear to follow a slow downward trend, as consumers move to newer formulations.

Despite technological advances that result in products with better organoleptic characteristics, cod liver oil has a reputation as a product with a strong taste. Because of this, penetration remains small in other markets. Several regions saw big percent changes in volume, but these are small markets and even minor changes in trade can artificially appear to have a large impact. Cod liver oil is a limited resource, and production and trade are subject to natural yearly changes in catches and yields, but global demand has remained relatively stable over the long term.

At a Glance: Cod Liver Oil Market

Below and on the next page are market figures for Cod Liver Oil by region and application.

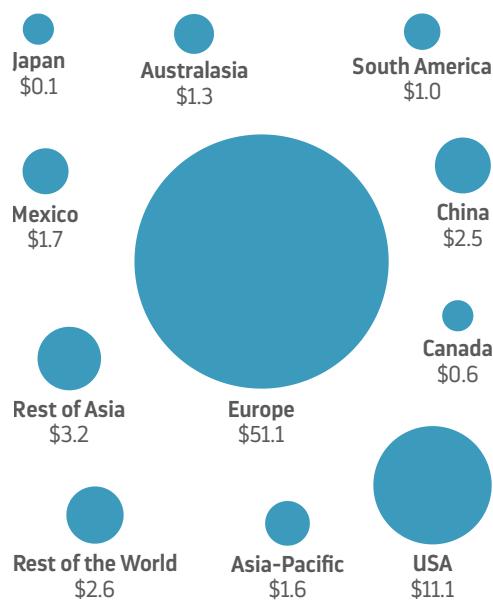
**2023 Cod Liver Oil Market by Region
(in Metric Tons)**



**Cod Liver Oil Market Volume Growth by Region
(in Metric Tons) and Percent Growth (Change from 2022 to 2023)**

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	10 mT	8.4%
Australasia	28 mT	29.8%
Canada	-10 mT	-17.0%
China	59 mT	28.8%
Europe	-213 mT	-4.3%
Japan	4 mT	26.9%
Mexico	-43 mT	-26.0%
Rest of Asia	98 mT	49.1%
Rest of the World	137 mT	109.3%
South America	-111 mT	-45.9%
USA	-104 mT	-11.3%

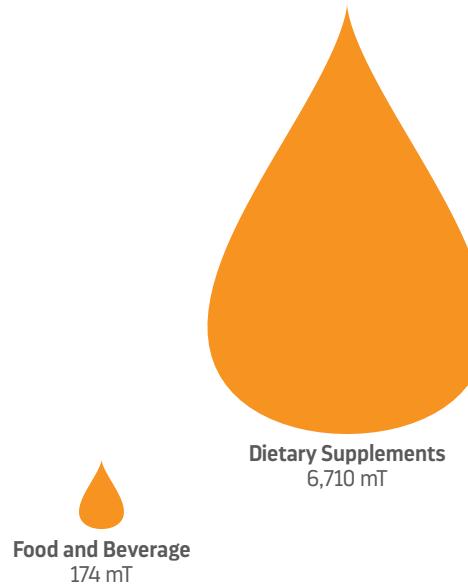
**2023 Cod Liver Oil Market by Region
(in Millions, U.S. Dollar)**



**Cod Liver Oil Market Value Growth by Region
(in Millions, U.S. Dollar) and Percent Growth
(Change from 2022 to 2023)**

	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	\$0.1	7.5%
Australasia	\$0.3	30.6%
Canada	\$0.1	23.7%
China	\$0.6	32.9%
Europe	\$12.1	30.9%
Japan	< \$0.1	56.0%
Mexico	\$0.4	30.0%
Rest of Asia	\$1.3	70.1%
Rest of the World	\$1.8	236.5%
South America	-\$0.5	-32.5%
USA	-\$0.9	-7.9%

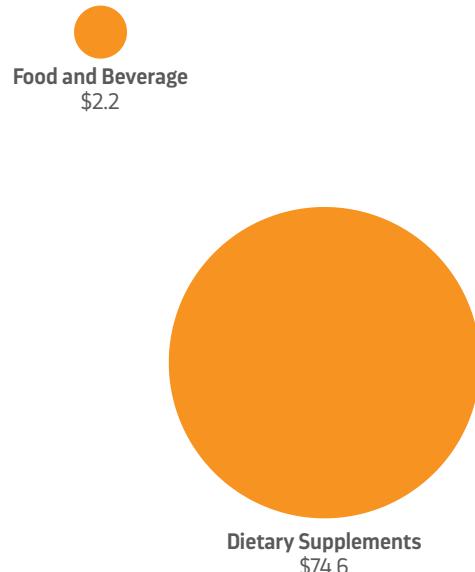
2023 Cod Liver Oil Market by Application (in Metric Tons)



Cod Liver Oil Market Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Dietary Supplements	-147 mT	-2.1%
Food and Beverage	3 mT	1.6%

2023 Cod Liver Oil Market by Application (in Millions, U.S. Dollar)



Cod Liver Oil Market Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Dietary Supplements	\$15.0	25.2%
Food and Beverage	\$0.3	17.2%

MENHADEN OIL

The term menhaden refers to two closely related species of forage fish, the Gulf menhaden (*Brevoortia patronus*) and Atlantic menhaden (*Brevoortia tyrannus*), both originating in US waters. Menhaden is used primarily for reduction into fish meal and oil, similar to the case for anchovy fisheries.

The increase in value was due to increases in pricing. Because the price of crude oils from different reduction fisheries are correlated, higher prices for Peruvian anchovy oils resulted in higher prices for menhaden oil.

The EPA and DHA content of crude menhaden oil, while relatively high, is not sufficient for it to be easily used as an ingredient for human applications, so refined menhaden oil is commonly used as an additive for pet foods. Smaller amounts are also used for dietary supplements and as additives for foods and beverages.

Menhaden Oil, by Application (in Metric Tons)



Almost all menhaden oil is used as an additive for pet foods, mostly in the USA.

The total volume of menhaden oil in 2023 was **10,877 metric tons (mT)**, a 3.6% increase from 10,501 mT in 2022.

Value increased 75.4% to **US\$40.8 MM**.

The pet nutrition segment uses 97.7% of the global menhaden omega-3 oil volume.

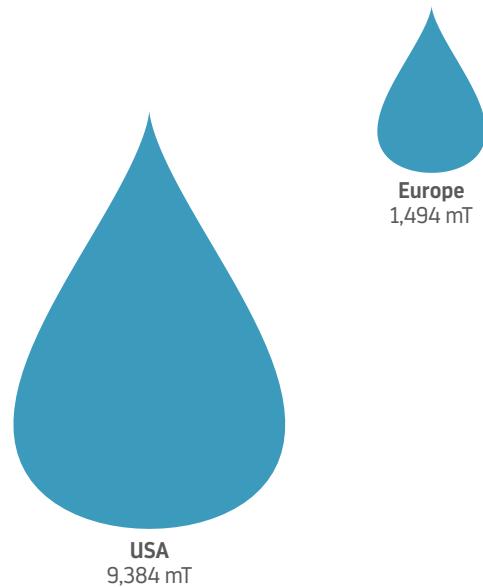
The largest market is the USA, which uses 86.3% of the global volume, and where demand grew 4.1% in 2023. Europe is a smaller but still important pet nutrition market, but it relies primarily on miscellaneous oils for pet applications (covered elsewhere in this report).

Menhaden is only caught in two fisheries, and oil production volumes are relatively stable—year-to-year changes in production reflect the natural variability in catches and oil yields.

At a Glance: Menhaden Oil Market

Below and on the next page are market figures for Menhaden Oil by region and application.

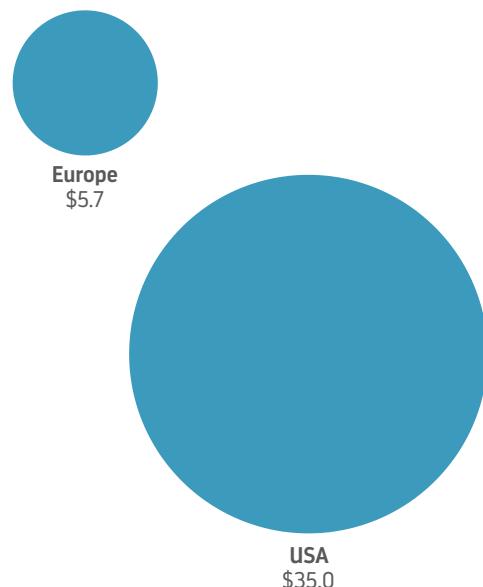
**2023 Menhaden Oil Market by Region
(in Metric Tons)**



**Menhaden Oil Market Volume Growth by Region
(in Metric Tons) and Percent Growth (Change from
2022 to 2023)**

	Change in VOLUME (mT)	Change in VOLUME (%)
Europe	14 mT	0.9%
USA	363 mT	4.0%

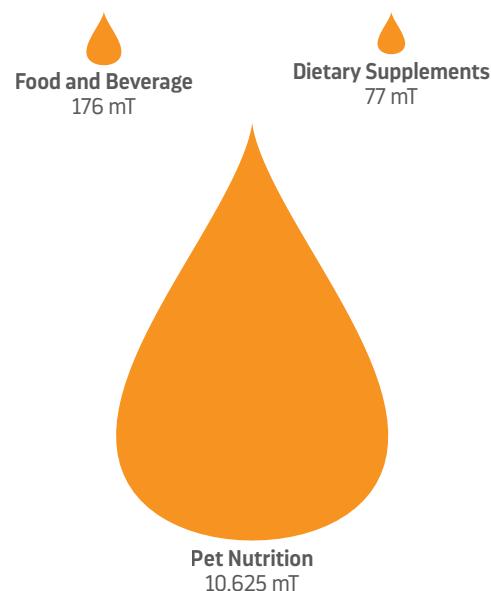
**2023 Menhaden Oil Market by Region
(in Millions, U.S. Dollar)**



**Menhaden Oil Market Value Growth by Region
(in Millions, U.S. Dollar) and Percent Growth
(Change from 2022 to 2023)**

	Change in VALUE (MM\$)	Change in VALUE (%)
Europe	\$2.4	70.8%
USA	\$15.2	76.2%

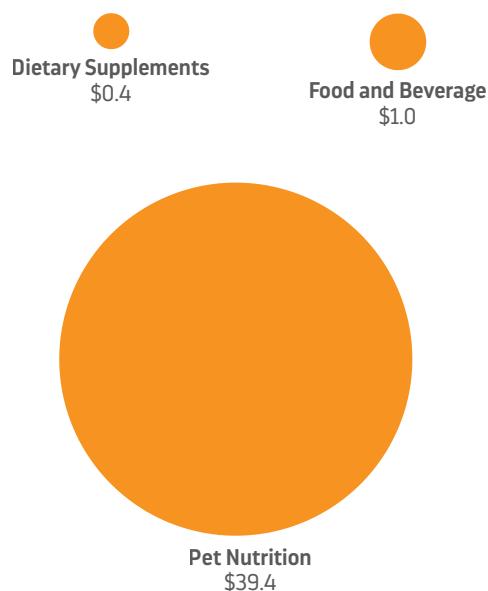
2023 Menhaden Oil Market by Application (in Metric Tons)



Menhaden Oil Market Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Dietary Supplements	-3 mT	-3.2%
Food and Beverage	-6 mT	-3.4%
Pet Nutrition	385 mT	3.8%

2023 Menhaden Oil Market by Application (in Millions, U.S. Dollar)



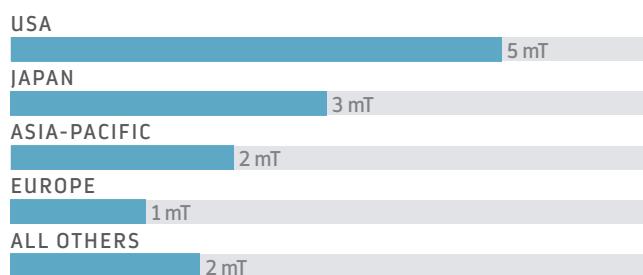
Menhaden Oil Market Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Dietary Supplements	\$0.2	60.0%
Food and Beverage	\$0.4	62.9%
Pet Nutrition	\$17.0	75.9%

GREEN-LIPPED MUSSEL OIL

Green lipped mussel powders and oils are extracted primarily from *Perna canaliculus*, a species of mussel, with most of the production in New Zealand. Volumes of green-lipped mussel oils are very small, but they tend to have much higher value than other omega-3 oils.

Green-Lipped Mussel Oil by Region (in Metric Tons)



Green-lipped mussel oil is sold in small volumes for dietary supplements.

The total volume of green-lipped mussel oil in 2023 was **13.8 metric tons (mT)**, a 4.3% increase from 12.7 mT in 2022.

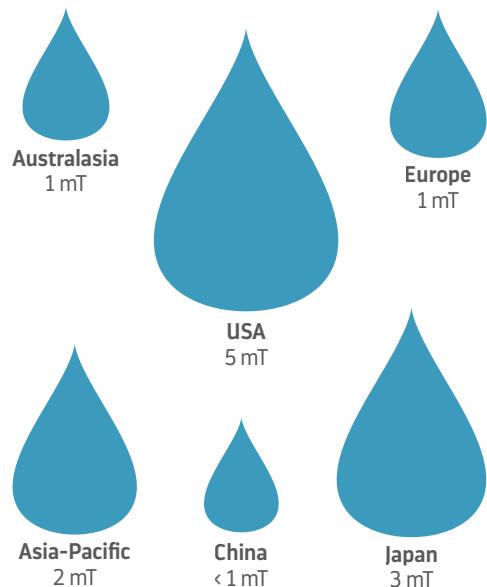
Value increased 3.4% to **US\$28.8 MM**.

Green lipped mussel oils are used only for dietary supplements, and because of their super-premium positioning, almost exclusively in affluent markets.

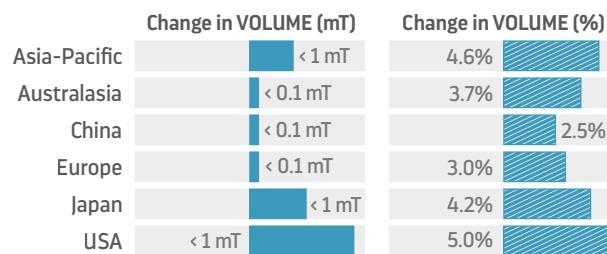
At a Glance: Green-Lipped Mussel Oil Market

Below are market figures for Green-Lipped Mussel Oil by region. In terms of applications, green-lipped mussel oil is only used in dietary supplements.

2023 Green-Lipped Mussel Oil Market by Region (in Metric Tons)



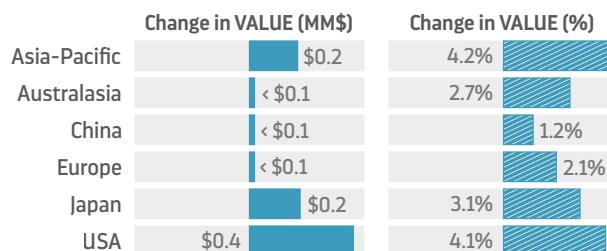
Green-Lipped Mussel Oil Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)



2023 Green-Lipped Mussel Oil Market by Region (in Millions, U.S. Dollar)



Green-Lipped Mussel Oil Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

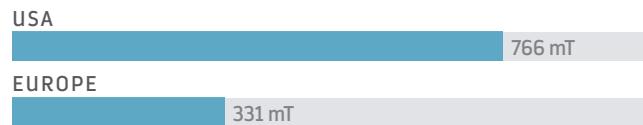


SQUID OIL

Squid oils, also marketed as calamari oils, are extracted from the cuttings of squid used in the seafood industry. Most squid oils are sold in concentrate form, although there are also small volumes sold as refined oil.

Squid oils are primarily used as dietary supplements in two markets, the USA (69.8% of the global demand) and Europe, and some smaller volumes are used in specialty food products.

Squid Oil by Region (in Metric Tons)



Squid oil demand is focused on only two geographic markets.

The total volume of squid oil in 2023 was **1,098 metric tons (mT)**, an 8.8% increase from 1,009 mT in 2022.

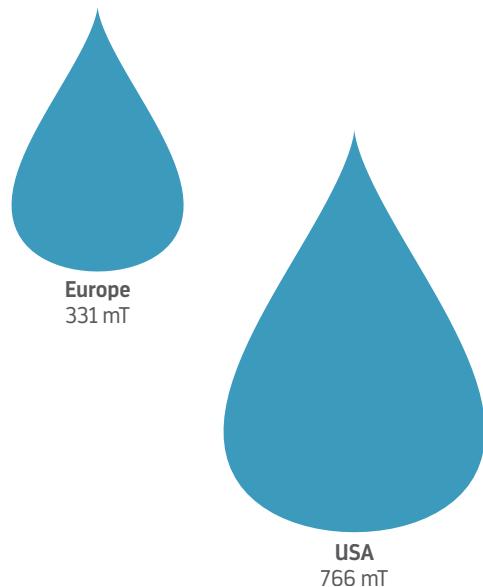
Value increased 7.4% to **US\$13.5 MM**.



At a Glance: Squid Oil Market

Below and on the next page are market figures for Squid Oil by region and application.

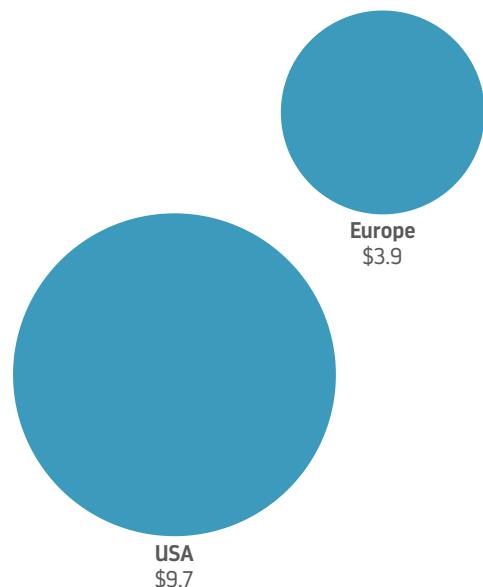
**2023 Squid Oil Market by Region
(in Metric Tons)**



Squid Oil Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Europe	43 mT	14.8%
USA	47 mT	6.5%

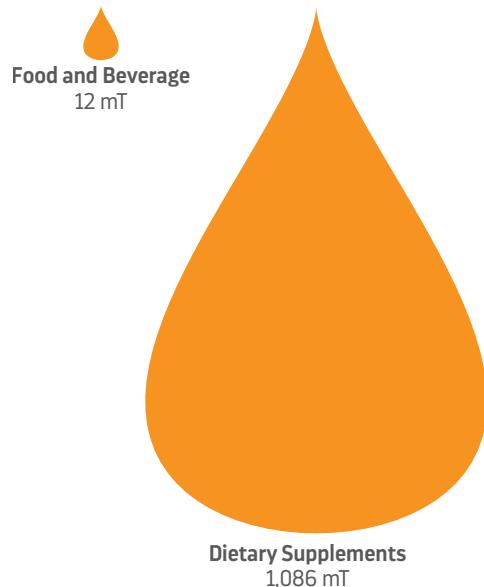
**2023 Squid Oil Market by Region
(in Millions, U.S. Dollar)**



Squid Oil Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Europe	\$0.4	12.9%
USA	\$0.5	5.3%

2023 Squid Oil Market by Application (in Metric Tons)



Squid Oil Market Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Dietary Supplements	89 mT	8.9%
Food and Beverage	< 1 mT	1.8%

2023 Squid Oil Market by Application (in Millions, U.S. Dollar)



Squid Oil Market Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Dietary Supplements	\$0.9	7.4%
Food and Beverage	< \$0.1	< 0.1%

CALANUS OIL

Calanus oil is extracted from calanus, the common name for several species in a genus of small crustaceans. There is currently a single product available in this category, derived from *Calanus finmarchicus*, a previously untapped resource with a large biomass.

Calanus provides a wax ester form of omega-3s and has a unique value proposition due to its composition, which includes astaxanthin and policosanols. This product is sold as a dietary supplement in Europe and the USA. This is a relatively new source and only a minor fraction of the biomass is harvested each year, so volumes are still small, but further growth can be expected.

The total volume of calanus oil in 2023 was **31 metric tons (mT)**, a 12.4% increase from 27 mT in 2022.

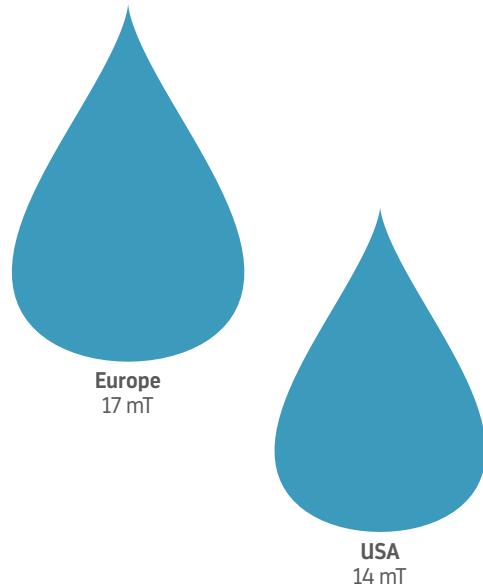
Value increased 11.9% to **US\$8.4 MM**.



At a Glance: Calanus Oil Market

Below are market figures for Calanus Oil by region. In terms of applications, calanus oil is only used in dietary supplements.

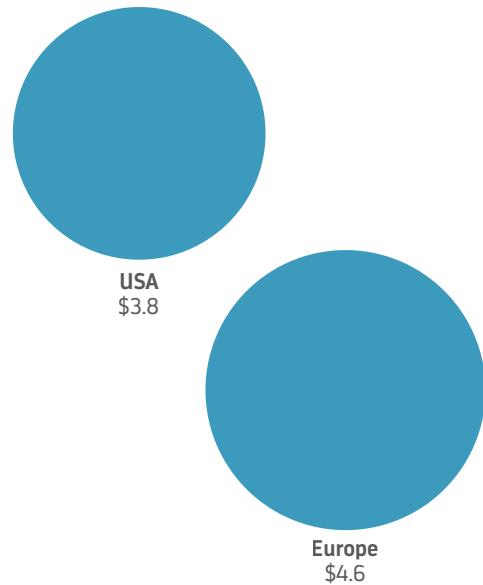
**2023 Calanus Oil Market by Region
(in Metric Tons)**



Calanus Oil Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Europe	2 mT	12.7%
USA	2 mT	12.0%

**2023 Calanus Oil Market by Region
(in Millions, U.S. Dollar)**



Calanus Oil Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Europe	\$0.5	12.4%
USA	\$0.4	11.2%

POLLOCK OIL

Pollock oil is primarily extracted from the livers of pollock caught in Alaska in an MSC-certified fishery and used in concentrated as well as refined form. The majority of the crude pollock oil volume is currently going into pet food and supplements (accounted for under the Miscellaneous Pet Food oil section), or into concentrates used for human dietary supplements (covered in the Concentrates section).

A small quantity of refined pollock oil, approximately 100 mT, is used as ingredients for dietary supplements in the USA, generally blended with other oils, like salmon and sometimes cod. These supplements are often marketed highlighting the sustainability of the oils from the Alaskan fisheries and particularly their MSC certification.

The total volume of refined pollock oil in 2023 was **102.5 metric tons (mT)**, a 2.5% increase from 100.0 mT in 2022.

Value increased 27.5% to **US\$0.5 MM**.

HOKI OIL

Hoki oils are extracted from the cuttings of hoki seafood production. Also sometimes called blue grenadier, hoki (*Macruronus novaezelandiae*) are caught in a few regions around the world but all the omega-3 oil production is in New Zealand. In past years, the oil sold was extracted from the livers, but given that hoki is a small fish, this was too labor intensive, and current hoki oil is extracted from more general cuttings.

All omega-3 hoki oils are used for dietary supplements, sometimes mixed with other refined oils. An increasing portion of hoki oil production goes into aquaculture and the market for dietary supplements is shrinking. Most of the volume is used in the USA and Europe, with smaller volumes also sold in Australasia (their region of origin) and China.

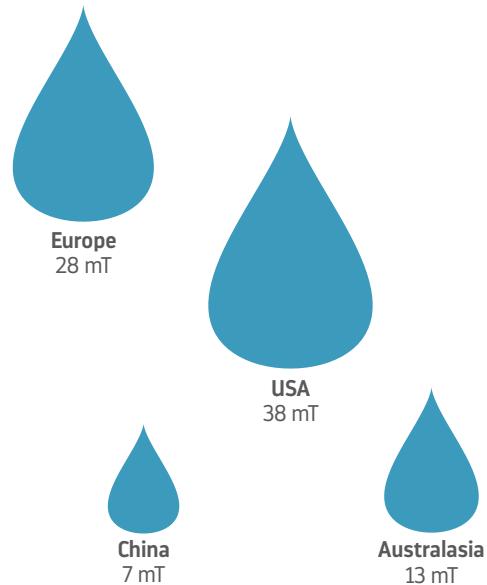
The total volume of hoki oil in 2023 was **86 metric tons (mT)**, a 6.2% decrease from 92 mT in 2022.

Value decreased 8.0% to **US\$0.5 MM**.

At a Glance: Hoki Oil Market

Below are market figures for Hoki Oil by region. In terms of applications, hoki oil is only used in dietary supplements.

**2023 Hoki Oil Market by Region
(in Metric Tons)**



Hoki Oil Market Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Australasia	< 1 mT	-6.2%
China	< 1 mT	-6.4%
Europe	-2 mT	-6.1%
USA	-3 mT	-6.3%

**2023 Hoki Oil Market by Region
(in Millions, U.S. Dollar)**



Hoki Oil Market Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Australasia	< \$0.1	-11.1%
China	< \$0.1	< 0.1%
Europe	< \$0.1	-5.6%
USA	< \$0.1	-11.1%

OMEGA-3 OIL REGIONS*

This section provides information about the 11 geographic regions that encompass the global markets for EPA and DHA omega-3 oils. Also included is an At a Glance section highlighting each region according to source and end use market, where applicable.

**Omega-3 oil regions presented in order of descending value.*



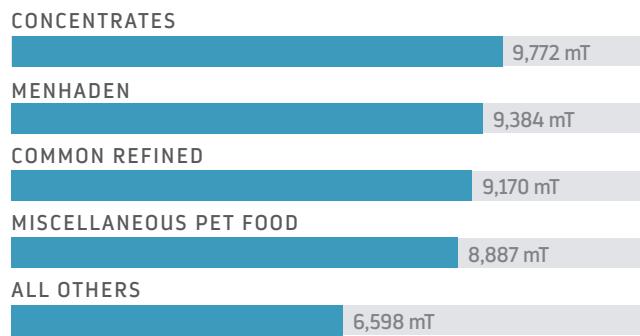
UNITED STATES

The US market is the largest, in terms of both volume and value, and demand for omega-3 oils is split among all applications and sources covered by this report. In 2023, the omega-3 market in the USA underwent some important changes, including ongoing weakness of the previously fast-growing pharmaceutical sector, changes in the preferences of dietary supplement users, and the effect of some ingredient shortages.

The US market, which is the largest and most diverse in the world, accounts for 35.2% of the global volume and 39.1% of the global value.

Among the largest sources are concentrates (9,771 mT, or 22.3% of the total volume) and common refined oils (9,170 mT, 20.9%). Both are primarily used for dietary supplements, of which they constitute a combined 82.5% of the volume. Concentrates are steadily gaining market share in the USA, as in other established markets, as supplement consumers move to products that offer a different value proposition. This long-term trend accelerated in 2023: low production of Peruvian anchovy oils, an important prime matter for both, affected more strongly the production of common refined oils compared to concentrates. Concentrates grew 1.1% in volume, and common refined oils contracted 8.2%. This rapid contraction in common refined oil volume appears to be due to restrictions in supply rather than a decline in consumer interest.

Volume by Source (in Metric Tons)



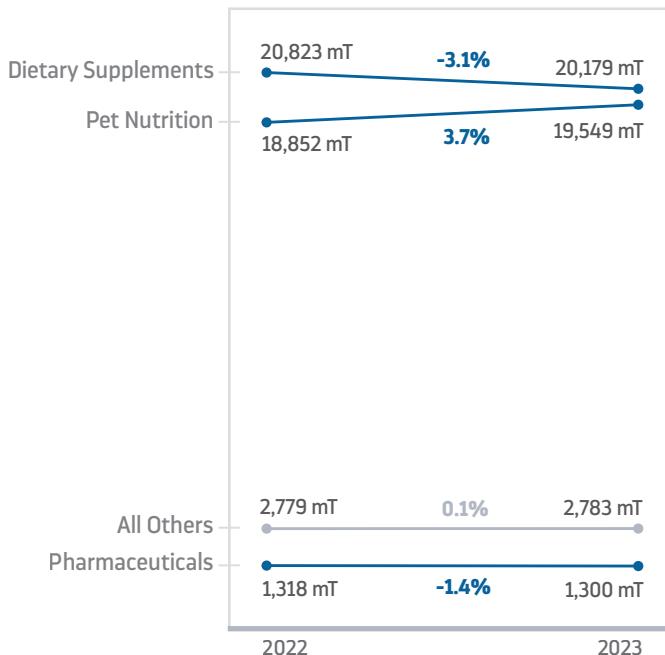
Concentrates and common refined remain top sources in the USA, along with menhaden, a key local offering.

The total volume of omega-3 oils sold in the USA in 2023 was **43,811 metric tons (mT)**, a 0.1% increase from 43,772 mT in 2022.

Value increased 22.2% to US\$817.8 MM.

Concentrates are used for higher-value applications (like pharmaceuticals and higher dose dietary supplements); therefore they command higher prices and, relative to their volume, capture a larger share of the value (50.7%). So do algal oils, used primarily in infant

Growth by Application (in Metric Tons)



Losses in dietary supplement volume, caused by supply contractions, were offset by growth in the pet nutrition sector.

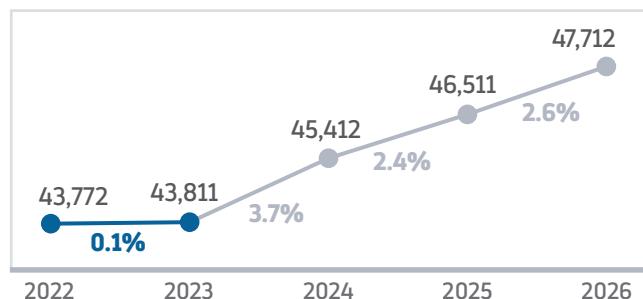
formula, dietary supplements and foods and beverage (4.8% of the volume, and 12.8% of the value) and krill oil, used for dietary supplements (0.8% of the volume, and 4.5% of the value).

The USA is home to a large and fast-growing pet nutrition market, and next in terms of volume are the oils primarily used for pet foods and pet supplements. Menhaden, an important local source (9384 mT, or 21.4% of the total volume), and miscellaneous pet food oils (8,887 mT, 20.3%) grew in both volume and value. The pet nutrition category added 697 mT, worth \$38.9 MM in 2023. This segment includes not only pet foods fortified with omega-3 oils, but also a diverse and growing pet supplement market.

Dietary supplements, the largest segment, lost 697 mT, due to ingredient shortages. Most of this contraction was caused by decreased availability of common refined oils. However, higher pricing for several ingredients resulted in a gain in value of \$116.4 MM.

Pharmaceuticals, a previously fast-growing application, contracted slightly (1.4%) in volume during 2023, a result of ongoing reduced marketing efforts subsequent to the introduction of Vascepa generics. Phar-

Volume Forecast in the United States Through 2026 (in Metric Tons)



maceutical companies started the year with adequate inventories and needed to buy only small ingredient volumes, which put downward pressure on prices, and the segment contracted 6.0% in value.

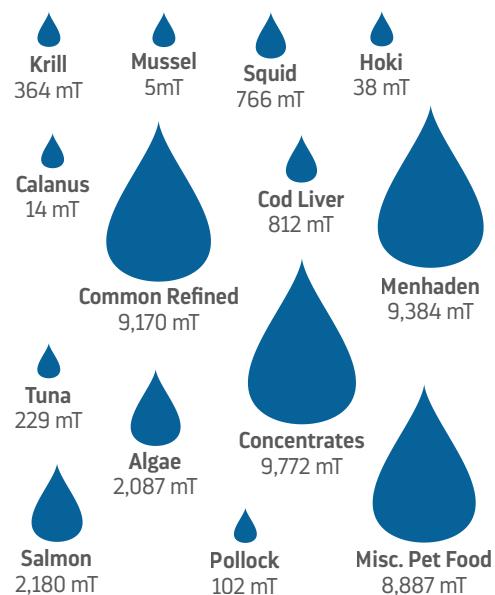
In the USA, infant formula is all fortified, and birth and breastfeeding rates are stable; therefore the volume used in this segment grew only slightly (1.5%). Of the remaining applications, Food and Beverage contracted 1.7%, and Clinical Nutrition grew 4.7%.

The US omega-3 market is expected to grow an additional 8.9% in volume by 2026, at an average annual growth rate of 2.9%.

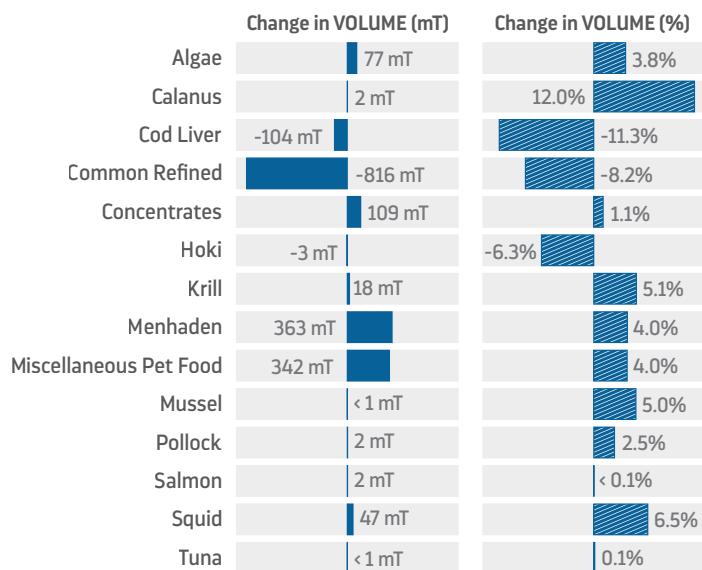
At a Glance: United States

Below and on the next page are market figures for the United States by source and application.

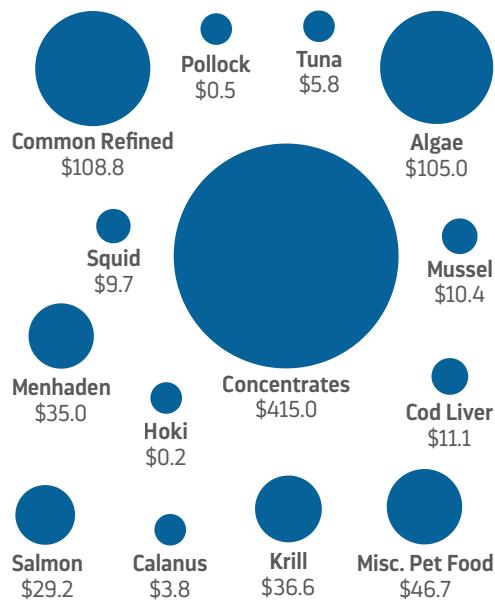
2023 United States Omega-3 Volume by Omega-3 Sources (in Metric Tons)



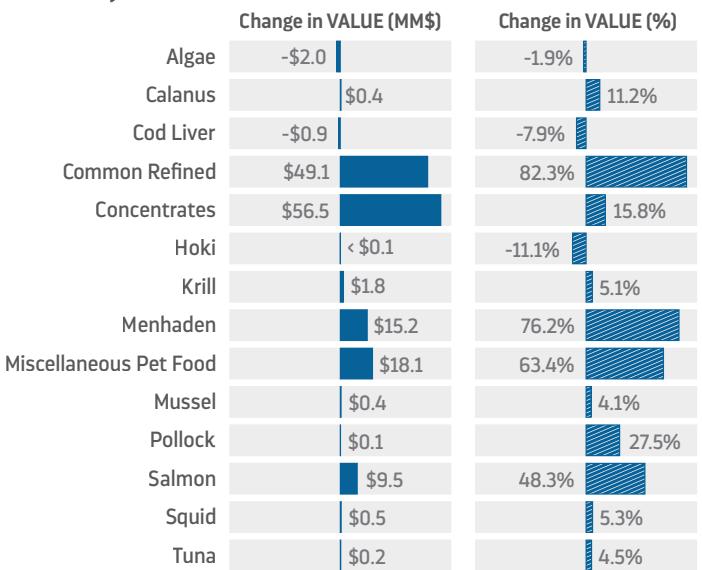
United States Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)



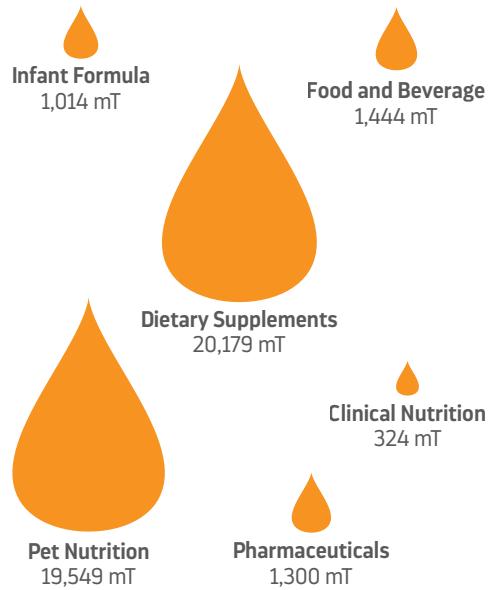
2023 United States Value by Omega-3 Sources (in Millions, U.S. Dollar)



United States Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)



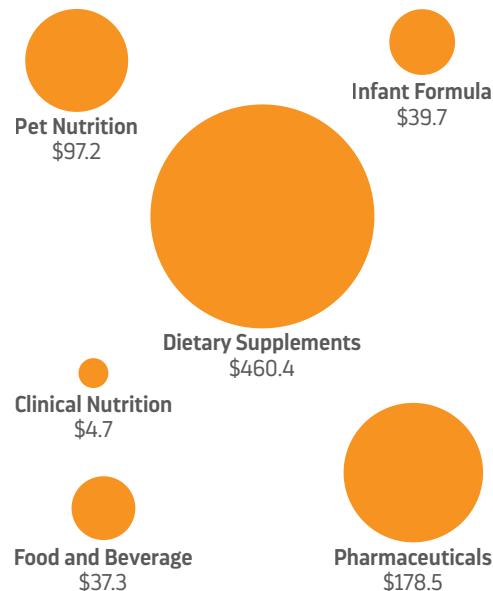
2023 United States Omega-3 Volume by Application (in Metric Tons)



United States Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	14 mT	4.7%
Dietary Supplements	-644 mT	-3.1%
Food and Beverage	-26 mT	-1.7%
Infant Formula	15 mT	1.5%
Pet Nutrition	697 mT	3.7%
Pharmaceuticals	-18 mT	-1.4%

2023 United States Omega-3 Value by Application (in Millions, U.S. Dollar)



United States Omega-3 Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

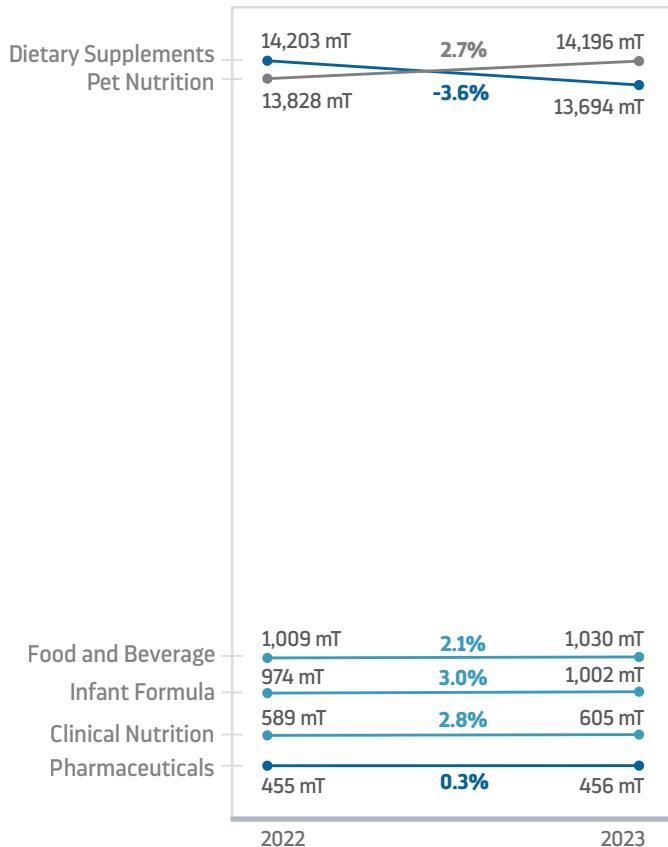
	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	\$2.0	75.2%
Dietary Supplements	\$116.4	33.8%
Food and Beverage	\$3.3	9.8%
Infant Formula	-\$0.4	-1.0%
Pet Nutrition	\$38.9	66.7%
Pharmaceuticals	-\$11.4	-6.0%

EUROPE

Europe is a mature, diverse and stable market where demand has remained essentially flat for several years and where in a typical year only small changes in demand are to be expected.

In 2023, the application in Europe commanding the largest share of the volume demand was pet nutrition (14,196 mT, representing 44.8% of the volume), which grew 2.7% and for the first time surpassed dietary supplements (13,694 mT, 44.2%), which contracted 3.6%. The growth in pet nutrition is due to multiple factors, including a slight increase in the number of dogs, bigger penetration of premium pet foods fortified with omega-3, and the emergence of a pet supplement market.

Growth by Application (in Metric Tons)



Volume grew for all applications, except dietary supplements, which contracted due to supply disruptions.

The total volume of omega-3 oils sold in Europe in 2023 was **30,984 metric tons (mT)**, a 10.2% decrease from 31,057 mT in 2022.

Value increased 25.3% to US\$429.3 MM.

Dietary supplements (44.2% of the volume, 59.1% of the value) declined 3.6% in volume. Contraction in this segment was driven by the reduced availability of refined oils, rather than a decline in consumer interest, which remains strong.

In Europe, where birth and breastfeeding rates are stable, a 3.0% increase in ingredients used for infant formula was driven by some producers still increasing their levels of DHA fortification, either to meet current European Union regulations or to match or exceed those of competitors.

All other applications grew in volume—a 2.8% growth for Clinical Nutrition and 0.3% for Pharmaceuticals. The slow growth in demand for pharmaceutical ingredients is due to the introduction of Vaskepa, a high-EPA product still sold in small volumes.

Because ingredient shortages resulted in higher pricing for some of the most common ingredients, value grew for all applications. Dietary supplements, the largest segment in terms of value, at 59.1%, grew 44.2%, while pet nutrition (18.9% of the volume) grew 18.9%.

The dominant sources in terms of volume are miscellaneous pet food oils (36.2% of the market), which grew 3.2%, concentrates (15.4%), which grew 2.5%, and cod liver oil (15.1%), a local source that for historical reasons captures a large share of some European markets, which contracted 4.3%. While there is a long-term slow trend of cod liver oil losing market share to other

newer ingredients, most of this source's change was due to natural fluctuations in catches and oil yields that are normal for any natural fishery. The next largest ingredient category, common refined oils, contracted by 10.0% due to temporary lower ingredient availability.

The European market is expected to grow an additional 4.9% in volume to 2026, at an average annual rate of 1.6%.

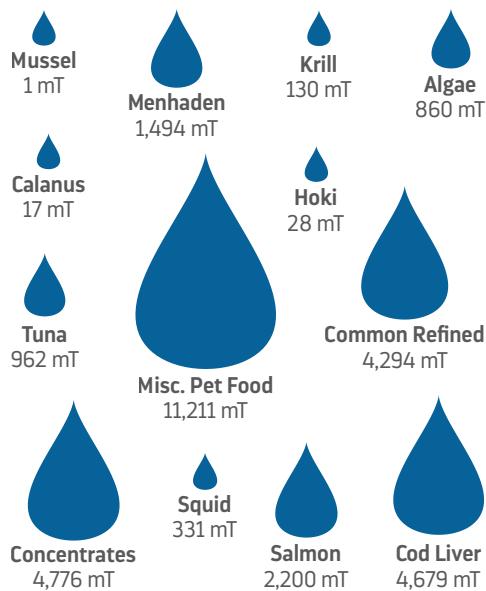
Volume Forecast in Europe Through 2026 (in Metric Tons)



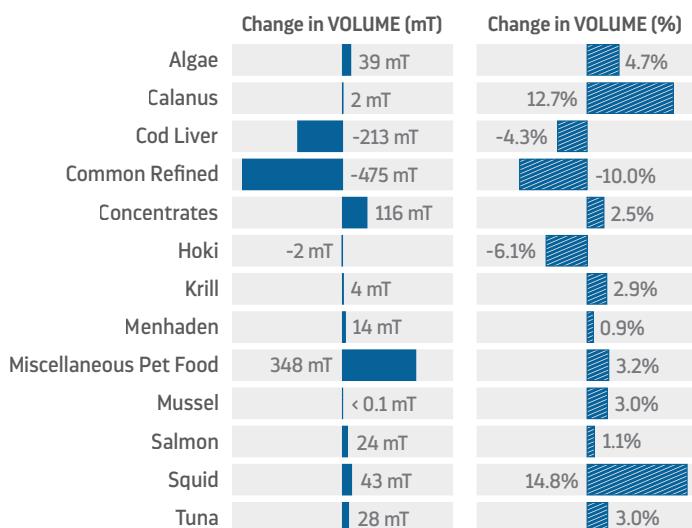
At a Glance: Europe

Below and on the next page are market figures for Europe by source and application.

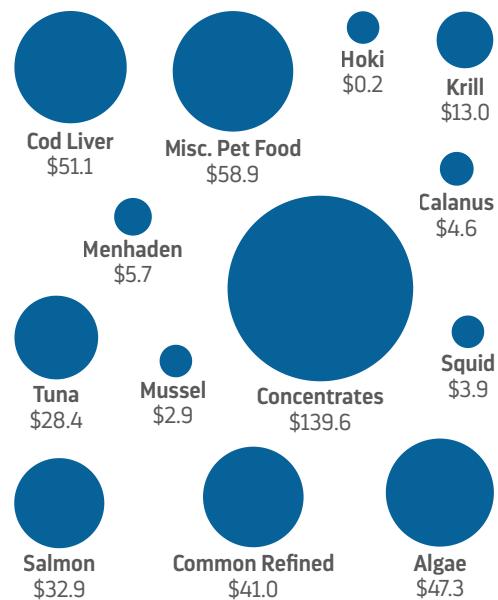
2023 Europe Omega-3 Volume by Omega-3 Sources (in Metric Tons)



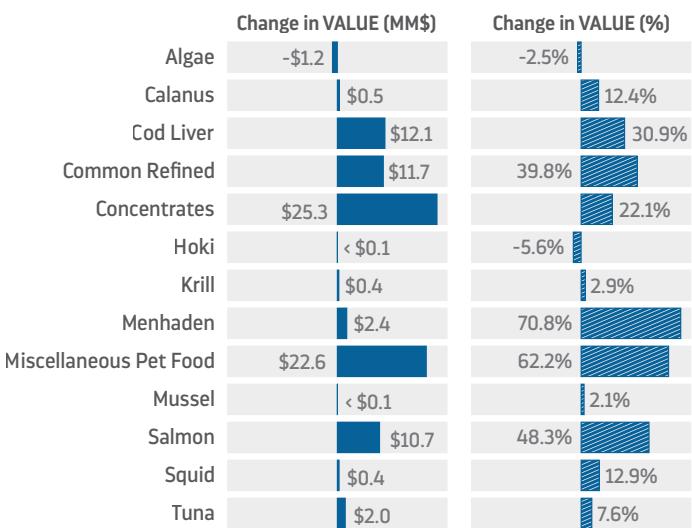
Europe Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)



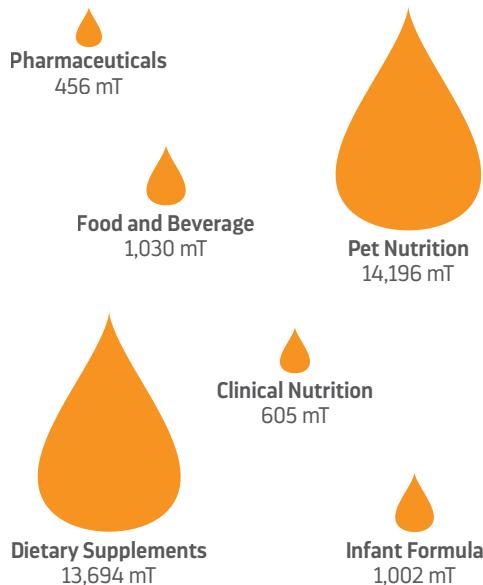
2023 Europe Value by Omega-3 Sources (in Millions, U.S. Dollar)



Europe Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)



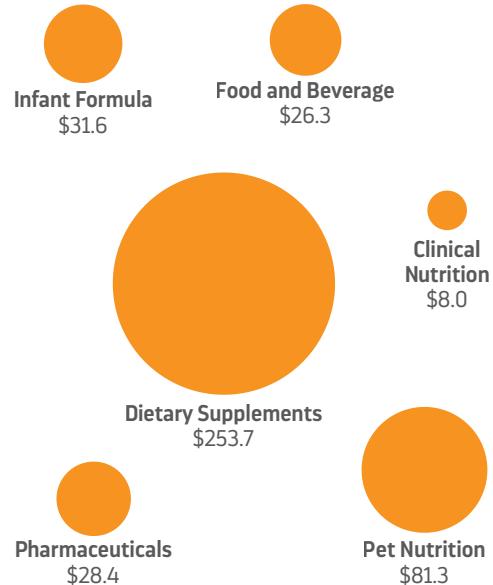
2023 Europe Omega-3 Volume by Application (in Metric Tons)



Europe Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	17 mT	2.8%
Dietary Supplements	-509 mT	-3.6%
Food and Beverage	21 mT	2.1%
Infant Formula	29 mT	3.0%
Pet Nutrition	368 mT	2.7%
Pharmaceuticals	2 mT	0.3%

2023 Europe Omega-3 Value by Application (in Millions, U.S. Dollar)



Europe Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	\$1.9	30.4%
Dietary Supplements	\$49.5	24.2%
Food and Beverage	\$1.6	6.5%
Infant Formula	\$1.9	6.2%
Pet Nutrition	\$31.2	62.2%
Pharmaceuticals	\$0.8	3.0%

CHINA

In China, continued socioeconomic changes and the rapid emergence of an affluent middle class with disposable income has created a fast-growing and diverse market.

China is home to a large and diverse dietary supplement market that uses 69.9% of the country's omega-3 volume and captures more than half (54.5%) of the value. This segment, fueled by improving economic conditions and continued consumer interest in prevention, grew 10.0% in volume. Second in importance in terms of volume are ingredients for infant formula (15.4% of the volume and 34.1% of the value), for which China is the largest global market. This segment grew 5.1% during 2023 in spite of dropping birthrates and this is not expected to continue in the future.

While commanding smaller (10.7%) volumes than in other major markets, pet nutrition grew rapidly at 21.2%, as increased urbanization has driven many couples to choose pets over children. This segment is becoming increasingly diverse, with the introduction of more dog foods fortified with omega-3 and the emergence of a pet supplement sector. Food and beverage

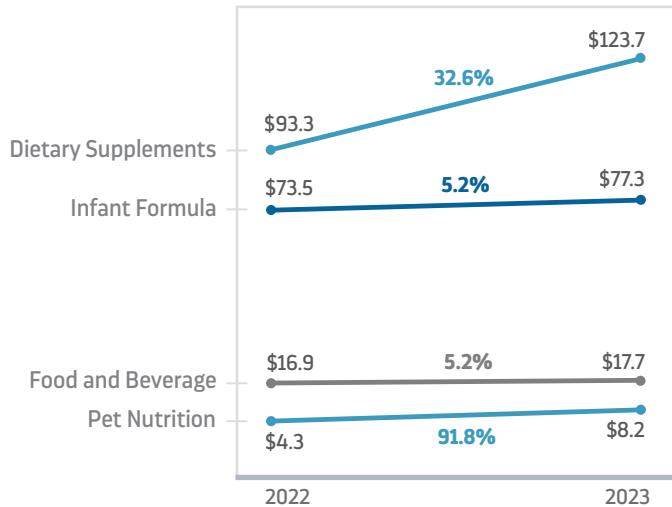
The total volume of omega-3 oils sold in China in 2023 was **14,148 metric tons (mT)**, a 10.1% increase from 12,854 mT in 2022.

Value increased 20.8% to US\$227.0 MM.

(4.0% of the volume) grew 4.4% in 2023. Pharmaceuticals are available for the first time but volumes sold thus far are too small to be estimated with any accuracy, so they are not covered in this report. All applications grew significantly in value.

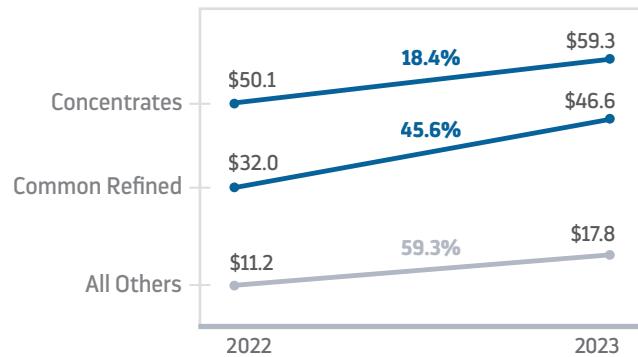
The main ingredients in the Chinese market are common refined oils and concentrates, which combined account for more than 90% of the volume and 85% of the value. Unlike in other markets, demand for both grew during 2023—Chinese ingredient manufacturers started the year with large inventories of crude and refined oils, gathered in preparation for expected

Growth by Application (in Millions, U.S. Dollar)



All applications grew in both volume and value.

Dietary Supplement Growth by Source (in Millions, U.S. Dollar)



The two major sources for dietary supplements grew rapidly in both volume and value. Losses were concentrated in ingredients sold in small volumes whose production is susceptible to significant year-to-year variability.

fast growth in the pharmaceutical sector that hasn't yet materialized, so the Chinese market was better able to navigate shortages in crude oil supply. In addition, in 2022, China suffered from a large number of Covid cases, which resulted in lower consumer confidence and slowed economic growth. In 2023, a return to more normal growth brought increased demand for premium supplements, and volumes of high concentration concentrates and krill grew rapidly, although out of small volumes.

Consequently, common refined oils (5,918 mT, representing 59.9% of the volume) grew by 8.5%, and concentrates (3,364 mT, 34%) grew by 9.5%, while demand for krill oil, which is still sold in minor quantities (less than 1% of the total volume), more than doubled (a 134% growth in volume).

Algal and tuna oils are used primarily for infant formula. In recent years, as more local algal oils producers have appeared, these oils have been steadily gaining market share in this segment. The first releases of Fukushima wastewater, in August, brought a government recommendation to reconsider the use of tuna

Volume Forecast in China Through 2026 (in Metric Tons)



oils in infant formula; therefore this trend is expected to accelerate in the next few years.

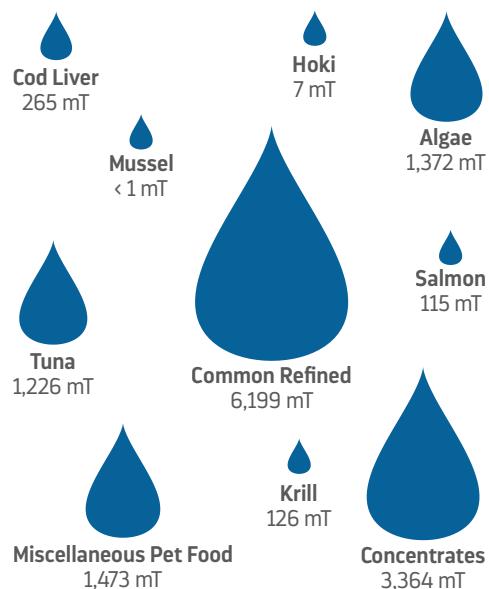
It is also worth mentioning the clinical nutrition market in China, which has been growing quickly compared to other regions. However, the volumes are still too low to be accurately estimated and are not included in this report.

The demand in volume for omega-3 ingredients is expected to continue a rapid expansion, and increase an additional 31.98% by 2026, at an estimated average annual growth rate of 9.7%.

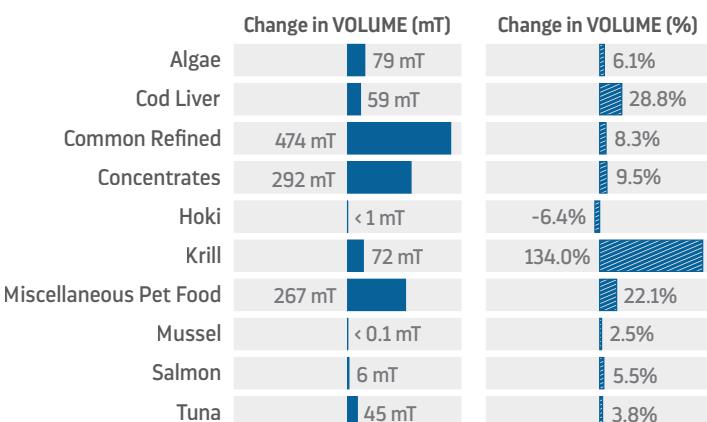
At a Glance: China

Below and on the next page are market figures for China by source and application.

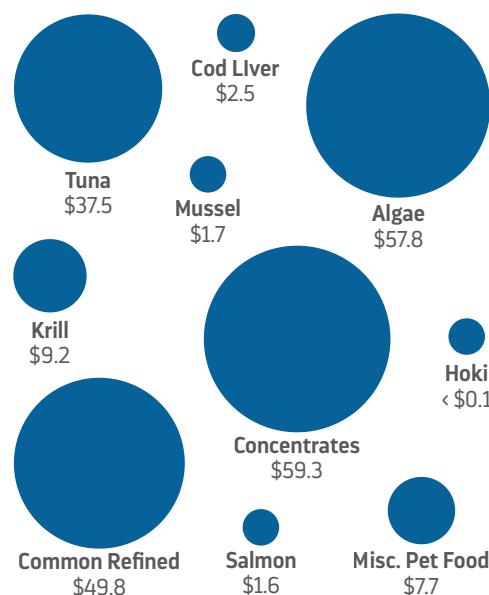
2023 China Omega-3 Volume by Omega-3 Sources (in Metric Tons)



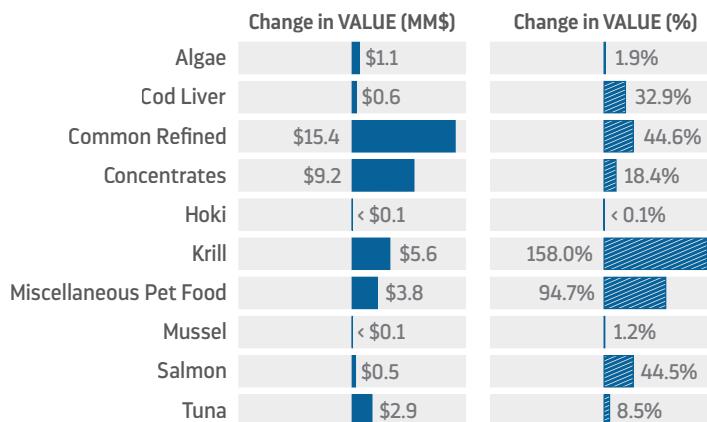
China Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)



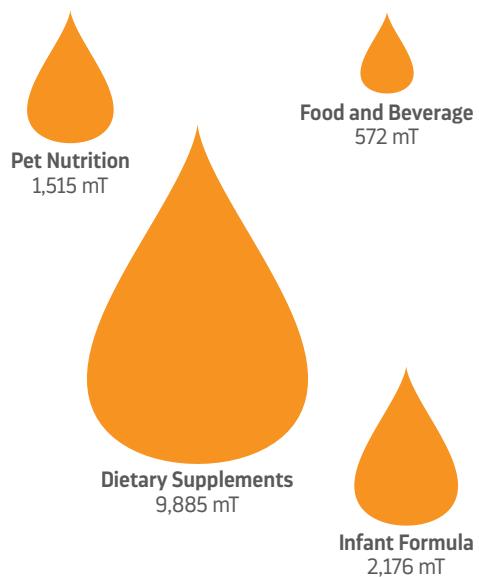
2023 China Value by Omega-3 Sources (in Millions, U.S. Dollar)



China Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)



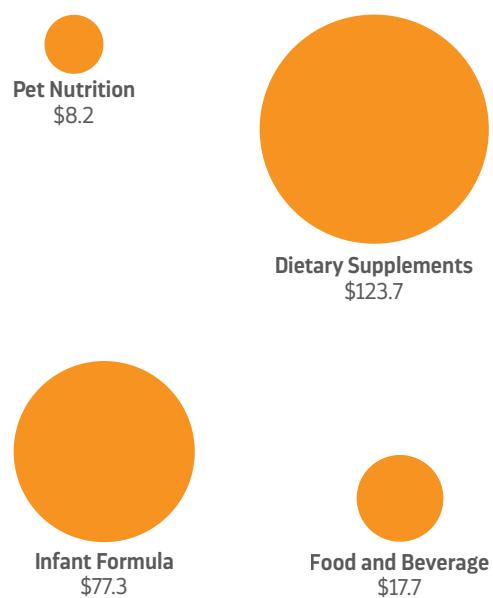
2023 China Omega-3 Volume by Application (in Metric Tons)



China Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Dietary Supplements	899 mT	10.0%
Food and Beverage	24 mT	4.4%
Infant Formula	105 mT	5.1%
Pet Nutrition	265 mT	21.2%

2023 China Omega-3 Value by Application (in Millions, U.S. Dollar)



China Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Dietary Supplements	\$30.4	32.6%
Food and Beverage	\$0.9	5.2%
Infant Formula	\$3.8	5.2%
Pet Nutrition	\$3.9	91.8%

ASIA-PACIFIC

The markets in the Asia-Pacific region (excluding China and Japan, treated separately in this report) are experiencing rapid economic growth, resulting in increased demand for consumer products that include omega-3. Relative to this region's population, volume is still low, and the region suffered from economic challenges in 2023, but continued growth is to be expected.

More than three quarters of the volume (76.3%), which accounts for 56.2% of the value, is used for dietary supplements. This is followed in a distant second place by infant formula (16.4% of the volume and 28.5% of the value). Pharmaceuticals use only 1.8% of the total ingredient volume but, due to the higher pricing of the required ingredients, command a more significant part of the value (5.9%).

The dominant market in the region, South Korea, underwent significant economic difficulties, including high inflation and interest rates, during 2023. This

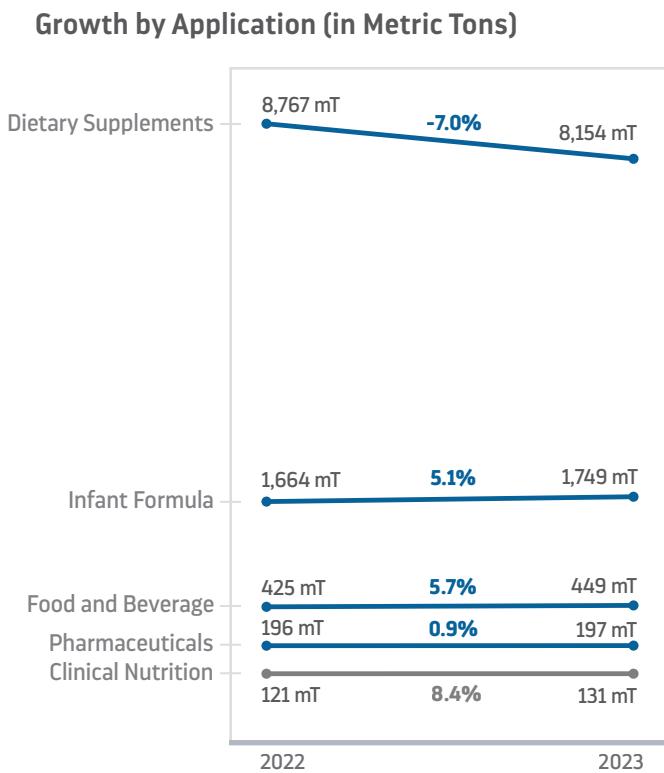
The total volume of omega-3 oils sold in the Asia-Pacific region in 2023 was **10,681 metric tons (mT)**, a 4.4% decrease from 11,172 mT in 2022.

Value increased 12.3% to **US\$202.6 MM**.

resulted in reduced consumption of consumer goods, including dietary supplements, and as a result demand for omega-3 ingredients for this segment contracted by 7.0%. With improving economic conditions, demand is expected to return to growth in 2024.

All other applications grew in volume, including infant formula which benefited from increased penetration in the region as a result of an emerging affluent middle class and the increased participation of women in the workforce. The infant formula segment grew by 5.1%.

The dominant sources in terms of volume are common refined oils (56.1% of the volume and 26.5% of the value) and concentrates (18.0% of the volume and 18.8% of the value). Both are used primarily for dietary



Volume contracted significantly for dietary supplements, but grew in all other applications.

Volume Forecast in Asia-Pacific Through 2026 (in Metric Tons)



supplements and, because of contraction of this segment, particularly in South Korea, declined in volume by 4.5% and 16.7% respectively. Other sources, including tuna and algal oils—used mainly for infant formula—command 13.3% and 8.2% of the volume respectively,

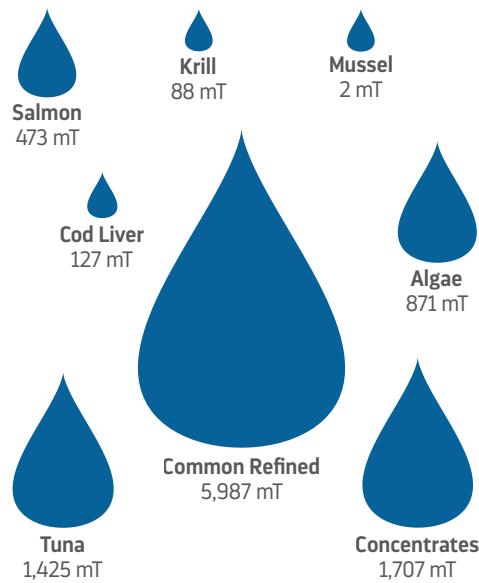
and due to their higher pricing, command a more significant share of the value (21.1% and 20.4%, respectively).

Demand for omega-3 ingredients is expected to grow an additional 7.2% to 2026 at an average annual growth rate of 2.4%.

At a Glance: Asia-Pacific

Below and on the next page are market figures for the Asia-Pacific region by source and application.

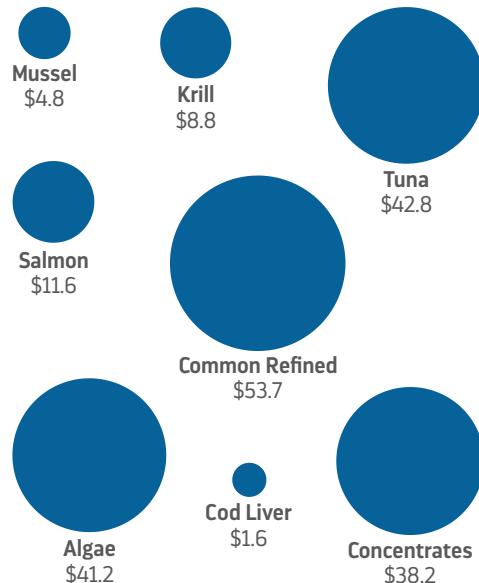
2023 Asia-Pacific Omega-3 Volume by Omega-3 Sources (in Metric Tons)



Asia-Pacific Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Algae	47 mT	5.7%
Cod Liver	10 mT	8.4%
Common Refined	-281 mT	-4.5%
Concentrates	-341 mT	-16.7%
Krill	3 mT	3.0%
Mussel	<1 mT	4.6%
Salmon	14 mT	3.2%
Tuna	56 mT	4.1%

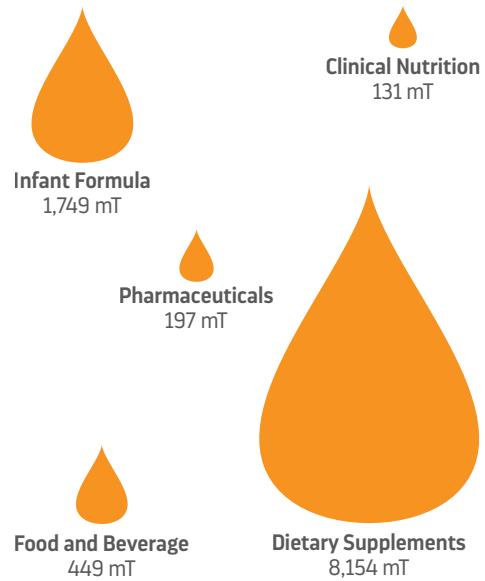
2023 Asia-Pacific Value by Omega-3 Sources (in Millions, U.S. Dollar)



Asia-Pacific Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Algae	-\$0.3	-0.7%
Cod Liver	\$0.1	7.5%
Common Refined	\$18.3	51.9%
Concentrates	-\$3.2	-7.6%
Krill	\$0.3	3.0%
Mussel	\$0.2	4.2%
Salmon	\$3.2	38.1%
Tuna	\$3.5	8.9%

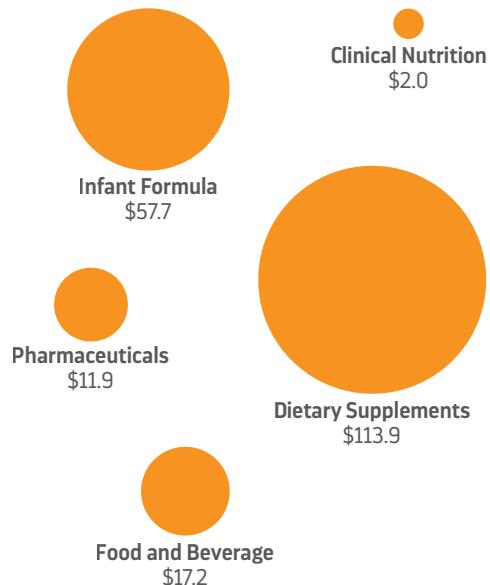
2023 Asia-Pacific Omega-3 Volume by Application (in Metric Tons)



Asia-Pacific Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	10 mT	8.4%
Dietary Supplements	-613 mT	-7.0%
Food and Beverage	24 mT	5.7%
Infant Formula	85 mT	5.1%
Pharmaceuticals	2 mT	0.9%

2023 Asia-Pacific Omega-3 Value by Application (in Millions, U.S. Dollar)



Asia-Pacific Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	\$0.3	19.5%
Dietary Supplements	\$17.2	17.8%
Food and Beverage	\$0.6	3.6%
Infant Formula	\$3.9	7.3%
Pharmaceuticals	\$0.1	0.9%

JAPAN

Japan is a mature and stable market, with a long history of considering fish an important part of a healthy diet and a high awareness of the health benefits of omega-3 fatty acids. Consequently, per capita consumption of omega-3 products is high, and demand grows consistently from year to year.

Approximately half (50.1%) of the volume in the Japanese market is used by the dietary supplement segment, which in 2023 grew by 1.7% in volume and 23.2% in value. Fortified food and beverage is also an important segment in this market; Japan is home to an aging population that relies on diverse F&B offerings for brain health and the prevention of chronic diseases. Despite its comparatively small population, Japan uses larger volumes for this segment than any other region covered in this report (32.3% of the global volume of omega-3 oils is used for foods and beverage.) This segment covers 31.7% of the Japanese volume demand (and 19.1% of the value) and it grew 4.4% in volume and 22.8% in value during 2022.

The pharmaceutical market garners a 13.1% share of the omega-3 ingredient volume, but because it requires higher priced ingredients, it captured 44.0% of the value. In 2023, this segment remained essen-

The total volume of omega-3 oils sold in Japan in 2023 was **6,142 metric tons (mT)**, a 2.4% increase from 5,997 mT in 2022.

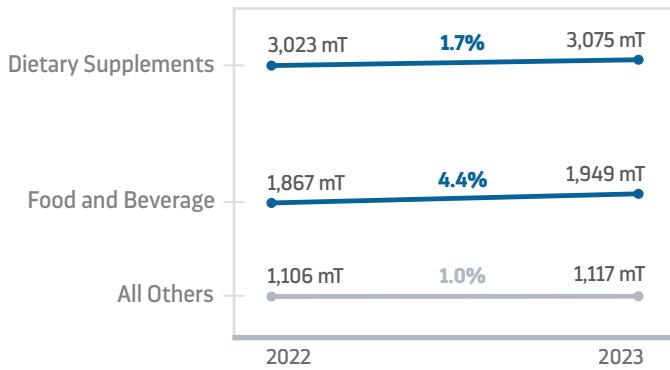
Value increased 11.2% to **US\$139.6 MM**.

tially flat (0.2% contraction in volume and 0.3% contraction in value).

Demand for ingredients used for infant formula is stable due to the country's low birth rates. Because of increases in ingredient prices, all applications grew significantly in value, except for pharmaceuticals.

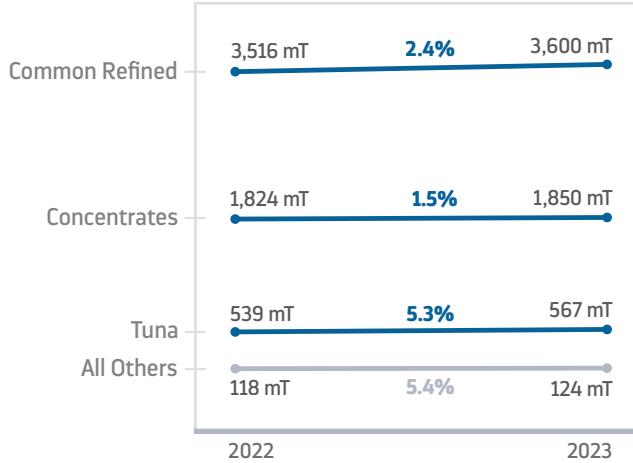
The two dominant sources are common refined oils, which commands 58.6% of the volume and 20.0% of the value, and concentrates (30.1% of the volume, 60.1% of the value). Refined tuna oil (9.2% and 12.2 % of the volume and value respectively) captures an unusually

Growth by Application (in Metric Tons)



All applications grew in volume and value, except pharmaceuticals, which remained flat. Most gains were realized in the important dietary supplements and food and beverage segments.

Growth by Source (in Metric Tons)



All major sources grew in both volume and value.

large share of the market. Because tuna is considered a healthy food, tuna oils are widely used as an ingredient for dietary supplements, infant formula and foods and beverage, as well as an important prime matter in the production of concentrates—treated separately in this report. All sources grew or remained stable in volume, and all grew in value.

Because the Japanese omega-3 market relies to a large extent on domestically produced oils from local sources, its supply is little affected by variability in production in other fisheries, and ingredient prices increased less than in other regions during 2023.

The demand for omega-3 oils in the Japanese mar-

Volume Forecast in Japan Through 2026 (in Metric Tons)

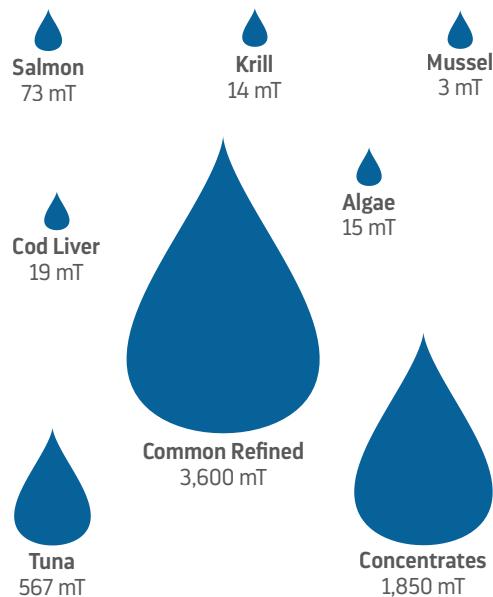


ket is expected to continue growing, and we expect volumes to increase by an additional 7.6% by 2026.

At a Glance: Japan

Below and on the next page are market figures for Japan by source and application.

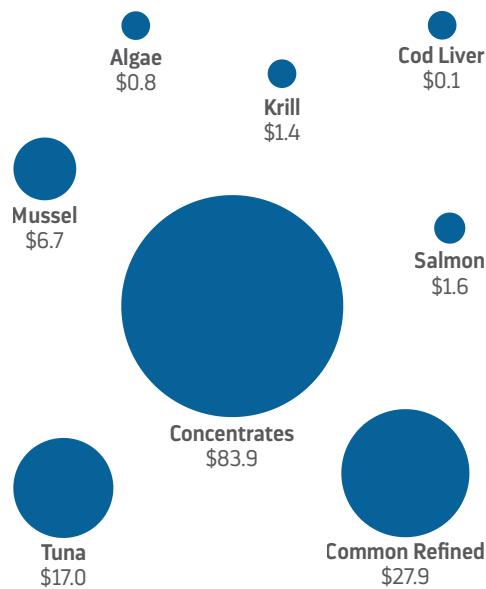
2023 Japan Omega-3 Volume by Omega-3 Sources (in Metric Tons)



Japan Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
	< 0.1 mT	< 0.1%
Algae		
Cod Liver	4 mT	26.9%
Common Refined	83 mT	2.4%
Concentrates	26 mT	1.5%
Krill	< 1 mT	2.8%
Mussel	< 1 mT	4.2%
Salmon	2 mT	2.6%
Tuna	28 mT	5.3%

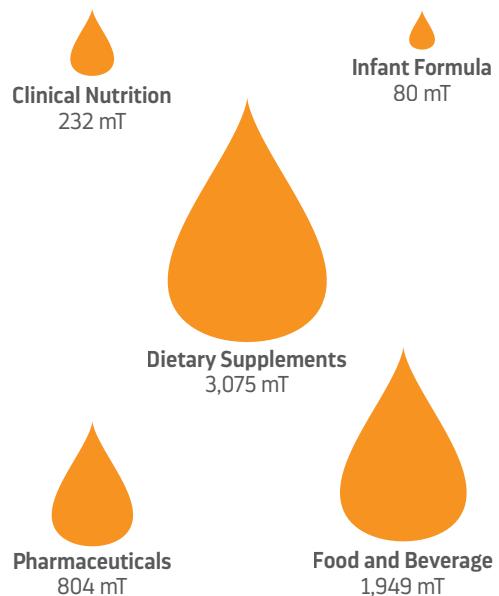
2023 Japan Value by Omega-3 Sources (in Millions, U.S. Dollar)



Japan Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
	< \$0.1	-8.2%
Algae		
Cod Liver	< \$0.1	56.0%
Common Refined	\$5.9	27.0%
Concentrates	\$5.7	7.3%
Krill	< \$0.1	3.0%
Mussel	\$0.2	3.1%
Salmon	\$0.4	37.5%
Tuna	\$1.7	11.4%

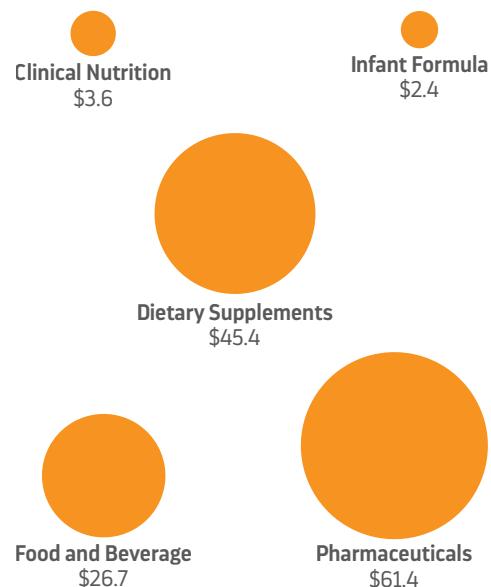
2023 Japan Omega-3 Volume by Application (in Metric Tons)



Japan Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	11 mT	5.1%
Dietary Supplements	52 mT	1.7%
Food and Beverage	81 mT	4.4%
Infant Formula	< 1 mT	1.2%
Pharmaceuticals	-1 mT	-0.2%

2023 Japan Omega-3 Value by Application (in Millions, U.S. Dollar)



Japan Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	\$0.6	19.6%
Dietary Supplements	\$8.5	23.2%
Food and Beverage	\$5.0	22.8%
Infant Formula	\$0.1	5.6%
Pharmaceuticals	-\$0.2	-0.3%

CANADA

Canada is a well-established market where a large dietary supplement segment captures most of the volume and value.

Dietary supplements capture the largest share of the volume (74.4%) and value (81.9%) in Canada, and this segment grew 0.8% in volume in 2023. A favorable regulatory environment helps clinical nutrition capture a larger share—8.6% of the volume and 8.3% of the value—than in other markets. Pet nutrition (12.3% and 4.4% of the volume and value respectively) grew 5.6%, food and beverage (4.1%; 4.4%) grew 2.4% and infant formula (0.5%; 1.5%) grew 2.2%.

The first omega-3 drug, Vascepa, was approved in 2020 but ingredient volumes sold for the pharmaceutical segment are still small and not yet covered in this report.

The two largest sources are concentrates and common refined oils, both used mainly as ingredients for dietary supplements. These two sources combined capture more than three quarters of the volume in the Canadian market. Like in other established markets, refined oils are being slowly replaced by ingredients that offer

The total volume of omega-3 oils sold in Canada in 2023 was **3,962 metric tons (mT)**, a 1.7% increase from 3,895 mT in 2022.

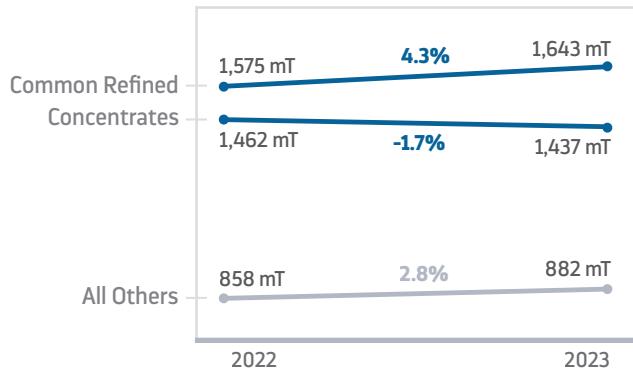
Value increased 31.3% to US\$66.2 MM.

a different value proposition, a trend that was accelerated in 2023 by lower availability of the crude fish oils necessary for their production. Concentrates (41.5% of the volume and 57.8% of the value) grew 4.3%, while common refined oils (36.3%; 20.1%) declined by 1.7%.

Algal oil captured a small share (0.9%) of the volume, but is more significant in value (2.9%) due to its wide use in Canadian infant formula, a high value segment. Miscellaneous pet food oils (10.9% of the volume and 3.4% of the value) grew 6.1%. Most other sources are used in small quantities and grew in volume.

Omega-3 ingredients in the Canadian market are expected to grow 16.6% in volume by 2026, at an average annual growth rate of 5.3%. The growth will be driven by the important dietary supplement market.

Growth by Source (in Metric Tons)



Shortage of prime matter accelerated the ongoing trend of concentrates gaining market share from common refined oils. Most other sources grew in volume.

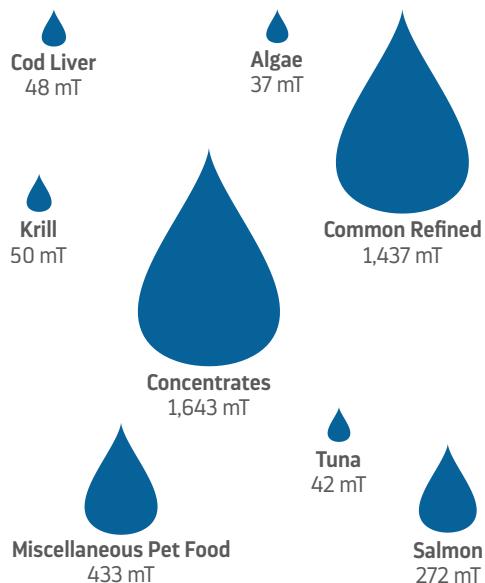
Volume Forecast in Canada Through 2026 (in Metric Tons)



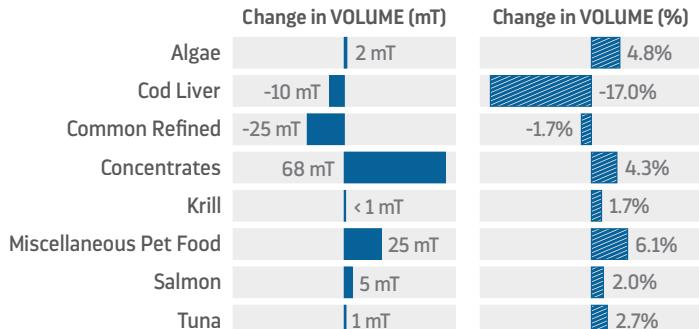
At a Glance: Canada

Below and on the next page are market figures for Canada by source and application.

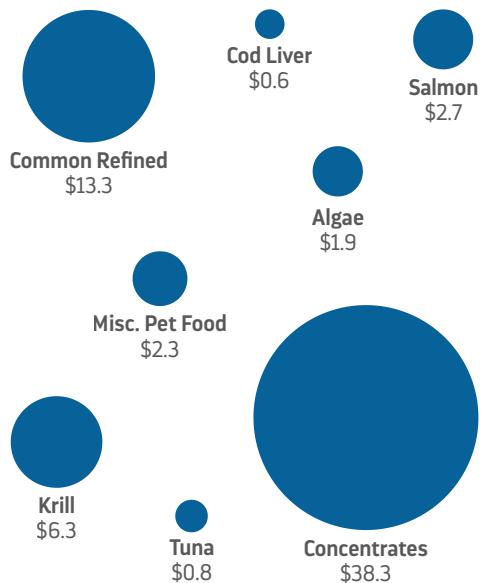
2023 Canada Omega-3 Volume by Omega-3 Sources (in Metric Tons)



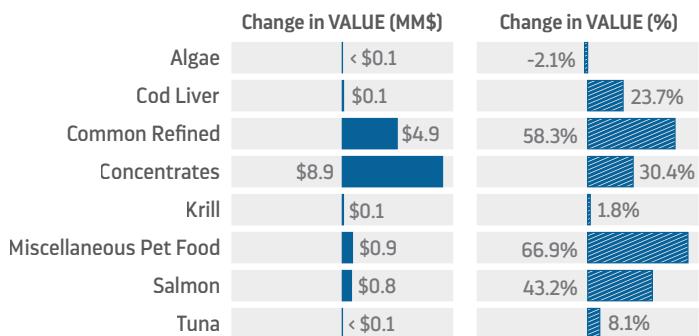
Canada Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)



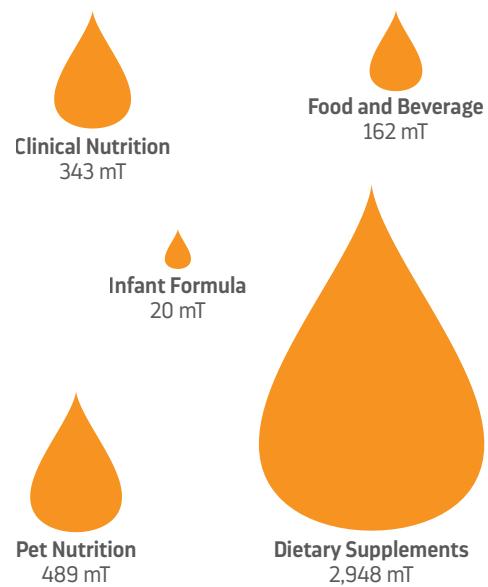
2023 Canada Value by Omega-3 Sources (in Millions, U.S. Dollar)



Canada Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)



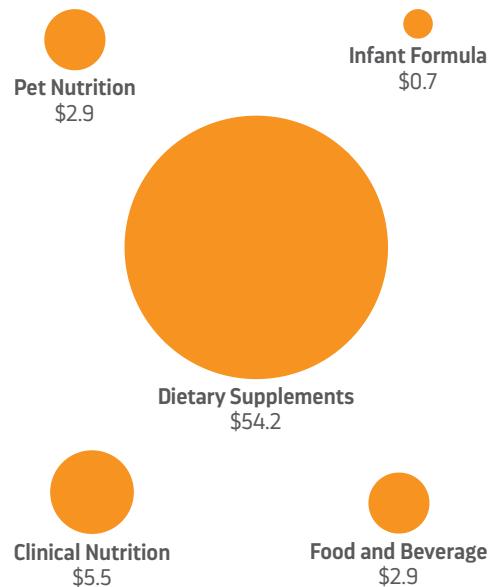
2023 Canada Omega-3 Volume by Application (in Metric Tons)



Canada Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	12 mT	3.7%
Dietary Supplements	25 mT	0.8%
Food and Beverage	4 mT	2.4%
Infant Formula	< 1 mT	2.2%
Pet Nutrition	26 mT	5.6%

2023 Canada Omega-3 Value by Application (in Millions, U.S. Dollar)



Canada Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	\$0.7	14.4%
Dietary Supplements	\$12.9	31.1%
Food and Beverage	\$1.1	57.3%
Infant Formula	< \$0.1	3.0%
Pet Nutrition	\$1.2	65.9%

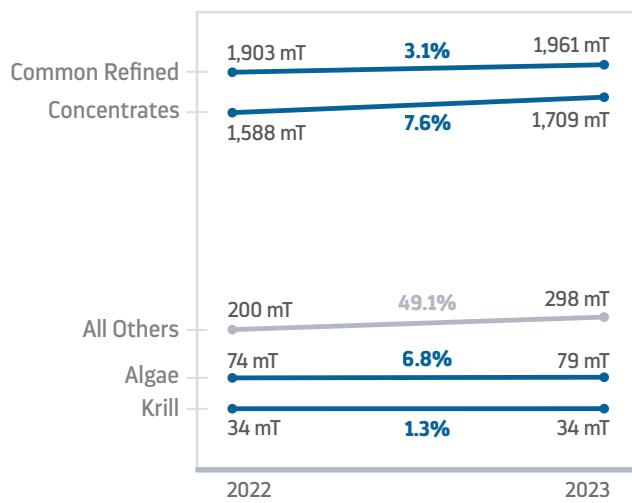
REST OF ASIA

The markets in the Rest of Asia are experiencing rapid overall growth, driven by socioeconomic changes, although the volumes remain relatively low.

Many countries in the region are experiencing strong economic growth and socioeconomic changes that are driving the increased usage of consumer products, including those containing omega-3 oils.

Almost all omega-3 ingredient oils (95.5% of the volume and 86.9% of the value) sold in this market are used as ingredients for dietary supplements. Just two sources, common refined oils and concentrates, cover more than 90% of the volume demand for this segment. Common refined oils (48.7% of the dietary supplement demand in volume) grew 3.1% in volume while concentrates (42.8% of the dietary supplement volume) grew 7.6% in volume. Countries in the region, particularly India, the largest market, rely on locally produced oils for their dietary supplement sector, and were largely protected from the effect of reduced production of Peruvian anchovy oil in 2023.

Growth by Source (in Metric Tons)



All sources grew in volume and value, except algal oils, which grew in volume but contracted in value due to price pressure.

The total volume of omega-3 oils sold in the Rest of Asia region in 2023 was **4,123 metric tons (mT)**, a 7.4% increase from 3,838 mT in 2022.

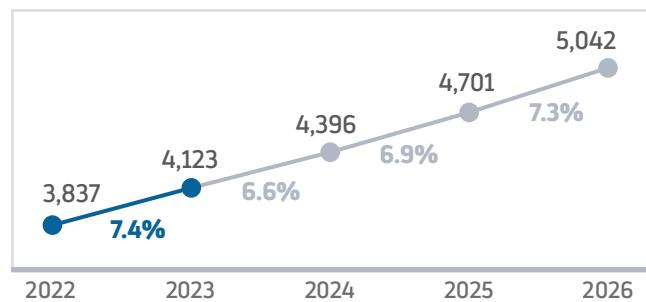
Value increased 36.8% to **US\$62.4 MM**.

The region is also home to a small but growing food and beverage sector. Demand for omega-3 ingredients for this segment accounts for less than 5% of the total volume and grew 7.1% in volume.

The rapid economic development of some markets in the region is fueling the emergence of dynamic infant formula and pet nutrition markets, but fortification with omega-3 is still uncommon. Infant formula, which captures less than 1% of the omega-3 ingredient volume, grew at an estimated 4.0%. Volumes of omega-3 ingredients used for pet nutrition remain too small to be covered accurately in this report.

Volume in the Rest of Asia region is expected to increase by an additional 22.3% by 2026, at an average annual growth rate of 6.9%.

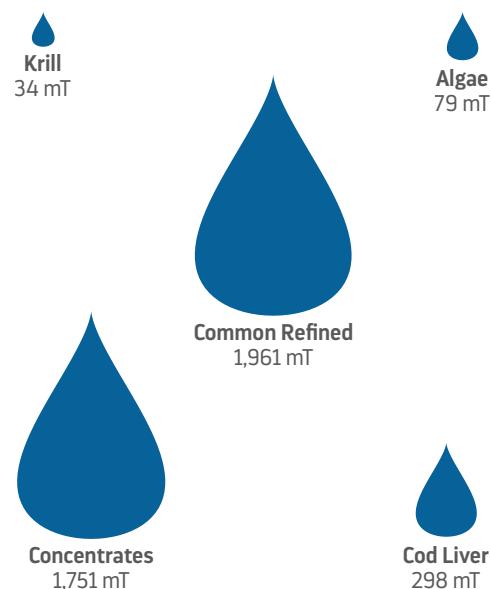
Volume Forecast in the Rest of Asia Through 2026 (in Metric Tons)



At a Glance: Rest of Asia

Below and on the next page are market figures for the Rest of Asia region by source and application.

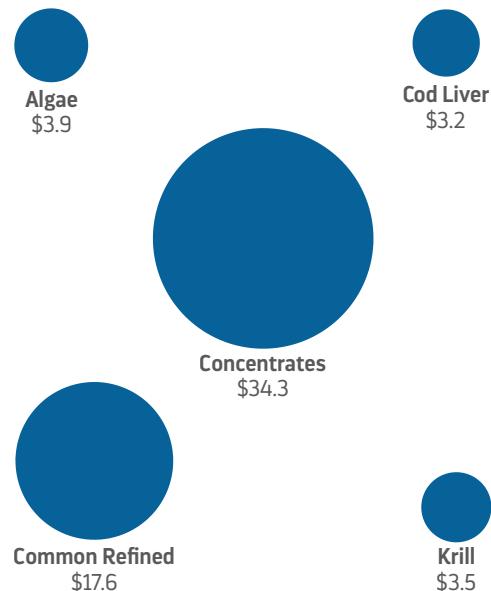
2023 Rest of Asia Omega-3 Volume by Omega-3 Sources (in Metric Tons)



Rest of Asia Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Algae	5 mT	6.8%
Cod Liver	98 mT	49.1%
Common Refined	58 mT	3.1%
Concentrates	124 mT	7.6%
Krill	< 1 mT	1.3%

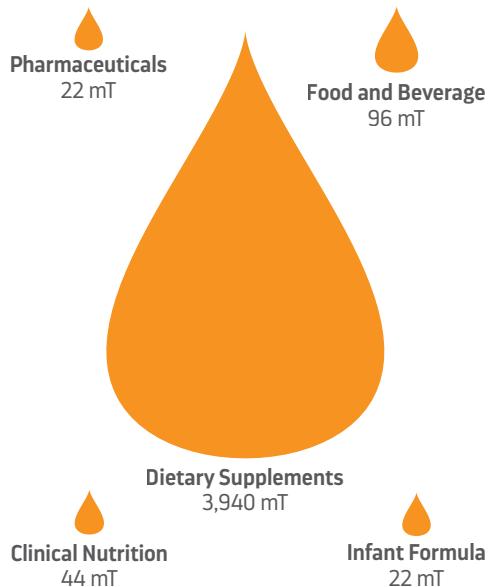
2023 Rest of Asia Value by Omega-3 Sources (in Millions, U.S. Dollar)



Rest of Asia Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Algae	< \$0.1	-0.3%
Cod Liver	\$1.3	70.1%
Common Refined	\$6.5	59.1%
Concentrates	\$8.9	35.1%
Krill	< \$0.1	1.2%

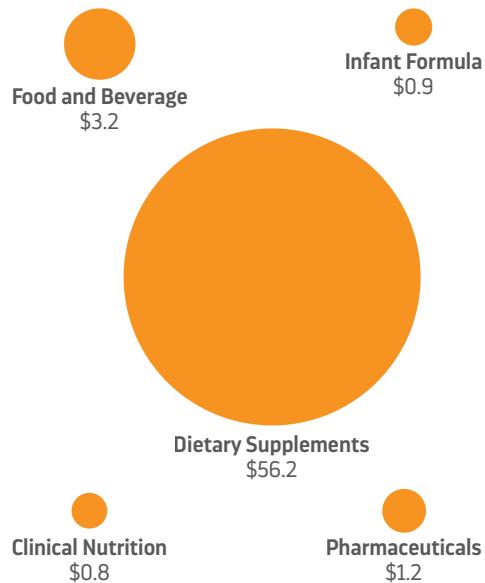
2023 Rest of Asia Omega-3 Volume by Application (in Metric Tons)



Rest of Asia Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	3 mT	8.3%
Dietary Supplements	274 mT	7.5%
Food and Beverage	6 mT	7.1%
Infant Formula	< 1 mT	4.0%
Pharmaceuticals	< 1 mT	1.8%

2023 Rest of Asia Omega-3 Value by Application (in Millions, U.S. Dollar)



Rest of Asia Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	\$0.1	20.9%
Dietary Supplements	\$16.5	41.6%
Food and Beverage	\$0.1	3.5%
Infant Formula	< \$0.1	1.1%
Pharmaceuticals	< \$0.1	1.7%

SOUTH AMERICA

The South American market is heavily dominated by dietary supplement products and in a few markets—particularly Brazil—pet food. All other applications combined accounted for less than 5% of the volume.

The dominant application in South America is dietary supplements, which accounts for 75.1% of the value and grew 1.7%. Supplement markets in this region, particularly Brazil, are becoming increasingly diverse, with a larger variety of ingredients (concentrates and algal and krill oil) quickly gaining market share.

While actual pet numbers in the region are large, the penetration of pet nutrition products (and particularly premium pet foods, the segment that uses most omega-3) is still low, and this application uses 20.3% of the total volume. However, demand for omega-3 oils for pet nutrition oils grew 7.5% as newer products are introduced, including foods, flavorants, supplements and chews.

All other applications grew in both volume and value, but out of a small volume.

Common refined oils, used primarily as ingredients for dietary supplements, comprise the largest part of

The total volume of omega-3 oils sold in South America in 2023 was **4,252 metric tons (mT)**, a 3.1% increase from 4,125 mT in 2022.

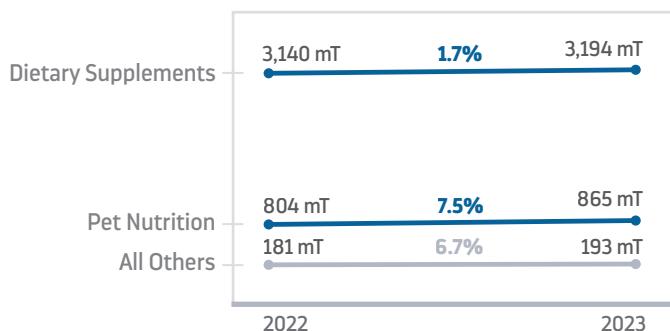
Value increased 51.2% to US\$48.7 MM.

the volume (66.9%) and grew at 2.3%. Miscellaneous pet food oils (17.7%) grew 7.4%. Concentrates, a higher value source that captures a small volume (6.0%) in this price sensitive market, grew rapidly at 66.8%.

Common refined oils also capture the largest share of the value in this market (51.8%), but concentrates and algae oils, two higher priced oils used in small (but growing) volumes, also earned a significant share (18.1% and 15.1%, respectively).

The South American market is expected to continue expanding, growing an additional 19.9% by 2026.

Growth by Application (in Metric Tons)



All applications grew in volume and value in 2023.

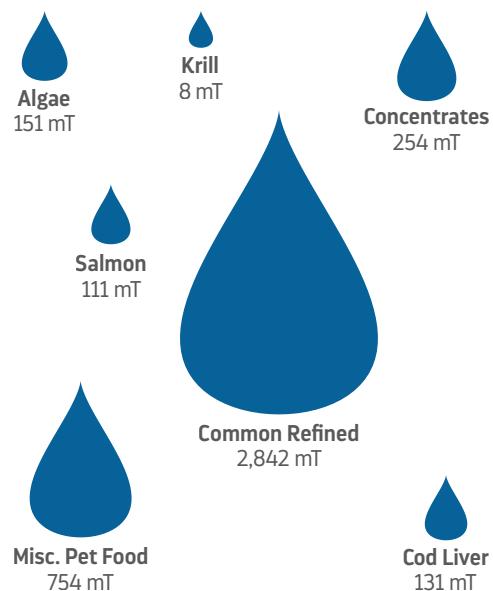
Volume Forecast in South America Through 2026 (in Metric Tons)



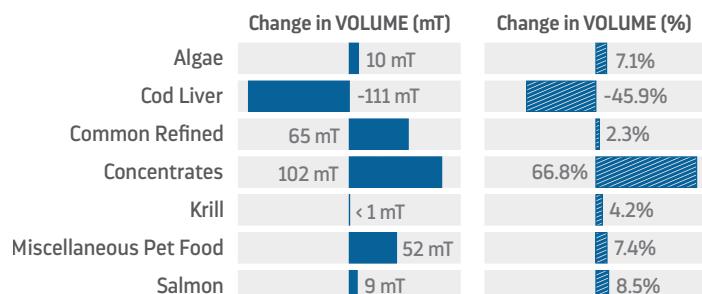
At a Glance: South America

Below and on the next page are market figures for South America by source and application.

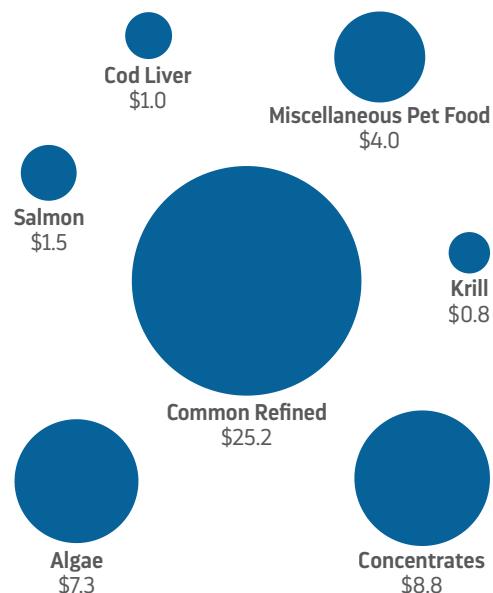
2023 South America Omega-3 Volume by Omega-3 Sources (in Metric Tons)



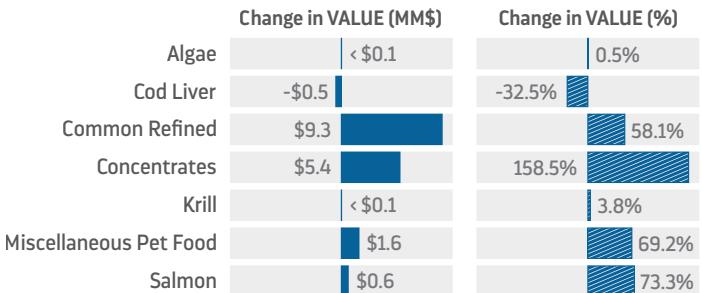
South America Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)



2023 South America Value by Omega-3 Sources (in Millions, U.S. Dollar)

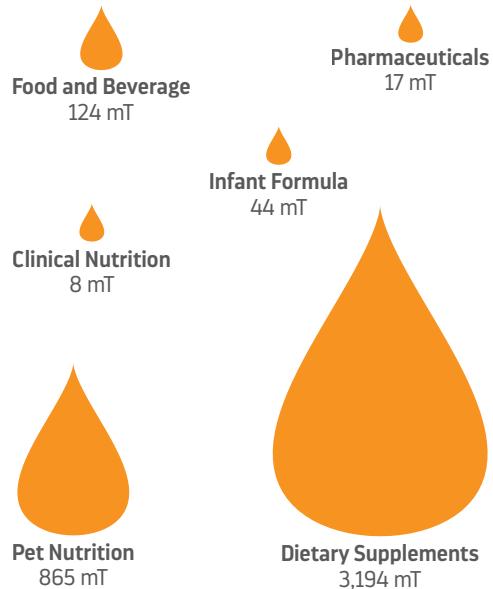


South America Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)



OMEGA-3 OIL REGIONS

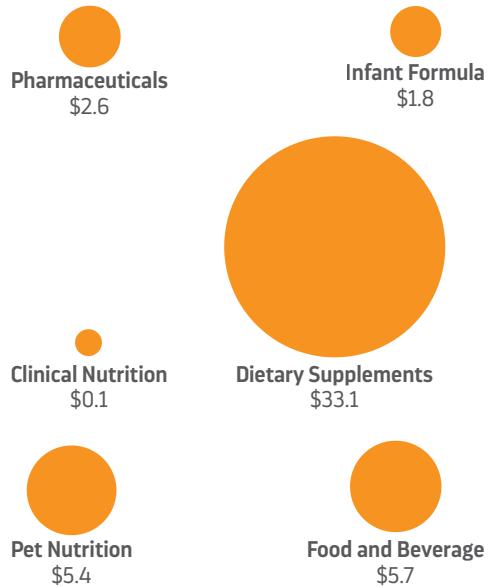
2023 South America Omega-3 Volume by Application (in Metric Tons)



South America Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	< 1 mT	5.2%
Dietary Supplements	54 mT	1.7%
Food and Beverage	10 mT	8.9%
Infant Formula	< 1 mT	2.3%
Pet Nutrition	61 mT	7.5%
Pharmaceuticals	< 1 mT	3.9%

2023 South America Omega-3 Value by Application (in Millions, U.S. Dollar)



South America Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	< \$0.1	11.1%
Dietary Supplements	\$12.4	60.1%
Food and Beverage	\$0.1	2.0%
Infant Formula	< \$0.1	-0.6%
Pet Nutrition	\$2.3	70.3%
Pharmaceuticals	\$1.7	186.7%

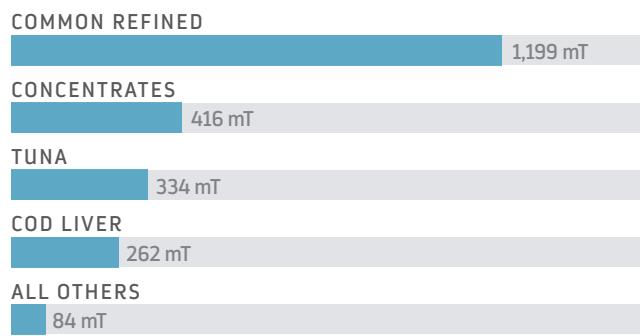
REST OF THE WORLD

Markets not covered in other sections of this report command just 1.7% of the global volume and value. Demand in these countries is growing and the diversity of these markets is reflected in the variety of oil types used.

Over three quarters of the ingredient volume (75.7%) in these markets is used by the dietary supplement sector, which grew at 11.2%. This is followed by infant formula (11.9%, growing at 4.2%), and clinical nutrition (6.4%, growing at 6.2%). Oils used in high-value segments capture a larger share of the market in terms of value. Dietary supplements accounted for 51.3% of the total value, infant formula 26.1%, clinical nutrition 7.9% and pharmaceuticals 6.9%. All applications grew in both volume and value during 2023.

The main ingredient is common refined oils, used mainly in dietary supplements. It accounted for 56.2% of volume and grew 1.5%. This is followed by concentrates (18.4% of the volume, grew 8.1%), and tuna (15.3%, grew 4.3%). Cod liver oil grew more rapidly, probably as a partial replacement for scarce common refined oils, but this growth came out of a very small volume.

Growth by Source (in Metric Tons)



The diversity of these markets is reflected in the variety of ingredient oils used.

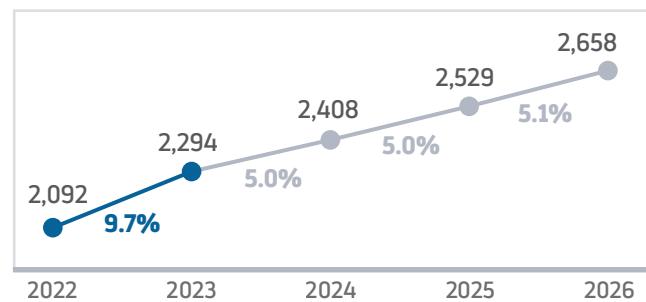
The total volume of omega-3 oils sold in the Rest of World in 2023 was **2,294 metric tons (mT)**, a 9.7% increase from 2,092 mT in 2022.

Value increased 31.2% to **US\$38.4 MM**.

In terms of value, three ingredients dominate the market, with similar total sales. Common refined oils and concentrates commanded \$11.1 MM and \$10.2 MM respectively, and tuna oil, used mainly for infant formula, came in at \$10.0 MM. All ingredients grew in volume and value.

The volume demand in these diverse markets is expected to continue growing in the next few years and to increase an additional 15.8% by 2026, at an average annual growth rate of 5.0%.

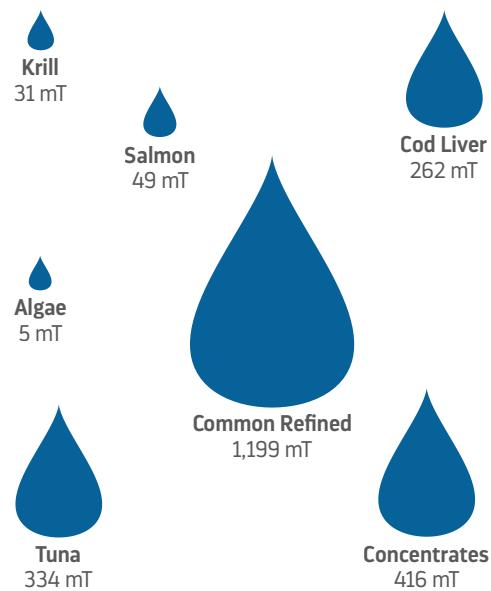
Volume Forecast in the Rest of the World Through 2026 (in Metric Tons)



At a Glance: Rest of the World

Below and on the next page are market figures for the Rest of World region by source and application.

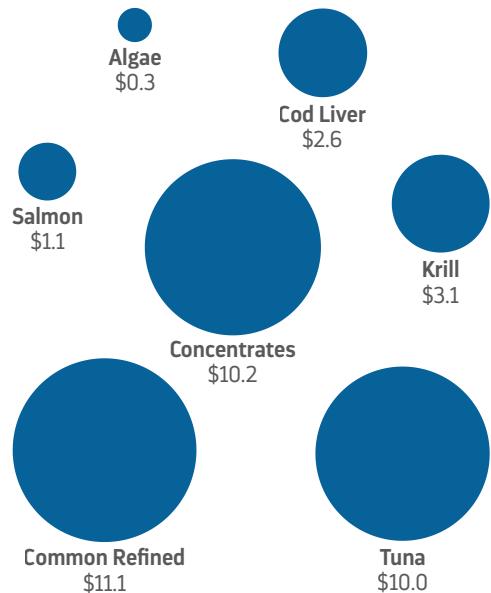
2023 Rest of the World Omega-3 Volume by Omega-3 Sources (in Metric Tons)



Rest of the World Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)		Change in VOLUME (%)	
	< 0.1 mT	137 mT	1.6%	109.3%
Algae				
Cod Liver		137 mT		109.3%
Common Refined		18 mT		1.5%
Concentrates		31 mT		8.1%
Krill		1 mT		4.0%
Salmon		1 mT		3.0%
Tuna		14 mT		4.3%

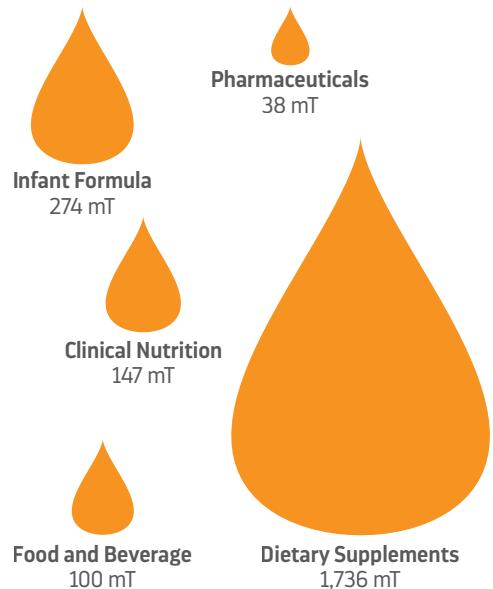
2023 Rest of the World Value by Omega-3 Sources (in Millions, U.S. Dollar)



Rest of the World Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)		Change in VALUE (%)	
	< \$0.1	\$1.8	-3.7%	236.5%
Algae				
Cod Liver		\$1.8		236.5%
Common Refined		\$4.0		56.2%
Concentrates		\$2.1		26.2%
Krill		\$0.1		4.0%
Salmon		\$0.3		37.5%
Tuna		\$0.8		8.7%

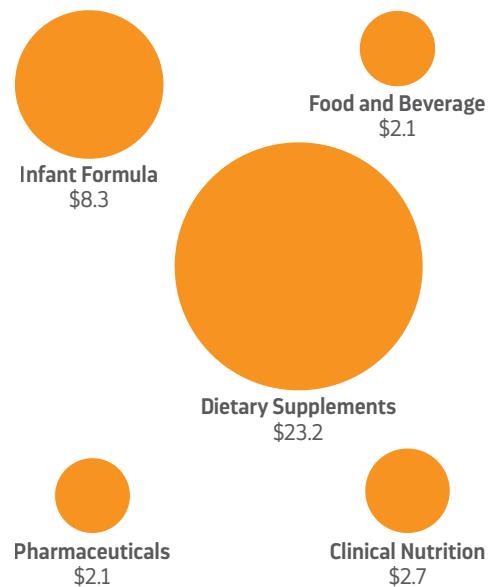
2023 Rest of the World Omega-3 Volume by Application (in Metric Tons)



Rest of the World Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	9 mT	6.2%
Dietary Supplements	175 mT	11.2%
Food and Beverage	5 mT	5.5%
Infant Formula	11 mT	4.2%
Pharmaceuticals	2 mT	5.1%

2023 Rest of the World Omega-3 Value by Application (in Millions, U.S. Dollar)



Rest of the World Value Growth by Application (in millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

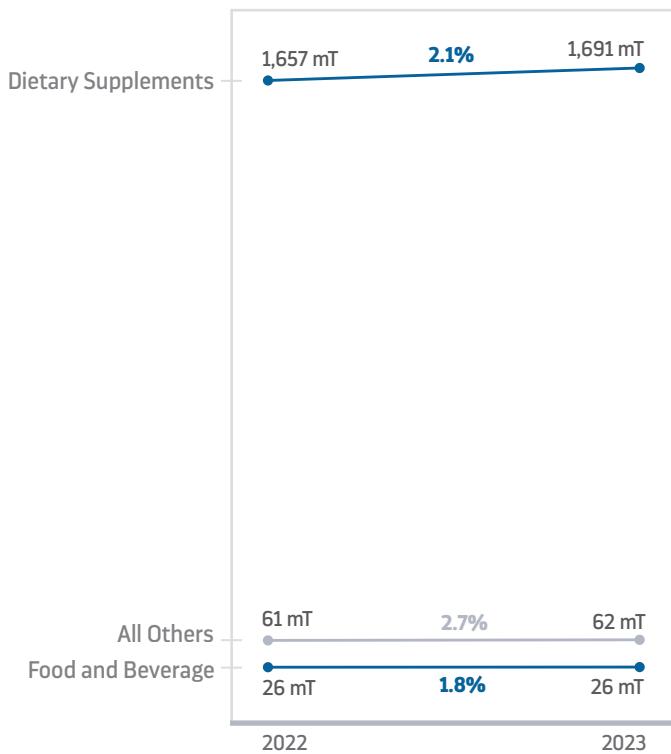
	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	\$0.4	15.9%
Dietary Supplements	\$7.6	49.2%
Food and Beverage	\$0.4	20.9%
Infant Formula	\$0.7	8.8%
Pharmaceuticals	\$0.1	5.0%

AUSTRALASIA

The Australasian market covers Australia and New Zealand and is dominated by a very large dietary supplement sector that accounts for 95.0% of the volume demand.

The Australasian dietary supplement segment has recovered from a long-term contraction that was accelerated by the economic and logistic challenges resulting from Covid. In 2023, the supplement sector grew 2.1% in volume and, due to the higher pricing of several ingredients, common refined oils, its major source, grew 26.5% in value during 2023. All other applications grew at similar rates but out of very small volumes. Increases in ingredient prices resulted in more significant gains in value.

Growth by Application (in Metric Tons)



All applications grew both in volume and value.

The total volume of omega-3 oils sold in Australia and New Zealand in 2023 was **1,780 metric tons (mT)**, a 2.1% increase from 1,743 mT in 2022.

Value increased 23.3% to **US\$31.9 MM**.

The two dominant ingredients, common refined oils and concentrates, are used primarily for the dietary supplements segment, and combined account for 85.5% of this segment. Common refined oils represent 65.5% of the total volume in the Australasian market, and remained flat (a 0.3% contraction), while concentrates (18.2%) grew at 2.9%. Due to higher pricing, both ingredients grew more significantly in value. All other ingredients grew in value, but out of much smaller volumes.

Demand in volume for omega-3 ingredients in the Australasian market is expected to increase by 6.3% by 2026, at an average annual growth rate of 2.1%.

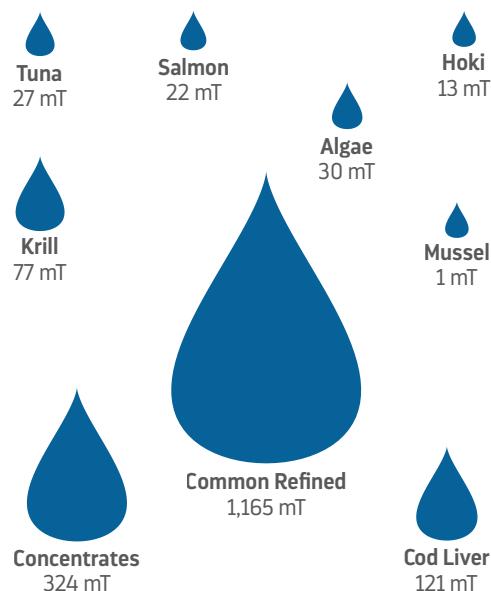
Volume Forecast in Australasia Through 2026 (in Metric Tons)



At a Glance: Australasia

Below and on the next page are market figures for Australasia by source and application.

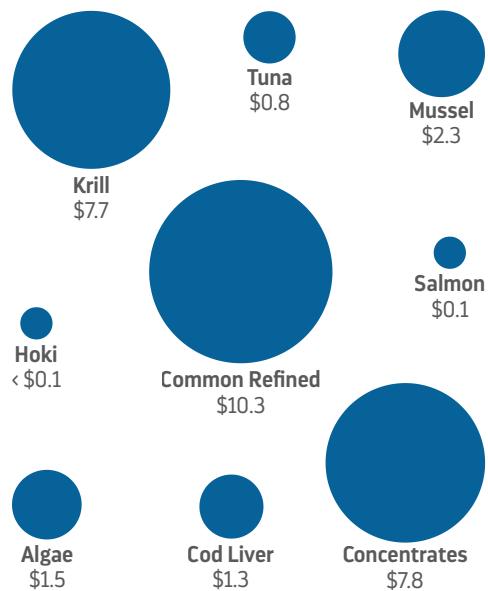
2023 Australasia Omega-3 Volume by Omega-3 Sources (in Metric Tons)



Australasia Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

Source	Change in VOLUME (mT)		Change in VOLUME (%)	
	< 1 mT	≥ 1 mT	< 1 mT	≥ 1 mT
Algae	< 1 mT	2.1%		
Cod Liver	28 mT	29.8%		
Common Refined	-3 mT	-0.3%		
Concentrates		9 mT		2.9%
Hoki	< 1 mT		-6.2%	
Krill		2 mT		3.0%
Mussel		< 0.1		3.7%
Salmon		< 1 mT		1.0%
Tuna		< 1 mT		2.9%

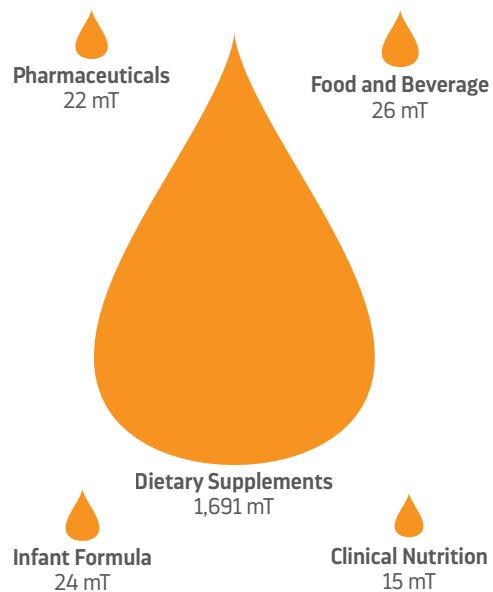
2023 Australasia Value by Omega-3 Sources (in Millions, U.S. Dollar)



Australasia Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

Source	Change in VALUE (MM\$)		Change in VALUE (%)	
	< \$0.1	≥ \$0.1	< 1 mT	≥ 1 mT
Algae	< \$0.1	2.7%	-4.5%	
Cod Liver		\$0.3	30.6%	
Common Refined	\$3.6		53.1%	
Concentrates		\$1.9	31.2%	
Hoki	< \$0.1		-11.1%	
Krill		\$0.2		3.0%
Mussel		< \$0.1		
Salmon		< \$0.1	40.0%	
Tuna		< \$0.1		7.7%

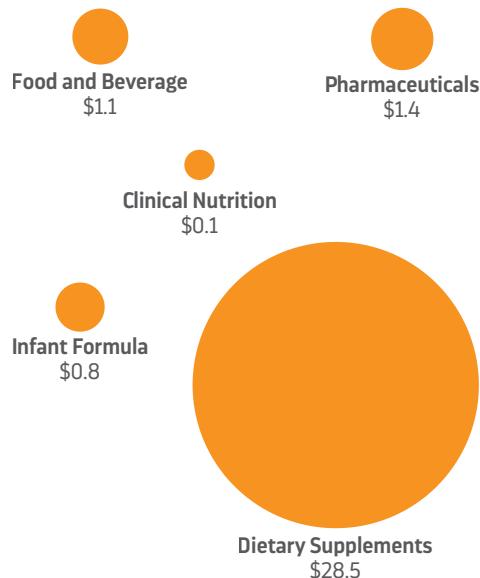
2023 Australasia Omega-3 Volume by Application (in Metric Tons)



Australasia Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	< 1 mT	3.2%
Dietary Supplements	35 mT	2.1%
Food and Beverage	< 1 mT	1.8%
Infant Formula	< 1 mT	2.1%
Pharmaceuticals	< 1 mT	2.9%

2023 Australasia Omega-3 Value by Application (in Millions, U.S. Dollar)



Australasia Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	< \$0.1	< 0.1%
Dietary Supplements	\$6.0	26.5%
Food and Beverage	< \$0.1	< 0.1%
Infant Formula	< \$0.1	2.4%
Pharmaceuticals	< \$0.1	3.1%

MEXICO

Mexico is a small but fast-growing market with a preference towards less expensive, more commodity-like ingredients, although some higher value segments do account for a significant share of the value. Almost all the volume of omega-3 ingredient oils is used for dietary supplements, sometimes mixed with plant oils to obtain 3-6-9 blends.

Almost all the volume (94.3%) of omega-3 ingredients in this market are used for dietary supplements, a segment that in 2023 grew by 2.8% in volume. Most of the value (79.5%) is captured by the dietary supplement segment, and because 86.2% of the volume used in this segment is refined oils, which increased rapidly in price, the value of ingredients used for this application grew 57.6%.

Other applications use small volumes, but because of their reliance on higher priced ingredients, their value is also significant. The food and beverage market (14.4% of the value) is concentrated among a few products, pharmaceuticals capture 4.8% of the value, and fortified infant formula and clinical nutrition each accounted for less than 1.0%.

In terms of volume, the largest source is common refined oils (82.4% of the volume), followed by concen-

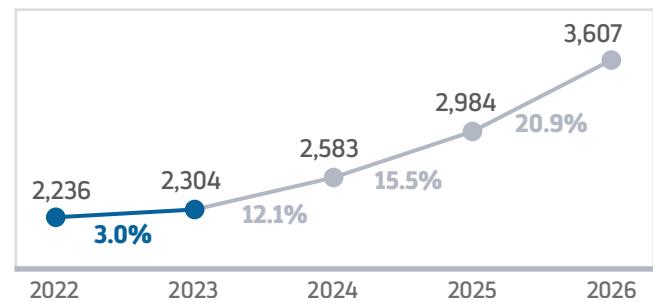
The total volume of omega-3 oils sold in Mexico in 2023 was **2,304 metric tons (mT)**, an 3.0% increase from 2,236 mT in 2022.

Value increased 44.2% to US\$29.9 MM.

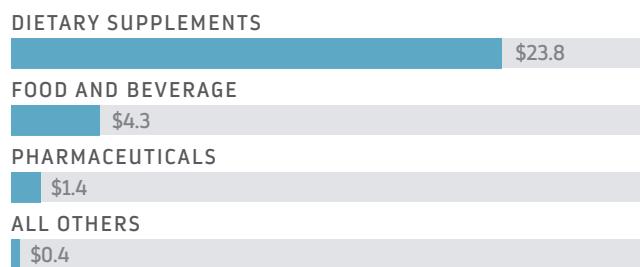
trates (7.5%), and cod liver oil (5.3%). Mexico has a long history of usage of cod liver oil as supplements, and the relatively high volume of cod used is an unusual feature of this market.

Mexico is a usually fast-growing market, but the supply shortage and higher prices of refined oil, the main ingredient in Mexican dietary supplements, slowed this growth. As the supply of these ingredients normalizes in 2024, demand is expected to grow rapidly.

Volume Forecast in Mexico Through 2026 (in Metric Tons)



Value by Application (in Millions, U.S. Dollars)

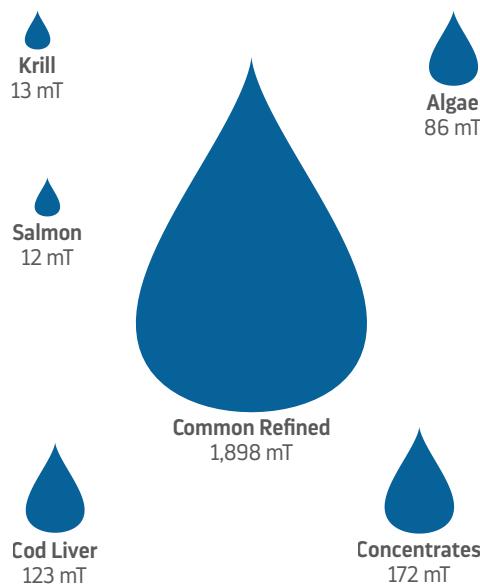


Dietary supplements are by far the largest application in Mexico.

At a Glance: Mexico

Below and on the next page are market figures for Mexico by source and application.

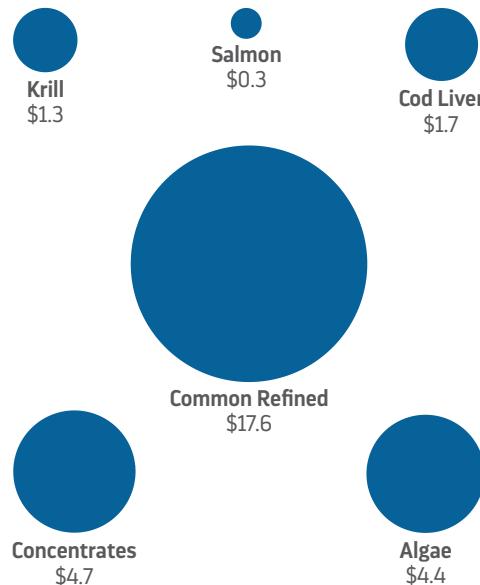
2023 Mexico Omega-3 Volume by Omega-3 Sources (in Metric Tons)



Mexico Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Algae	7 mT	8.3%
Cod Liver	-43 mT	-26.0%
Common Refined	33 mT	1.7%
Concentrates	68 mT	65.3%
Krill	4 mT	42.5%
Salmon	< 1 mT	2.8%

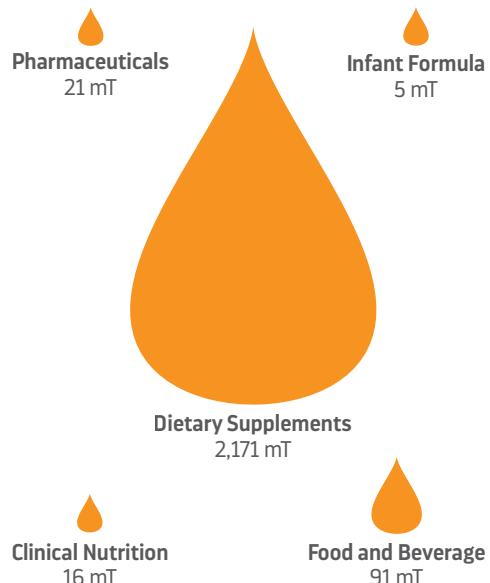
2023 Mexico Value by Omega-3 Sources (in Millions, U.S. Dollar)



Mexico Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Algae	< \$0.1	0.5%
Cod Liver	\$0.4	30.0%
Common Refined	\$6.3	56.0%
Concentrates	\$2.0	73.7%
Krill	\$0.4	42.9%
Salmon	< \$0.1	40.0%

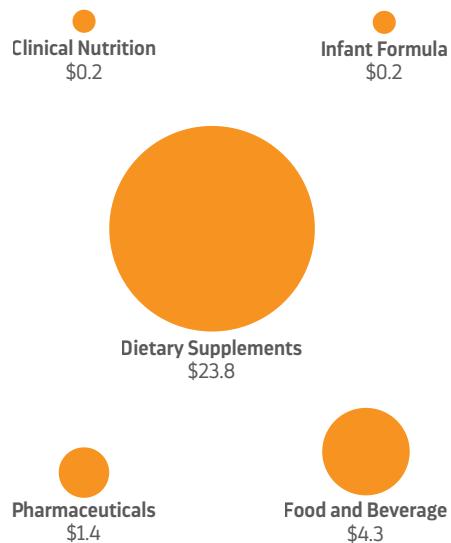
2023 Mexico Omega-3 Volume by Application (in Metric Tons)



Mexico Volume Growth by Application (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Clinical Nutrition	1 mT	8.0%
Dietary Supplements	59 mT	2.8%
Food and Beverage	6 mT	7.6%
Infant Formula	< 1 mT	4.9%
Pharmaceuticals	< 1 mT	3.7%

2023 Mexico Omega-3 Value by Application (in Millions, U.S. Dollar)



Mexico Value Growth by Application (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Clinical Nutrition	< \$0.1	11.1%
Dietary Supplements	\$9.0	61.3%
Food and Beverage	< \$0.1	-0.2%
Infant Formula	< \$0.1	5.3%
Pharmaceuticals	\$0.1	9.2%

OMEGA-3 OIL APPLICATIONS*

This section provides information about the six end use categories that detail the finished product applications for EPA and DHA omega-3 oils. Also included is an At a Glance section highlighting each application according to source and region, where applicable.

*Omega-3 oil applications presented in order of descending value.



DIETARY SUPPLEMENTS

The largest and most varied application for omega-3 ingredients is dietary supplements, in terms of both volume and value. The category is found in every geography and almost all omega-3 sources are represented.

The dietary supplement category utilizes both the largest diversity and the largest volume of omega-3 ingredient oils. In 2023 it accounted for 57.2% of the volume and 58.1% of the value of EPA and DHA oils.

Common refined oils take the largest share of the volume (50.0%), but in 2023 the reduced availability and higher cost of the crude fish oils required for their manufacturing resulted in a 2.7% decline in volume. Refined oils, both as ingredients or as finished products, are typically sold on a thin profit margin and many players further along the value chain, facing crude oil shortages, preferred to use the decreasing existing inventories as prime matter for concentrates. Due to much higher pricing, the value of common refined oils used for dietary supplements grew by 56.2%, but it is important to observe that this reflects the value, at 2023 pricing, of oils consumed during that year. Pro-

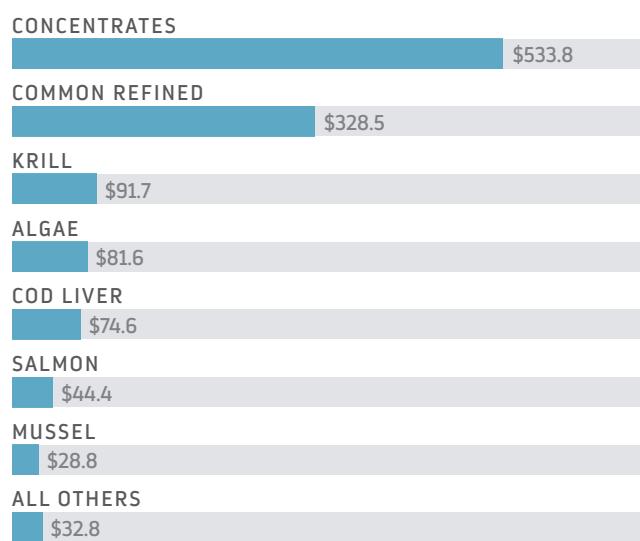
The total volume of omega-3 oils sold for use in dietary supplements in 2023 was **70,669 metric tons (mT)**, a 0.3% decrease from 70,861 mT in 2022.

Value increased 30.8% to **US\$1216.2 MM**.

duction and international trade values were significantly lower.

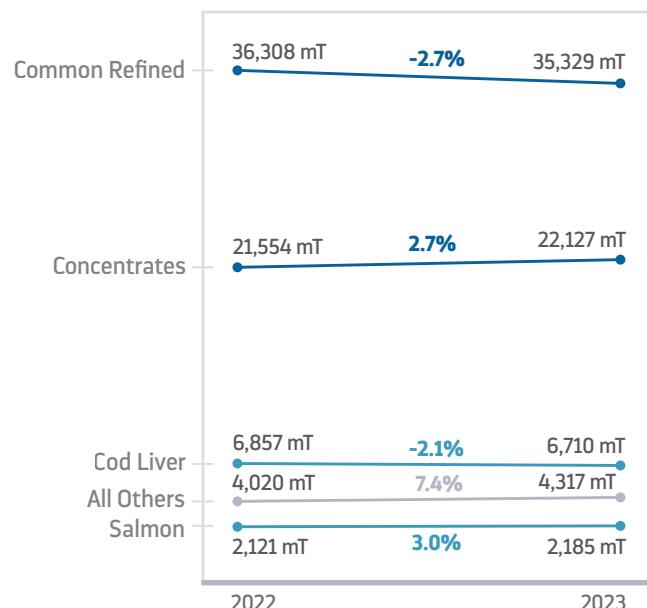
Concentrates, the next source in volume (31.3%), grew 2.7% in volume, which is a modest growth rate for this type of oils—crude oils from Peruvian anchovies are an important prime matter for these oils, and their scarcity during 2023 prevented further growth. Different

Value by Source (in Millions, U.S. Dollar)



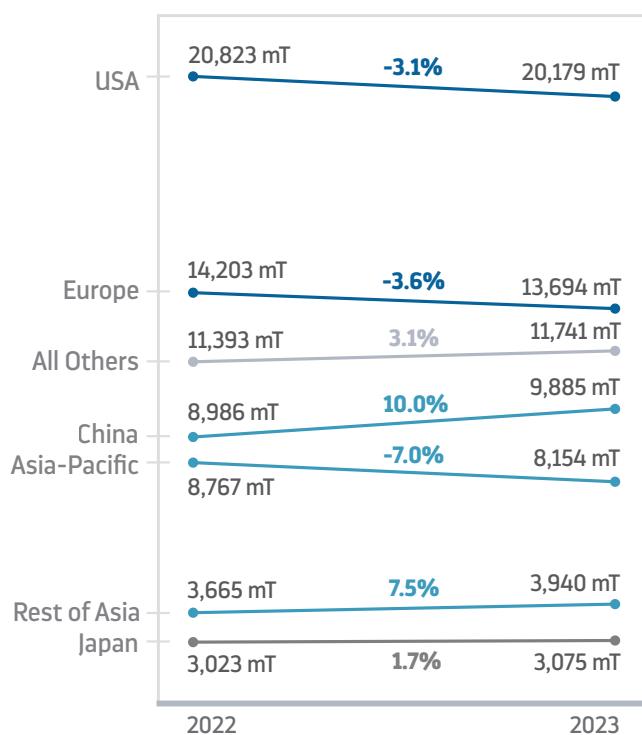
Multiple sources capture significant share of the diverse dietary supplement market.

Growth By Source (in Metric Tons)



Growth in other sources were insufficient to completely offset contractions in common refined and cod liver oils.

Growth by Region (in Metric Tons)



Supply restrictions resulted in contraction in the USA and Europe, while Asian markets grew in volume, except for the Asia-Pacific region.

types of omega-3 oils used in dietary supplements are sold because each offers a unique value proposition and volumes are often limited by the size of existing fisheries. This makes it difficult to compensate for shortages in prime matter for one source with other ingredients. Cod liver oil (9.5% of the volume) contracted by 2.1%, and salmon oil (3.1%) grew 3.0%.

Some sources sold in comparatively small volumes, due to their premium positioning, are important in terms of value. Krill oil (1.3% of the volume, but 7.5% of the value) grew 12.7% in volume, mostly due to rapid expansion in demand in the Chinese market. Algal oils

Volume Forecast in Dietary Supplements Through 2026 (in Metric Tons)



(1.3%; 6.7%) grew 7.3%, fueled by ongoing consumer interest in plant-based nutrition in multiple markets, including the USA and Europe.

Omega-3 supplements are used in all regions covered in this report. The largest markets in terms of both volume and value are the USA (28.6% of the global volume, 37.9% of the value), which decreased 3.1% in volume, followed by Europe (19.4%; 20.9%), which declined 3.6%. Contraction in these markets was driven by shortages in common refined oils, rather than by a decline in consumer demand, which remains healthy.

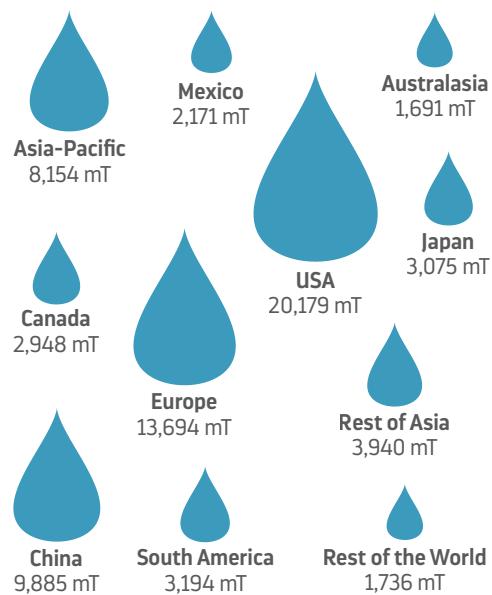
Next in size are China (14.0%; 10.2%), which grew at 10.0%, due to improving economic conditions, and the Asia-Pacific region (11.5%; 9.4%), which contracted by 7.0% in volume, due to economic difficulties in the important South Korean market. All other markets grew in both volume and value.

As the supply of Peruvian anchovy oil returns to normal, the demand for omega-3 ingredients for the dietary supplement segment is expected to return to growth. The volume used by this category should increase an additional 16.8% by 2026, at an average annual growth rate of 5.3%.

At a Glance: Dietary Supplements

Below and on the next page are market figures for Dietary Supplements by source and region.

2023 Dietary Supplements Volume by Region (in Metric Tons)



Dietary Supplements Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	-613 mT	-7.0%
Australasia	35 mT	2.1%
Canada	25 mT	0.8%
China	899 mT	10.0%
Europe	-509 mT	-3.6%
Japan	52 mT	1.7%
Mexico	59 mT	2.8%
Rest of Asia	274 mT	7.5%
Rest of the World	175 mT	11.2%
South America	54 mT	1.7%
USA	-644 mT	-3.1%

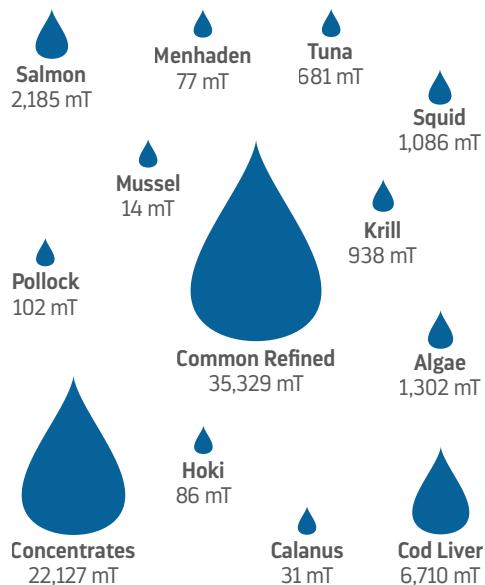
2023 Dietary Supplements Value by Region (in Millions, U.S. Dollar)



Dietary Supplements Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	\$17.2	17.8%
Australasia	\$6.0	26.5%
Canada	\$12.9	31.1%
China	\$30.4	32.6%
Europe	\$49.5	24.2%
Japan	\$8.5	23.2%
Mexico	\$9.0	61.3%
Rest of Asia	\$16.5	41.6%
Rest of the World	\$7.6	49.2%
South America	\$12.4	60.1%
USA	\$116.4	33.8%

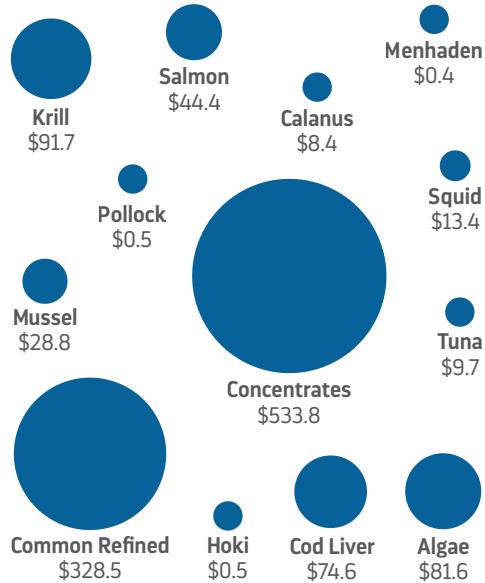
2023 Dietary Supplements Volume by Omega-3 Sources (in Metric Tons)



Dietary Supplements Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Algae	89 mT	7.3%
Calanus	3 mT	12.4%
Cod Liver	-147 mT	-2.1%
Common Refined	-979 mT	-2.7%
Concentrates	574 mT	2.7%
Hoki	-6 mT	-6.2%
Krill	106 mT	12.7%
Menhaden	-3 mT	-3.2%
Mussel	< 1 mT	4.3%
Pollock	2 mT	2.5%
Salmon	64 mT	3.0%
Squid	89 mT	8.9%
Tuna	15 mT	2.3%

2023 Dietary Supplements Value by Omega-3 Sources (in Millions, U.S. Dollar)



Dietary Supplements Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Algae	-\$0.8	-0.9%
Calanus	\$0.9	11.9%
Cod Liver	\$15.0	25.2%
Common Refined	\$118.2	56.2%
Concentrates	\$129.3	32.0%
Hoki	< \$0.1	-8.0%
Krill	\$9.0	10.8%
Menhaden	\$0.2	60.0%
Mussel	\$0.9	3.4%
Pollock	\$0.1	27.5%
Salmon	\$12.2	38.1%
Squid	\$0.9	7.4%
Tuna	\$0.6	6.5%

PHARMACEUTICALS

The market for pharmaceutical products containing omega-3s is dominated by a few high-end products in specific countries. While this segment uses a relatively small volume, the ingredient pricing makes it an important part of the global value.

All pharmaceuticals currently in the market are concentrates in ethyl ester form with concentrations above 80%, and all are aimed at secondary cardiovascular prevention. There are also many new pharmaceutical products being developed globally in various stages of the drug research and development pipeline, addressing multiple conditions, not all of them cardiovascular. The pharmaceutical market of the future will probably be driven by these new drugs.

Almost 90% of the global volume is concentrated in just three markets: the USA (45.2% of the volume, 61.8% of the value), Japan (28.0%; 21.2%) and Europe (15.9%; 9.8%). While the US market contracted slightly (1.4%) in volume—an ongoing effect of the introduction of generics for Vascepa, a high-EPA product—Japan and Europe remained essentially flat (a contraction of 0.2% and growth of 0.3% respectively). All other markets grew in volume, although out of much smaller volumes.

Unlike concentrates used for other applications, whose pricing increased rapidly during 2023, prices for pharmaceutical ingredients decreased. Pharmaceutical companies started the year with sufficient inventories, and needed to purchase only small volumes, which put

The total volume of omega-3 oils sold for use in pharmaceuticals in 2023 was **2,878 metric tons (mT)**, an 0.4% decrease from 2,890 mT in 2022.

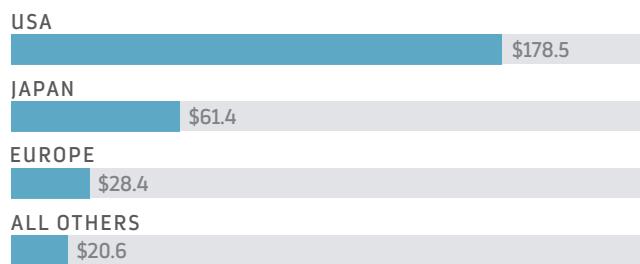
Value decreased 2.9% to US\$288.9 MM.

downward pressure on some prices. As a result, the US market declined 6.0% in value and Japan 0.3%, while Europe grew 3.0%.

Vascepa, a product originally sold only in the USA, has been approved in other regions, including Europe, Canada, the Middle East (part of the Rest of the World region) and China. Volumes in these markets are still too small to be reported accurately, except for Europe, covered for the first time this year, where demand, while small, is growing rapidly.

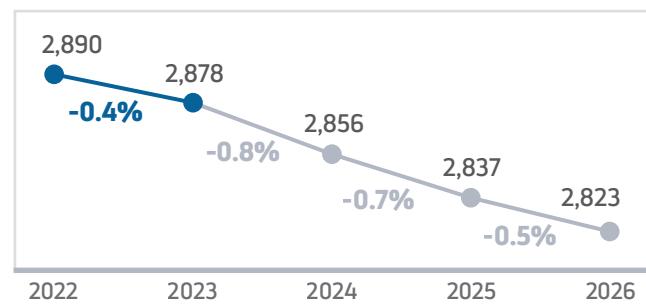
Future growth of the pharmaceutical sector will be determined by the speed of adoption of omega-3 pharmaceuticals in China and by how quickly Vascepa can grow in the European markets. Both will take some time: introducing a new pharmaceutical in Europe

Value by Region (in Millions, U.S. Dollar)



Most of the volume and value is concentrated in only three regions.

Volume Forecast in Pharmaceuticals Through 2026 (in Metric Tons)



requires country-specific approval and reimbursement agreements, and the Chinese market still needs a reimbursement strategy. Until this work is completed, the global demand for omega-3 pharmaceutical ingredients

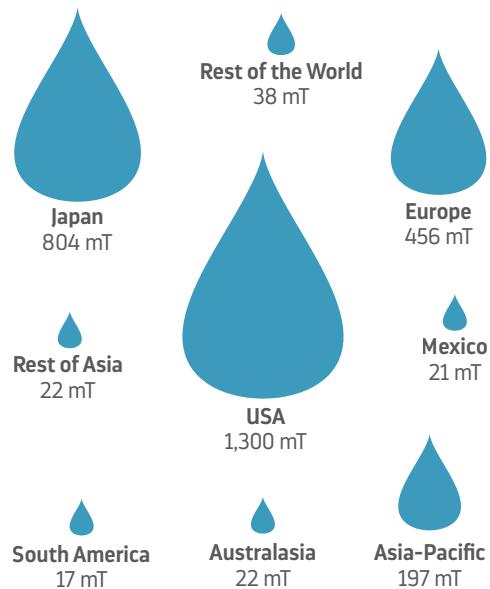
is expected to continue declining slowly.

Volumes of omega-3 oils used in pharmaceuticals are expected to drop by an additional 1.9% to 2026, at an average rate of 0.6% per year.

At a Glance: Pharmaceuticals

Below are market figures for Pharmaceuticals by region. Concentrates are the only omega-3 source for pharmaceutical applications.

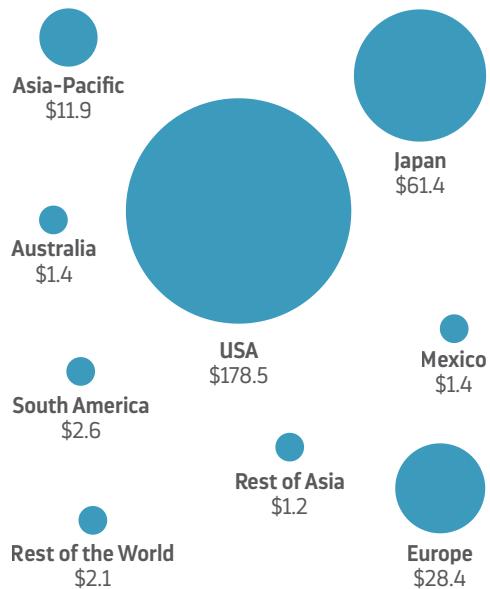
2023 Pharmaceuticals Volume by Region (in Metric Tons)



Pharmaceuticals Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	2 mT	0.9%
Australasia	< 1 mT	2.9%
Europe	2 mT	0.3%
Japan	-1 mT	-0.2%
Mexico	< 1 mT	3.7%
Rest of Asia	< 1 mT	1.8%
Rest of the World	2 mT	5.1%
South America	< 1 mT	3.9%
USA	-18 mT	-1.4%

2023 Pharmaceuticals Value by Region (in Millions, U.S. Dollar)



Pharmaceuticals Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	\$0.1	0.9%
Australasia	< \$0.1	3.1%
Europe	\$0.8	3.0%
Japan	-\$0.2	-0.3%
Mexico	\$0.1	9.2%
Rest of Asia	< \$0.1	1.7%
Rest of the World	\$0.1	5.0%
South America	\$1.7	186.7%
USA	-\$11.4	-6.0%

INFANT FORMULA

Because infant formula requires higher amounts of DHA than EPA, only two sources are currently used: algal and tuna oils.

More than 60% of the demand in infant formula volume comes from two large markets: China and the Asia-Pacific region. In these markets, growth has been driven by the balance of multiple socio-economic factors. Economic development, urbanization and the emergence of an affluent middle class have seen more women of child-bearing age working outside the home, creating both a need for the convenience of formula and the disposable incomes to purchase it. However, these same factors have caused a long-term trend of declining birth rates.

China, the largest market (33.6%), faced a late Covid surge during 2022, which resulted in a slowdown in economic growth and lower consumer confidence. This,

The total volume of omega-3 oils sold for use in infant formula in 2023 was **6,410 metric tons (mT)**, up 4.0% from 6,182 mT in 2022.

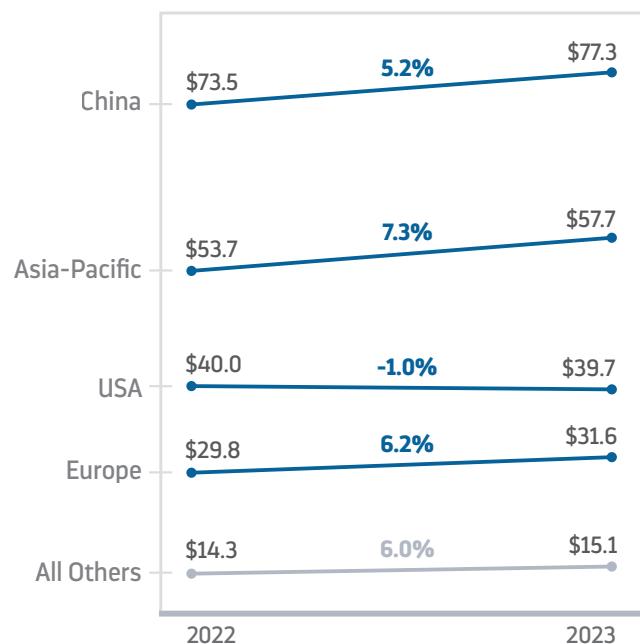
Value increased 4.8% to US\$221.4 MM.

combined with an accelerated drop in birthrate, resulted in a contraction in this segment. With the economy returning to normal, demand for omega-3 ingredients returned to growth (5.1%) during 2023. The increase in demand was due in part to a resumption in the growth of the affluent urban middle class, and in part to increased levels of supplementation (within the normal range), as new entrants use new formulations to differentiate their product from those of more established competitors. Growth in demand was only partially offset by a rapid decline in the number of babies born.

In the Asia-Pacific region (27.3% of the global volume), where birthrates are also declining, a 5.1% growth in demand was driven by increased penetration and fortification of infant formula in several previously underserved markets, including Malaysia and Indonesia.

In developed markets, birth and breastfeeding rates are stable and almost all infant formula is fortified, and demand grows slowly. The USA (15.8% of the global volume) grew at 1.5% in volume but, due to lower pricing

Growth by Region (in Millions, U.S. Dollar)



Value grew or remained flat in most regions, except the USA, which grew in volume but contracted in value due to lower ingredient prices.

Value by Source (in Millions, U.S. Dollar)



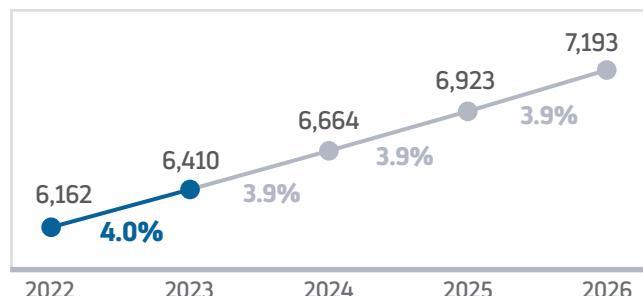
While tune captures a larger share of the global volume than algae, both have equal shares in value.

of algal oil (the most used ingredient), value declined by 1.0%. In Europe (15.6% of the volume), demand increased by 3.0% in volume, mainly due to increases in DHA supplementation levels. Because this market is more dependent on tuna oil, whose pricing increased in 2023, value increased by 6.2%.

All other markets grew in volume and either grew or remained flat in value, but this is from much smaller volumes.

The dominant source globally remains tuna oil, accounting for 57.1% share of the volume. The only other source, algal oils, captures the remaining 42.9% share, although due to the higher pricing of algal oils both ingredients are almost exactly equal in value. The market share of algal oils is slowly increasing. Demand for algal oils grew faster (4.5% in volume) in 2023 than demand for tuna oil (3.7%). This resulted in algal oils, slowly gaining market share, a long-term trend that is expected to accelerate. This is due both to a change in preferences in the European market, and a recommen-

Volume Forecast in Infant Formula Through 2026 (in Metric Tons)



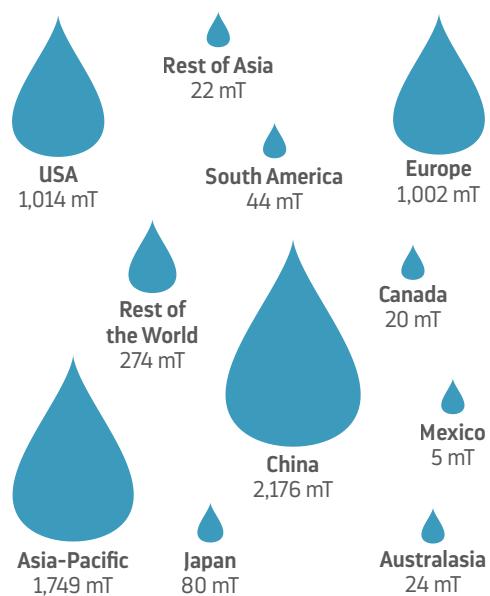
dation of the Chinese government for manufacturers to re-evaluate the safety of tuna oils used for infant formula, following the first releases of Fukushima waste-waters into the ocean in August 2023.

The demand for DHA-rich ingredient oils for infant formula is expected to continue growing, and to increase in volume by an additional 12.2% by 2026, at an estimated 3.9% annual growth rate.

At a Glance: Infant Formula

Below and on the next page are market figures for Infant Formula by source and region.

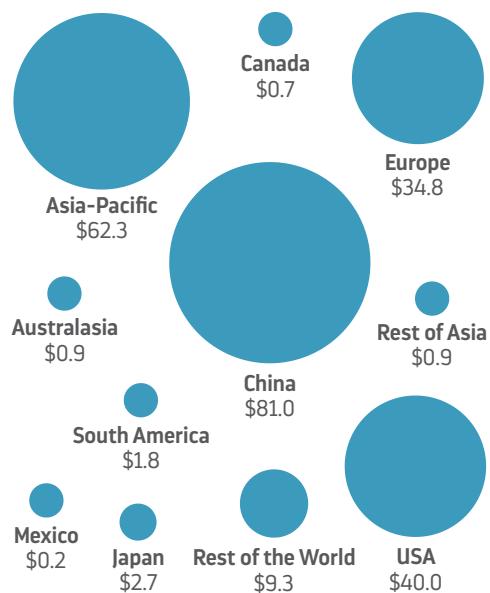
**2023 Infant Formula Volume by Region
(in Metric Tons)**



Infant Formula Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	85 mT	5.1%
Australasia	< 1 mT	2.1%
Canada	< 1 mT	2.2%
China	105 mT	5.1%
Europe	29 mT	3.0%
Japan	< 1 mT	1.2%
Mexico	< 1 mT	4.9%
Rest of Asia	< 1 mT	4.0%
Rest of the World	11 mT	4.2%
South America	< 1 mT	2.3%
USA	15 mT	1.5%

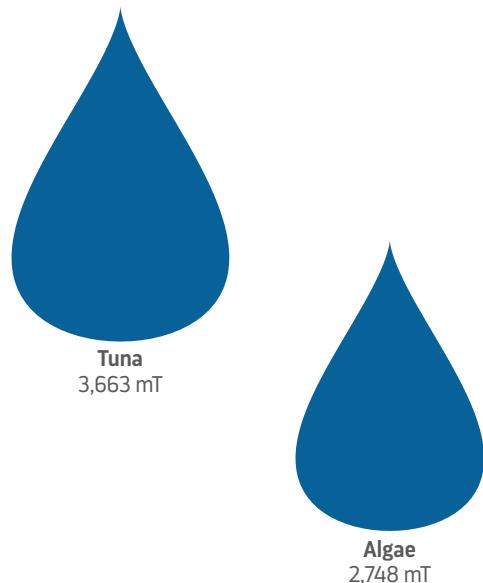
**2023 Infant Formula Value by Region
(in Millions, U.S. Dollar)**



Infant Formula Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	\$8.6	16.0%
Australasia	< \$0.1	8.5%
Canada	< \$0.1	10.6%
China	\$7.5	10.2%
Europe	\$5.1	17.1%
Japan	\$0.4	18.6%
Mexico	< \$0.1	5.3%
Rest of Asia	< \$0.1	1.1%
Rest of the World	\$1.7	21.8%
South America	< \$0.1	-0.6%
USA	< \$0.1	< 0.1%

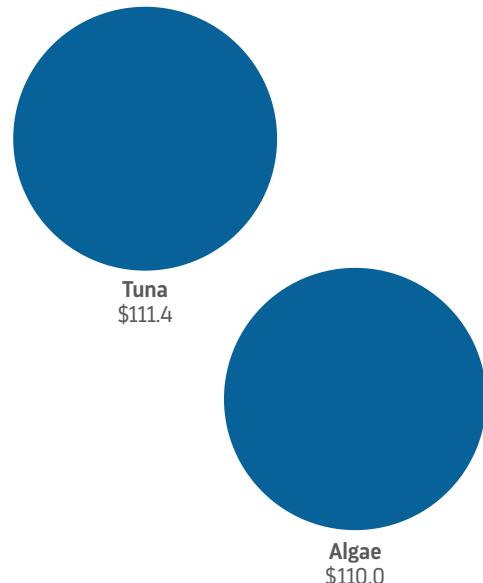
2023 Infant Formula Volume by Omega-3 Sources (in Metric Tons)



Infant Formula Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Algae	118 mT	4.5%
Tuna	130 mT	3.7%

2023 Infant Formula Value by Omega-3 Sources (in Millions, U.S. Dollar)



Infant Formula Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Algae	\$1.5	1.4%
Tuna	\$21.9	21.3%

PET NUTRITION

This category is a large and diverse segment of the omega-3 ingredient market. It includes fortified pet foods and treats, products consumers can add to enhance food flavor, and a growing pet supplement segment. While only a small percentage of pet foods, usually premium and super-premium dog foods, are fortified with omega-3 oils, this category requires significant oil volumes.

Only a few economically developed countries have significant penetrance of the premium pet nutrition products that are fortified with omega-3 oils. As a result, demand for these ingredients is concentrated in a few regions, and more than 90% of the demand in both volume and value is concentrated in two markets: the USA and Europe.

The largest of these markets, the USA, commands 53.4% of the global volume and grew at 3.7%. In 2022, the number of new dogs joining US homes dropped, as a correction from the record number of dog adoptions during the Covid pandemic. Growth in demand was fueled by adoption rates returning to normal and by the

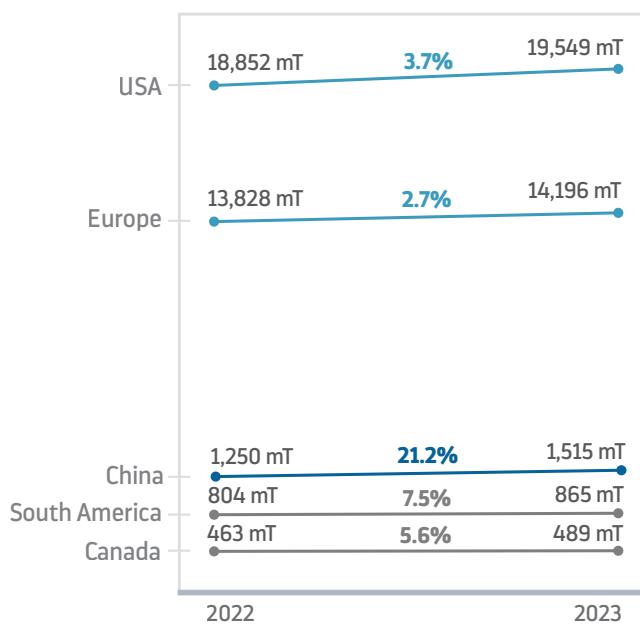
The total volume of omega-3 oils sold for use in pet foods and supplements in 2023 was **36,613 metric tons (mT)**, a 4.0% increase from 35,197 mT in 2022.

Value increased 65.8% to US\$195.1 MM.

growth of the diverse and fast-growing pet supplement segment, partially offset by a reduction in the fortification levels of some pet foods, due to higher ingredient prices. Demand in the European market (38.8% of the global volume) grew at 2.7%.

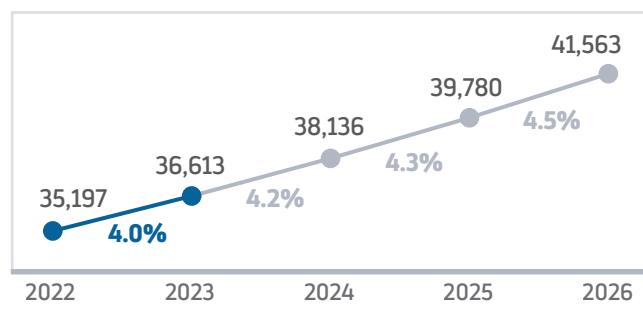
China is home to a still small (4.1% of the global volume) but fast-growing pet nutrition market; demand in volume grew by 21.2% in 2023. As more couples moved to cities and balanced work with taking care of aging parents, more chose not to have children and opt for having pets, and the convenience of pet nutrition products. As a result, the Chinese market is rapidly becoming more diverse and now includes omega-3 premium pet

Growth by Region (in Metric Tons)



Demand for pet nutrition ingredients grew in all markets.

Volume Forecast for Pet Nutrition Through 2026 (in Metric Tons)



foods, chews and supplements. Fast growth is expected to continue.

All other markets grew in volume and value, although out of smaller volumes.

Pet foods use a large share (29.4%) of the global volume of omega-3 ingredient oils. However, these ingre-

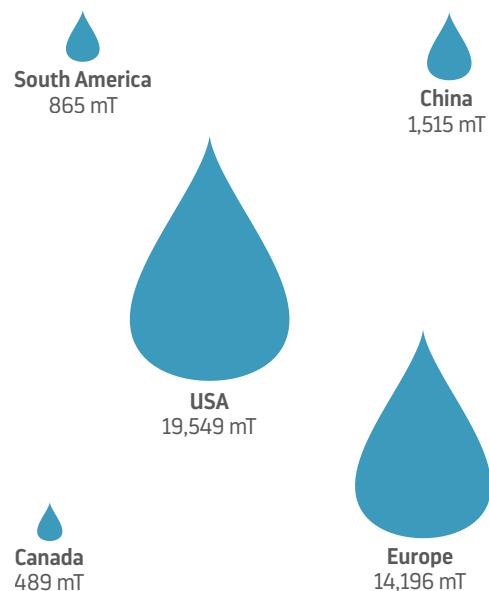
dients usually command lower prices, and their share of the global value (9.3%) is smaller than the share of most other applications.

The volume of omega-3 oils used as ingredients for pet nutrition is expected to grow an additional 13.5% by 2026, at an average annual growth rate of 4.3%.

At a Glance: Pet Food

Below and on the next page are market figures for Pet Food by source and region.

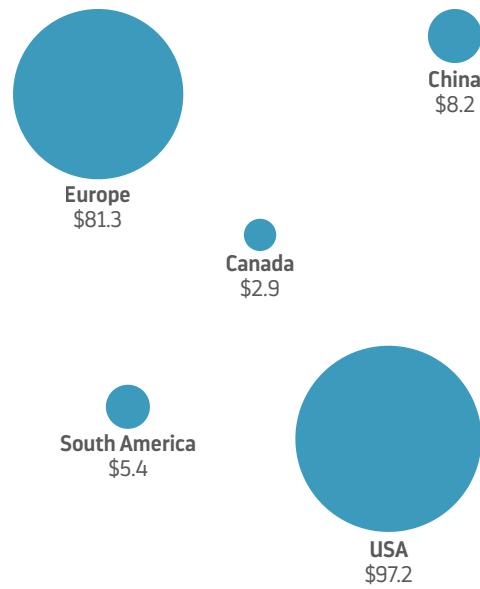
**2023 Pet Food Volume by Region
(in Metric Tons)**



**Pet Food Volume Growth by Region (in Metric Tons)
and Percent Growth (Change from 2022 to 2023)**

	Change in VOLUME (mT)	Change in VOLUME (%)
Canada	26 mT	5.6%
China	265 mT	21.2%
Europe	368 mT	2.7%
South America	61 mT	7.5%
USA	697 mT	3.7%

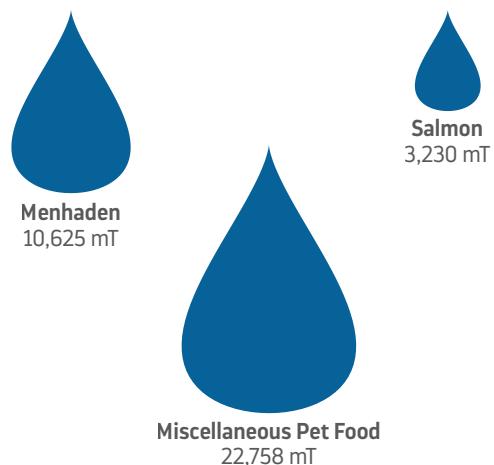
**2023 Pet Food Value by Region
(in Millions, U.S. Dollar)**



**Pet Food Value Growth by Region (in Millions,
U.S. Dollar) and Percent Growth (Change from 2022
to 2023)**

	Change in VALUE (MM\$)	Change in VALUE (%)
Canada	\$1.2	65.9%
China	\$3.9	91.8%
Europe	\$31.2	62.2%
South America	\$2.3	70.3%
USA	\$38.9	66.7%

2023 Pet Food Volume by Omega-3 Sources (in Metric Tons)



Pet Food Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Menhaden	385 mT	3.8%
Miscellaneous Pet Food	1,033 mT	4.8%
Salmon	-2 mT	< 0.1%

2023 Pet Food Value by Omega-3 Sources (in Millions, U.S. Dollar)



Pet Food Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

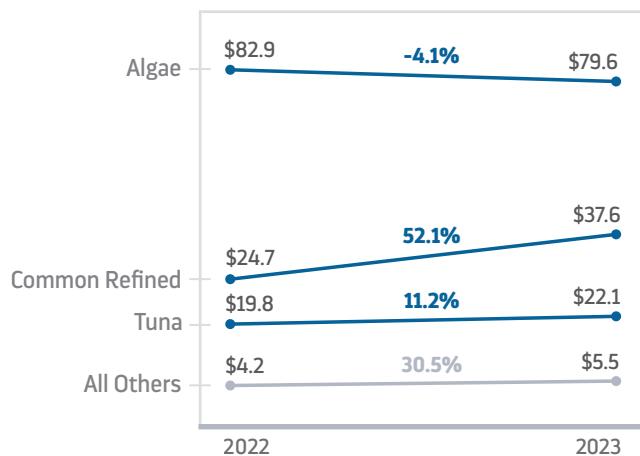
	Change in VALUE (MM\$)	Change in VALUE (%)
Menhaden	\$17.0	75.9%
Miscellaneous Pet Food	\$47.0	64.8%
Salmon	\$13.4	59.1%

FOOD AND BEVERAGE

EPA and DHA omega-3s are used to fortify a variety of food and beverage products, including dairy products, breads/other baked goods, juices and other beverages, processed meats, prepared foods and cooking oils. Most of the omega-3 used in this segment goes to fortify dairy products and spreadable fats. Omega-3 oils are also used to fortify infant formula, a type of food, but because of its importance and its unique market dynamics, this application is treated in a separate section of this report.

Because of the cost sensitivity of food companies, common refined oils remain the dominant source in this segment, and account for 59.3% of the ingredient volume. The volume of these oils grew by 2.1%, mostly due to increased demand in Asia. Asian markets, particularly Japan, use significant volumes of locally sourced oils, and are less affected by shortages in production in other regions. Next in importance are algae (25.5% of the global volume), which grew by 4.0%, and tuna (7.7%), which grew 6.4%. Because of their higher pricing, algal oils capture a higher (55.0%) share of the value, followed by common refined oils (26.0%) and tuna (15.3%). All ingredients grew or remained stable in value, except for algae, which contracted by 4.1% because increased competition and improvements in production efficiency have resulted in lower pricing.

Growth by Source (in Millions, U.S. Dollar)



All sources used in food and beverage, except algae, grew or remained stable in value.

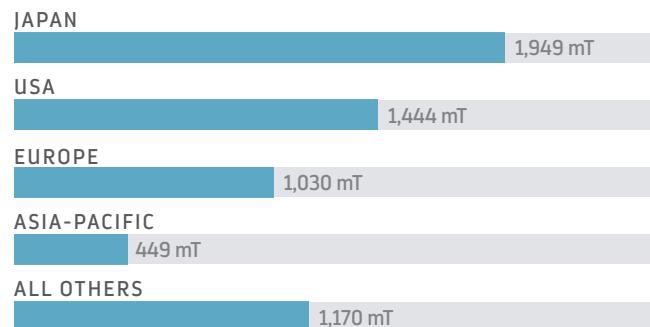
The total volume of omega-3 oils sold for use in foods and beverages in 2023 was **6,043 metric tons (mT)**, a 2.7% increase from 5,885 mT in 2023.

Value increased 9.9% to US\$144.7 MM.

Foods and beverages fortified with omega-3 are present in all markets covered by this report. Japan is the largest market and accounts for 32.3% of the global volume. Volume demand grew at 4.4% in volume during 2023, due to a varied and innovative fortified foods market. Japan is home to an aging population with a high awareness of the health benefits of fish and fish oils, and many use fortified foods for prevention, particularly the maintenance of brain health.

Of the next two largest markets, the USA (23.9% share of the volume) declined at an annual rate of 1.7%

Value by Region (in Metric Tons)



The food and beverage category is present in all regions, but a small number of regions account for most of the value and volume.

and Europe (17.1% share of the volume) grew 2.1%. In both of these markets, there was higher consumer interest driven by a focus on prevention, including by the use of natural means like diet, but this was offset by shortages in the supply of refined oils, the main ingredient. Demand in China (9.5% of the global volume) grew by 4.4%. The markets of the Asia-Pacific and Rest of Asia regions, fueled by the emergence of a larger middle class, are growing rapidly in volume (5.7% and 7.1% annual growth rates), but out of a much smaller base. All other markets grew in volume, and, due to higher ingredient prices, all markets grew in value.

Global demand for omega-3 ingredients in food and beverage has grown slowly for several years, but the growth is concentrated on a few products, and the number of functional food product launches has continued to slow globally. Technological advancements in stabilization and sensory attributes currently allow the development of a larger variety of innovative high-qual-

Volume Forecast in Food and Beverage Through 2026 (in Metric Tons)



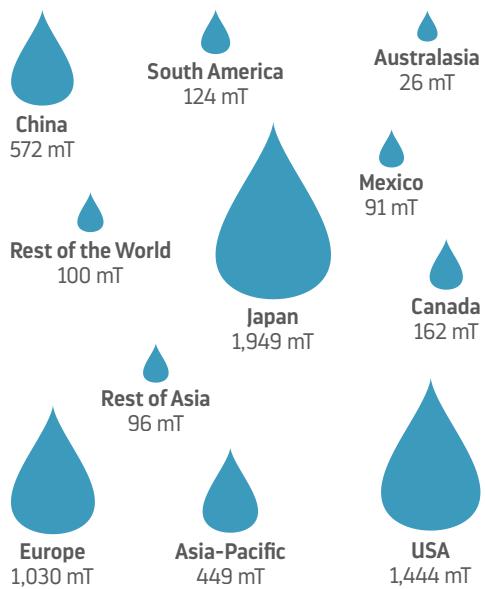
ity products, but consumers in some of the largest and more established markets expect fortification only in familiar products, like dairy and spreads, and resist purchasing newer ones, making faster growth challenging.

The volume of omega-3 ingredients used to fortify foods and beverages is expected to continue growing in the next few years and increase by 9.0% by 2026, at an average annual growth rate of 2.9%.

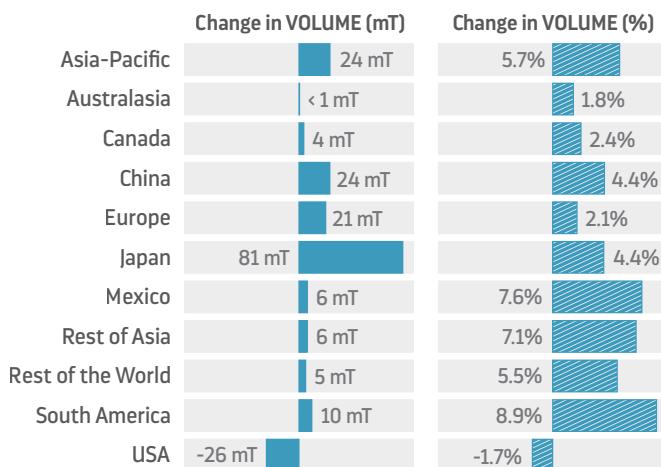
At a Glance: Food and Beverage

Below and on the next page are market figures for Food and Beverage by source and region.

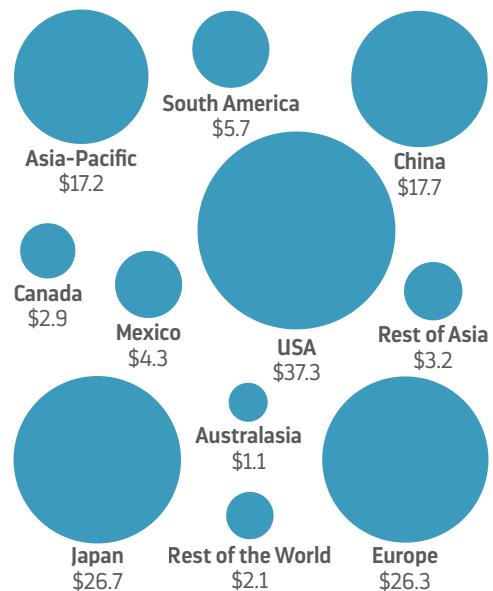
2023 Food and Beverage Volume by Region (in Metric Tons)



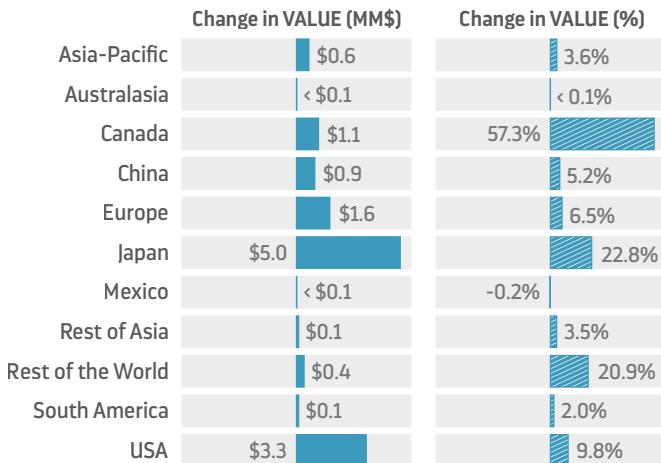
Food and Beverage Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)



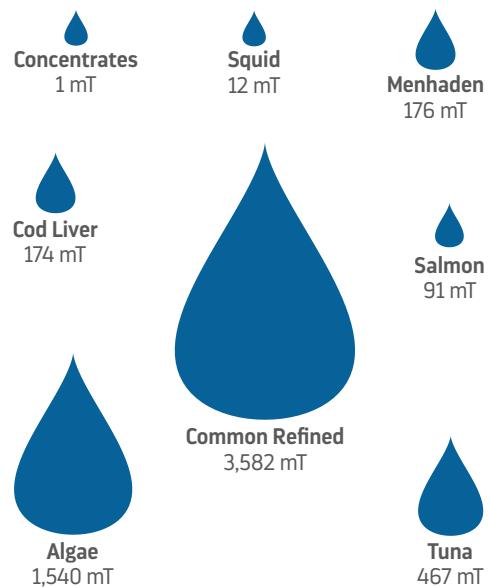
2023 Food and Beverage Value by Region (in Millions, U.S. Dollar)



Food and Beverage Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)



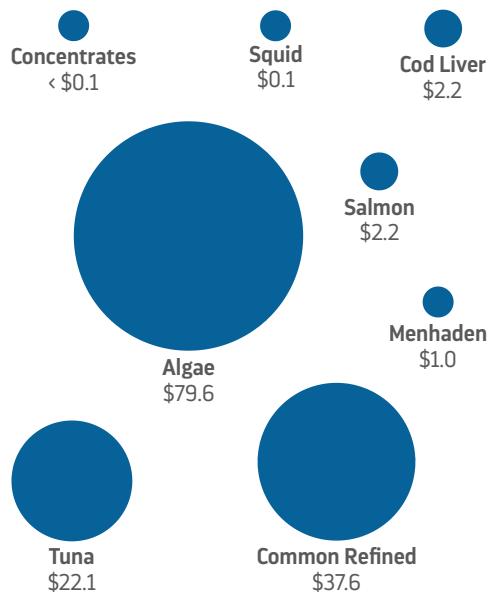
2023 Food and Beverage Volume by Omega-3 Sources (in Metric Tons)



Food and Beverage Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Algae	59 mT	4.0%
Cod Liver	-3 mT	1.6%
Common Refined	73 mT	2.1%
Concentrates	< 0.1 mT	-3.2%
Menhaden	-6 mT	-3.4%
Salmon	2 mT	1.8%
Squid	< 1 mT	1.8%
Tuna	28 mT	6.4%

2023 Food and Beverage Value by Omega-3 Sources (in Millions, U.S. Dollar)



Food and Beverage Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Algae	-\$3.4	-4.1%
Cod Liver	\$0.3	17.2%
Common Refined	\$12.9	52.1%
Concentrates	< \$0.1	< 0.1%
Menhaden	\$0.4	62.9%
Salmon	\$0.6	35.6%
Squid	< \$0.1	< 0.1%
Tuna	\$2.2	11.2%

CLINICAL NUTRITION

For the purposes of this report, the term Clinical Nutrition covers two distinct but related segments: clinical nutrition and medical foods. According to the US FDA's definitions, medical food is "a food which is formulated to be consumed or administered enterally under the supervision of a physician and which is intended for the specific dietary management of a disease or condition for which distinctive nutritional requirements, based on recognized scientific principles, are established by medical evaluation." By contrast, clinical nutrition is nutrition administered in an in-patient clinical setting, either via enteral (nasogastric tube) or parenteral (intravenous line) means. Applications for clinical nutrition/medical foods include oncology, critical care, malnutrition/malabsorption, GI disorders, epilepsy, memory impairment and metabolic diseases.

This segment relies on just three oil sources. Concentrates with low EPA+DHA (a concentration of around 30%) account for 54.7% of the global volume and refined oils for 45.2%. The only additional source, algal oils, represents less than 0.1% of the volume.

Concentrates capture 63.1% of the global value, refined oils 36.4% and algal oils less than 1%. Both major sources grew in volume at comparable rates (4.2% and 4.7% respectively), but because common refined oils prices increased more rapidly in 2023, they grew differently in value (13.9% and 62.7%, respectively).

Europe, the largest market, commands 32.4% of the global volume and grew at 2.8%. Canada, where a favor-

The total volume of omega-3 oils sold for use in clinical nutrition in 2023 was **1,866 metric tons (mT)**, a 4.4% increase from 1,787mT in 2022.

Value increased 27.7% to **US\$27.7 MM**.

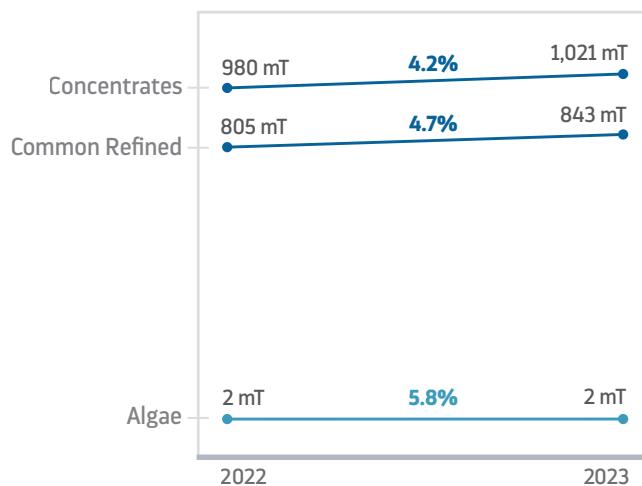
able regulatory environment has resulted in a large per capita volume for this segment, used 18.4% of the volume, and grew at 3.7%. The USA and Japan, commanding 17.4% and 12.5% of the global volume respectively, grew at 4.7% and 5.1%. All other regions grew in both volume and value.

The volume of omega-3 ingredient oils used for clinical nutrition is expected to continue growing, and to increase an additional 14.1% by 2026, at an annual average growth rate of 4.5%.

Volume Forecast in Clinical Nutrition Through 2026 (in Metric Tons)



Growth by Source (in Metric Tons)

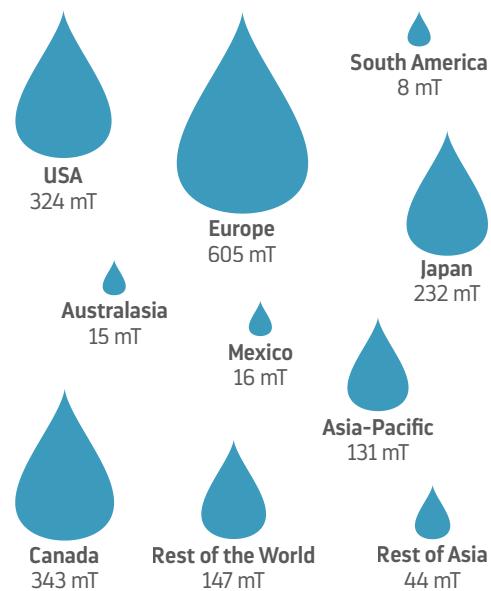


All sources going into clinical nutrition grew at comparable rates.

At a Glance: Clinical Nutrition

Below and on the next page are market figures for Clinical Nutrition by source and region.

2023 Clinical Nutrition Volume by Region (in Metric Tons)



Clinical Nutrition Volume Growth by Region (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
Asia-Pacific	10 mT	8.4%
Australasia	< 1 mT	3.2%
Canada	12 mT	3.7%
Europe	17 mT	2.8%
Japan	11 mT	5.1%
Mexico	1 mT	8.0%
Rest of Asia	3 mT	8.3%
Rest of the World	9 mT	6.2%
South America	< 1 mT	5.2%
USA	14 mT	4.7%

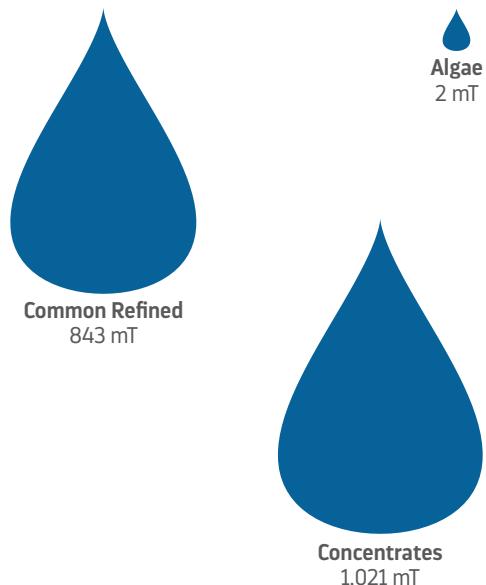
2023 Clinical Nutrition Value by Region (in Millions, U.S. Dollar)



Clinical Nutrition Value Growth by Region (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
Asia-Pacific	\$0.3	19.5%
Australasia	< \$0.1	< 0.1%
Canada	\$0.7	14.4%
Europe	\$1.9	30.4%
Japan	\$0.6	19.6%
Mexico	< \$0.1	11.1%
Rest of Asia	\$0.1	20.9%
Rest of the World	\$0.4	15.9%
South America	< \$0.1	11.1%
USA	\$2.0	75.2%

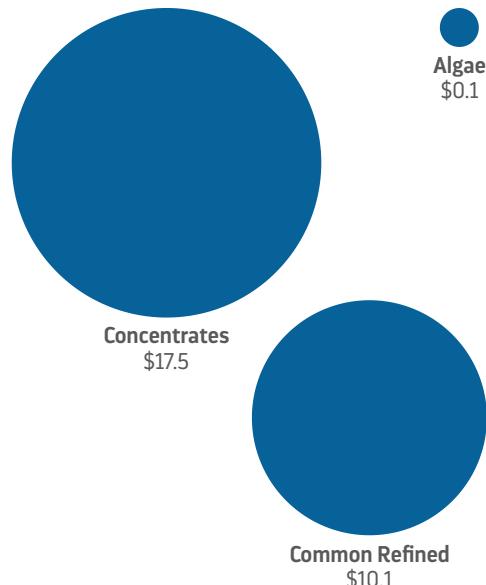
2023 Clinical Nutrition Volume by Omega-3 Sources (in Metric Tons)



Clinical Nutrition Volume Growth by Source (in Metric Tons) and Percent Growth (Change from 2022 to 2023)

	Change in VOLUME (mT)	Change in VOLUME (%)
	< 1 mT	5.8%
Algae	< 1 mT	5.8%
Common Refined	37 mT	4.7%
Concentrates	41 mT	4.2%

2023 Clinical Nutrition Value by Omega-3 Sources (in Millions, U.S. Dollar)



Clinical Nutrition Value Growth by Source (in Millions, U.S. Dollar) and Percent Growth (Change from 2022 to 2023)

	Change in VALUE (MM\$)	Change in VALUE (%)
	< \$0.1	< 0.1%
Algae	< \$0.1	< 0.1%
Common Refined	\$3.9	62.7%
Concentrates	\$2.1	13.9%

INDUSTRY SUMMARY

The following Summary provides a synopsis of the key market factors and global issues that influenced the EPA and DHA omega-3 industry in 2023.



The omega-3 market grew modestly in volume and very significantly in value during 2023, due to a severely restricted supply of some major ingredients and resulting higher pricing. The omega-3 ingredient market is dynamic and diverse, and a variety of raw material sources supply oils for a wide range of applications. However, more than half of the ingredient volume is obtained from crude oil from anchovies, of which Peru remains the most dominant supplier, which makes the omega-3 market overly dependent on a single source.

The availability of crude fish oils is subject to natural year-to-year variation in the volumes of fish caught and their oil content and composition, which depend on multiple environmental variables. During late 2022 and all of 2023, higher water temperatures off the coast of South America resulted in Peruvian anchovy oil production that was much lower than the yearly average. As a result, 2023 was characterized by shortages of the necessary crude oils, which drove a widespread increase in prices to historic highs.

It is important to note that while global value grew, this did not result in generalized higher profits. Companies throughout the omega-3 market value chain saw their operational costs increase, and few passed on the totality of these higher costs to their clients. Fortunately, the omega-3 industry succeeded in keeping products available for consumers. To meet existing demand required exhausting existing inventories, adapting production to other sources and implementing alternative practices that, under other circumstances, would have been considered too costly.

Under normal circumstances, growth in the global omega-3 category is driven by consumer interest—consumers in all major markets are generally aware of the health benefits of EPA and DHA so demand remains healthy—and the low growth rate in volume appears to have been due to supply constraints rather than lower consumer interest. Starting in 2022, ingredient manufacturers were forced to increase their sales prices, creating a chain of price increases that reached consumers in early 2023, when consumers around the world were already dealing with the increased cost of living. Demand appears to have remained healthy, despite the higher cost.

The total volume of omega-3 ingredients used globally in 2023 was **124,480 metric tons (mT)**, representing a 1.4% increase from the 122,782 mT used in 2022.

The total market value of these ingredients was **US\$2,093.9 MM**, up 22.5% from the value in 2022 (US\$1,709.5 MM).



In 2024, water temperatures off Peru have normalized, and production appears to be returning to the normal levels. In the long term, supply should be able to match demand, but occasional disruptions are to be expected, and the omega-3 industry needs to adapt their practices to better manage this risk. While supply will likely be able to meet demand for the next few years, it is too early to predict the long-term effects that such a challenging year may have had on the omega-3 market dynamics.

The US and European markets are the largest in terms of both volume and value, and in both, volume demand for omega-3 ingredient oils remained flat, although higher pricing resulted in significant gains in value.

China, whose economic growth slowed down during 2022 because of a late-onset Covid outbreak, returned to more normal growth in 2023 and demand for omega-3 ingredients grew rapidly. China depends on a variety of local oils and started the year with large inventories of crude and refined oil in preparation for a rapid growth in the pharmaceutical market that has yet to materialize. This made Chinese producers less dependent on scarce Peruvian anchovy oils.

Demand in the Asia-Pacific region declined, due to an economic contraction in South Korea, its dominant market. Japan, a stable market that largely relies on oils from local fisheries, grew at a moderate pace. All other markets grew in volume, and all markets grew in value.

The dominant omega-3 ingredient in volume remains common refined oils, and concentrates are the leading source in value. Algal oils have traditionally been used for applications that would justify their higher pricing, like infant formula, fortified foods or dietary supplements for specific populations (vegetarians, vegans or people

with fish allergies) but consumer interest for plant-based ingredients, coupled with lower prices and a larger variety of available compositions, have contributed to making them more desirable and algal oils are emerging from their traditional dietary supplement niche segments. Krill oil, another ingredient sold in comparatively low volumes but that commands significant value, grew rapidly, mainly because of increased demand in China.

Despite constraints in supply, demand for most sources grew in both volume and value during 2023. The only exceptions are common refined oils, which contracted because of lower availability of the Peruvian anchovy crude oils used as prime matter, and ingredients like cod liver oil, derived from specific fisheries whose production volumes vary from year to year.

Looking ahead, consumer interest in products containing omega-3 ingredients remains strong, and global demand is increasing. However, the omega-3 market underwent significant changes during 2023, due to reduced supply and lower availability of Peruvian crude anchovy oil. This, coupled with historically high fish oil prices resulted in changes in production practices and a redistribution of the market shares (both in terms of volume and value) of different oil types. With Peruvian oil production returning to average historical levels, the omega-3 industry will adjust to a new normal. However, 2023 brought big changes in production practices and consumption patterns, and it is too early to know which changes will prove to be temporary, and which permanent.

ACKNOWLEDGMENTS

We are profoundly grateful to all who provided us with insights and information for the preparation of this report. Without their data, and, more crucially, their knowledge, advice, time and generosity, this report would not have been possible. Below is a partial list of companies that contributed information to this year's report. Others shared details but prefer to remain anonymous.

Aker Biomarine	Nestle
Algarithm/Mara	Newscience
Aroma NZ	Nissui
BASF	Nordic Naturals
Biosearch Life/Kerry	Novosana
Blackmores	Nu-Mega Ingredients
Daybrook Fisheries	<i>Nutrition Business Journal</i>
dsm-firmenich	Olvea
Epax	Omega Protein/Bioriginal
Erausquin International Consulting	Ooyen Research
Fermentalg	Originates/Naturmega
GC Rieber Oils	Pharmavite
Gihon Laboratorios Quimicos	Seadragon
Global Nutrition Group	Seafoodia
Golden Omega	Sofinol
Huatai Biopharm Inc.	Solutex
Huve Nutra	TASA
IFFO	Thai Union
KD Pharma	Tharos
KinOmega Biopharm	The Scoular Company
Köster	Trident Seafoods
Lysi	Vesteraalens
Maruha Nichiro	Virun
Nature's Way	Wiley Companies



APPENDIX

The Appendix includes all applicable market figures, in table form, for all sources, regions and applications.

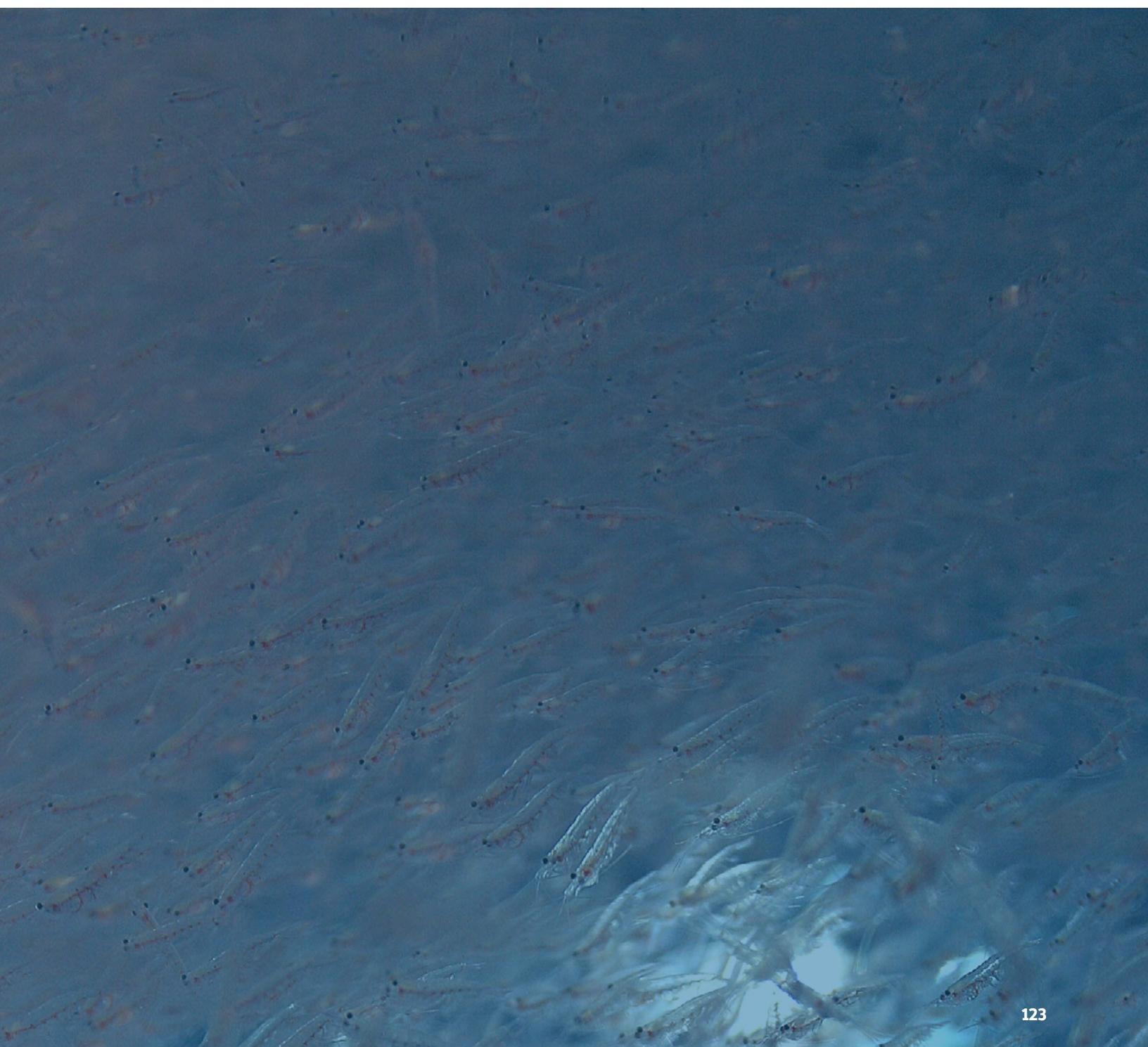


Table of Contents

Table of Contents	124
Sources	126
Concentrates	126
Common Refined	140
Algae	142
Tuna	144
Miscellaneous Pet Food.....	146
Krill.....	147
Salmon.....	148
Cod Liver	150
Menhaden	151
Mussel.....	152
Squid.....	153
Calanus	154
Pollock	155
Hoki.....	156
Geographies.....	157
USA	157
Europe	159
China	161
Asia-Pacific.....	163

Japan	165
Canada	167
Rest of Asia	169
South America	170
Rest of the World	172
Australasia	174
Mexico	176
Applications	177
Dietary Supplements	177
Pharmaceuticals	181
Infant Formula	183
Pet Nutrition	185
Food and Beverage.....	186
Clinical Nutrition.....	190

Sources

Concentrates

Volume, by Region and Application

	Dietary Supplements			Pharmaceuticals			Clinical Nutrition			Food and Beverage		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	293	301	2.9%	22	22	2.9%	-	-	-	-	-	-
Canada	1,277	1,334	4.5%	-	-	-	298	309	3.4%	-	-	-
China	3,072	3,364	9.5%	-	-	-	-	-	-	-	-	-
Europe	3,987	4,098	2.8%	455	456	0.3%	219	222	1.4%	-	-	-
Japan	871	891	2.3%	806	804	-0.2%	147	155	5.5%	-	-	-
Mexico	84	151	80.0%	20	21	3.7%	-	-	-	-	-	-
Rest of the World	225	246	9.4%	36	38	5.1%	123	131	6.5%	-	-	-
Asia-Pacific	1,738	1,385	-20.3%	196	197	0.9%	115	125	8.6%	-	-	-
Rest of Asia	1,567	1,687	7.7%	22	22	1.8%	39	42	8.5%	-	-	-
South America	136	237	74.3%	16	17	3.9%	-	-	-	-	-	-
USA	8,304	8,433	1.5%	1,318	1,300	-1.4%	39	38	-3.2%	1	1	-3.2%

Volumes in metric tons (mT)

Concentrates

Value, by Region and Application

	Dietary Supplements			Pharmaceuticals			Clinical Nutrition			Food and Beverage		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	\$4.7	\$6.5	39.1%	\$1.3	\$1.4	3.1%	-	-	-	-	-	-
Canada	\$24.9	\$33.2	33.5%	-	-	-	\$4.4	\$5.0	13.0%	-	-	-
China	\$50.1	\$59.3	18.4%	-	-	-	-	-	-	-	-	-
Europe	\$83.2	\$107.3	28.9%	\$27.6	\$28.4	3.0%	\$3.5	\$3.9	11.0%	-	-	-
Japan	\$14.4	\$20.0	38.4%	\$61.5	\$61.4	-0.3%	\$2.3	\$2.6	15.0%	-	-	-
Mexico	\$1.4	\$3.3	134.5%	\$1.3	\$1.4	9.2%	-	-	-	-	-	-
Rest of the World	\$3.9	\$5.6	42.3%	\$2.0	\$2.1	5.0%	\$2.2	\$2.5	16.6%	-	-	-
Asia-Pacific	\$27.9	\$24.4	-12.8%	\$11.8	\$11.9	0.9%	\$1.6	\$1.9	18.9%	-	-	-
Rest of Asia	\$23.6	\$32.3	37.3%	\$1.2	\$1.2	1.7%	\$0.7	\$0.8	19.7%	-	-	-
South America	\$2.5	\$6.2	148.4%	\$0.9	\$2.6	186.7%	-	-	-	-	-	-
USA	\$167.9	\$235.7	40.4%	\$189.9	\$178.5	-6.0%	\$0.7	\$0.8	5.4%	< 0.1	< 0.1	-

Values in millions of US dollars (MM US\$)

Volume of 30-60% Concentrate by Region and Application

Total

	Dietary Supplements			Clinical Nutrition			Food and Beverage		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	240	247	3.1%	-	-	-	-	-	-
Canada	414	426	2.9%	298	309	3.4%	-	-	-
China	2,301	2,553	10.9%	-	-	-	-	-	-
Europe	2,639	2,711	2.7%	219	222	1.4%	-	-	-
Japan	688	704	2.2%	147	155	5.5%	-	-	-
Mexico	56	96	71.0%	-	-	-	-	-	-
Rest of the World	140	153	8.8%	123	131	6.5%	-	-	-
Asia-Pacific	1,237	982	-20.6%	115	125	8.6%	-	-	-
Rest of Asia	1,089	1,175	7.9%	39	42	8.5%	-	-	-
South America	73	82	12.9%	-	-	-	-	-	-
USA	4,869	4,892	0.5%	39	38	-3.2%	1	1	-3.2%

Volumes in metric tons (mT)

Volume of 30-60% Concentrate by Region and Application

Ethyl ester

	Dietary Supplements			Clinical Nutrition			Food and Beverage		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	-	-	-	-	-	-	-	-	-
Canada	343	353	2.9%	298	309	3.4%	-	-	-
China	1,750	1,956	11.8%	-	-	-	-	-	-
Europe	1,115	1,134	1.7%	219	222	1.4%	-	-	-
Japan	-	-	-	147	155	5.5%	-	-	-
Mexico	54	94	74.1%	-	-	-	-	-	-
Rest of the World	105	115	9.8%	123	131	6.5%	-	-	-
Asia-Pacific	810	638	-21.2%	115	125	8.6%	-	-	-
Rest of Asia	954	1,032	8.1%	39	42	8.5%	-	-	-
South America	37	45	21.9%	-	-	-	-	-	-
USA	3,769	3,777	0.2%	39	38	-3.2%	1	1	-3.2%

Volumes in metric tons (mT)

Reesterified triglyceride

	Dietary Supplements		
	2022	2023	Change
Australasia	240	247	3.1%
Canada	71	72	2.7%
China	551	596	8.2%
Europe	1,523	1,576	3.5%
Japan	688	704	2.2%
Mexico	2	3	4.4%
Rest of the World	35	37	5.7%
Asia-Pacific	427	344	-19.4%
Rest of Asia	134	143	6.4%
South America	35	37	3.5%
USA	1,099	1,115	1.4%

Volumes in metric tons (mT)

Value of 30-60% Concentrate by Region and Application

Total

	Dietary Supplements			Clinical Nutrition			Food and Beverage		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	\$3.1	\$4.3	39.7%	-	-	-	-	-	-
Canada	\$4.7	\$6.1	31.8%	\$4.4	\$5.0	13.0%	-	-	-
China	\$27.1	\$32.8	20.7%	-	-	-	-	-	-
Europe	\$38.6	\$53.9	39.8%	\$3.5	\$3.9	11.0%	-	-	-
Japan	\$8.8	\$12.2	38.3%	\$2.3	\$2.6	15.0%	-	-	-
Mexico	\$0.6	\$1.4	117.5%	-	-	-	-	-	-
Rest of the World	\$1.7	\$2.3	39.8%	\$2.2	\$2.5	16.6%	-	-	-
Asia-Pacific	\$14.8	\$12.8	-13.3%	\$1.6	\$1.9	18.9%	-	-	-
Rest of Asia	\$12.0	\$16.6	37.7%	\$0.7	\$0.8	19.7%	-	-	-
South America	\$0.9	\$1.3	47.1%	-	-	-	-	-	-
USA	\$59.3	\$84.2	42.1%	\$0.7	\$0.8	5.4%	< 0.1	< 0.1	-

Values in millions of US dollars (MM US\$)

Value of 30-60% Concentrate by Region and Application

Ethyl ester

	Dietary Supplements			Clinical Nutrition			Food and Beverage		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	-	-	-	-	-	-	-	-	-
Canada	\$3.7	\$4.8	30.1%	\$4.4	\$5.0	13.0%	-	-	-
China	\$20.1	\$24.4	21.3%	-	-	-	-	-	-
Europe	\$16.3	\$20.4	25.6%	\$3.5	\$3.9	11.0%	-	-	-
Japan	-	-	-	\$2.3	\$2.6	15.0%	-	-	-
Mexico	\$0.6	\$1.3	120.0%	-	-	-	-	-	-
Rest of the World	\$1.1	\$1.6	38.3%	\$2.2	\$2.5	16.6%	-	-	-
Asia-Pacific	\$9.3	\$8.0	-14.5%	\$1.6	\$1.9	18.9%	-	-	-
Rest of Asia	\$10.3	\$14.1	36.6%	\$0.7	\$0.8	19.7%	-	-	-
South America	\$0.4	\$0.7	54.8%	-	-	-	-	-	-
USA	\$43.3	\$60.7	40.3%	\$0.7	\$0.8	5.4%	< 0.1	< 0.1	-

Values in millions of US dollars (MM US\$)

Reesterified triglyceride

	Dietary Supplements		
	2022	2023	Change
Australasia	\$3.1	\$4.3	39.7%
Canada	\$1.0	\$1.3	38.5%
China	\$7.0	\$8.3	18.9%
Europe	\$22.3	\$33.5	50.1%
Japan	\$8.8	\$12.2	38.3%
Mexico	< 0.1	< 0.1	66.7%
Rest of the World	\$0.5	\$0.7	43.1%
Asia-Pacific	\$5.4	\$4.8	-11.4%
Rest of Asia	\$1.7	\$2.4	44.0%
South America	\$0.4	\$0.6	40.0%
USA	\$16.0	\$23.5	47.0%

Values in millions of US dollars (MM US\$)

Volume of 61-80% Concentrate by Region and Application

<i>Total</i>				<i>Ethyl ester</i>				<i>Reesterified triglyceride</i>			
				<i>Dietary Supplements</i>				<i>Dietary Supplements</i>			
	2022	2023	Change		2022	2023	Change		2022	2023	Change
Australasia	53	54	1.9%	Australasia	-	-	-	Australasia	53	54	1.9%
Canada	863	908	5.3%	Canada	810	851	5.0%	Canada	53	58	9.1%
China	665	702	5.6%	China	474	497	4.9%	China	191	204	7.2%
Europe	1,319	1,357	2.9%	Europe	879	906	3.1%	Europe	440	451	2.4%
Japan	183	187	2.5%	Japan	-	-	-	Japan	183	187	2.5%
Mexico	28	55	98.4%	Mexico	26	53	104.1%	Mexico	2	2	8.0%
Rest of the World	85	94	10.5%	Rest of the World	53	58	10.1%	Rest of the World	32	35	11.1%
Asia-Pacific	501	403	-19.6%	Asia-Pacific	348	276	-20.8%	Asia-Pacific	153	127	-17.0%
Rest of Asia	478	512	7.1%	Rest of Asia	418	448	7.1%	Rest of Asia	60	64	7.5%
South America	63	155	144.6%	South America	60	152	151.0%	South America	3	3	9.1%
USA	2,891	2,968	2.7%	USA	2,546	2,605	2.3%	USA	345	363	5.5%

Volumes in metric tons (mT)

Volumes in metric tons (mT)

Volumes in metric tons (mT)

Value of 61-80% Concentrate by Region and Application

Total				Ethyl ester			Reesterified triglyceride						
	Dietary Supplements			Dietary Supplements			Dietary Supplements						
	2022	2023	Change		2022	2023	Change		2022	2023	Change		
Australasia	\$1.6	\$2.2	38.0%	Australasia		-	-	Australasia		\$1.6	\$2.2	38.0%	
Canada	\$20.2	\$27.1	33.9%	Canada		\$18.6	\$24.7	32.7%	Canada		\$1.6	\$2.4	47.2%
China	\$16.8	\$19.4	15.2%	China		\$11.0	\$12.5	13.8%	China		\$5.8	\$6.8	17.9%
Europe	\$41.9	\$50.8	21.3%	Europe		\$28.4	\$32.0	12.8%	Europe		\$13.5	\$18.8	39.1%
Japan	\$5.6	\$7.8	38.7%	Japan		-	-	-	Japan		\$5.6	\$7.8	38.7%
Mexico	\$0.8	\$1.9	148.7%	Mexico		\$0.7	\$1.8	156.3%	Mexico		<0.1	<0.1	40.0%
Rest of the World	\$2.3	\$3.3	44.2%	Rest of the World		\$1.3	\$1.8	39.1%	Rest of the World		\$1.0	\$1.5	51.0%
Asia-Pacific	\$13.2	\$11.6	-12.1%	Asia-Pacific		\$8.5	\$7.3	-14.1%	Asia-Pacific		\$4.7	\$4.3	-8.7%
Rest of Asia	\$11.5	\$15.8	36.9%	Rest of Asia		\$9.7	\$13.1	35.2%	Rest of Asia		\$1.8	\$2.7	45.7%
South America	\$1.6	\$4.9	202.5%	South America		\$1.5	\$4.7	217.4%	South America		\$0.1	\$0.2	42.9%
USA	\$69.1	\$97.5	41.1%	USA		\$58.6	\$82.2	40.2%	USA		\$10.5	\$15.4	46.6%

Values in millions of US dollars (MM US\$)

Values in millions of US dollars (MM US\$)

Values in millions of US dollars (MM US\$)

Volume of 81-90% Concentrate by Region and Application

Total

	Dietary Supplements			Pharmaceuticals		
	2022	2023	Change	2022	2023	Change
Australasia	-	-	-	22	22	2.9%
Canada	-	-	-	-	-	-
China	88	92	3.7%	-	-	-
Europe	29	31	3.9%	444	438	-1.3%
Japan	-	-	-	320	321	0.2%
Mexico	-	-	-	20	21	3.7%
Rest of the World	-	-	-	36	38	5.1%
Asia-Pacific	-	-	-	196	197	0.9%
Rest of Asia	-	-	-	22	22	1.8%
South America	-	-	-	16	17	3.9%
USA	509	534	5.0%	483	483	-0.2%

Volumes in metric tons (mT)

Volume of 81-90% Concentrate by Region and Application

Ethyl ester

	Dietary Supplements			Pharmaceuticals		
	2022	2023	Change	2022	2023	Change
Australasia	-	-	-	22	22	2.9%
Canada	-	-	-	-	-	-
China	88	92	3.7%	-	-	-
Europe	29	31	3.9%	444	438	-1.3%
Japan	-	-	-	320	321	0.2%
Mexico	-	-	-	20	21	3.7%
Rest of the World	-	-	-	36	38	5.1%
Asia-Pacific	-	-	-	196	197	0.9%
Rest of Asia	-	-	-	22	22	1.8%
South America	-	-	-	16	17	3.9%
USA	278	287	3.2%	483	483	-0.2%

Volumes in metric tons (mT)

Reesterified triglyceride

	Dietary Supplements		
	2022	2023	Change
Australasia	-	-	-
Canada	-	-	-
China	-	-	-
Europe	-	-	-
Japan	-	-	-
Mexico	-	-	-
Rest of the World	-	-	-
Asia-Pacific	-	-	-
Rest of Asia	-	-	-
South America	-	-	-
USA	231	247	7.1%

Volumes in metric tons (mT)

Value of 81-90% Concentrate by Region and Application

Total

	Dietary Supplements			Pharmaceuticals		
	2022	2023	Change	2022	2023	Change
Australasia	-	-	-	\$1.3	\$1.4	3.1%
Canada	-	-	-	-	-	-
China	\$5.2	\$5.9	12.5%	-	-	-
Europe	\$2.8	\$2.6	-6.8%	\$25.4	\$25.1	-1.3%
Japan	-	-	-	\$18.0	\$18.1	0.2%
Mexico	-	-	-	\$1.3	\$1.4	9.2%
Rest of the World	-	-	-	\$2.0	\$2.1	5.0%
Asia-Pacific	-	-	-	\$11.8	\$11.9	0.9%
Rest of Asia	-	-	-	\$1.2	\$1.2	1.7%
South America	-	-	-	\$0.9	\$2.6	186.7%
USA	\$37.4	\$51.0	36.5%	\$26.9	\$26.9	-0.2%

Values in millions of US dollars (MM US\$)

Value of 81-90% Concentrate by Region and Application

Ethyl ester

	Dietary Supplements			Pharmaceuticals		
	2022	2023	Change	2022	2023	Change
Australasia	-	-	-	\$1.3	\$1.4	3.1%
Canada	-	-	-	-	-	-
China	\$5.2	\$5.9	12.5%	-	-	-
Europe	\$2.8	\$2.6	-6.8%	\$25.4	\$25.1	-1.3%
Japan	-	-	-	\$18.0	\$18.1	0.2%
Mexico	-	-	-	\$1.3	\$1.4	9.2%
Rest of the World	-	-	-	\$2.0	\$2.1	5.0%
Asia-Pacific	-	-	-	\$11.8	\$11.9	0.9%
Rest of Asia	-	-	-	\$1.2	\$1.2	1.7%
South America	-	-	-	\$0.9	\$2.6	186.7%
USA	\$15.4	\$21.1	37.2%	\$26.9	\$26.9	-0.2%

Values in millions of US dollars (MM US\$)

Reesterified triglyceride

	Dietary Supplements		
	2022	2023	Change
Australasia	-	-	-
Canada	-	-	-
China	-	-	-
Europe	-	-	-
Japan	-	-	-
Mexico	-	-	-
Rest of the World	-	-	-
Asia-Pacific	-	-	-
Rest of Asia	-	-	-
South America	-	-	-
USA	\$21.9	\$29.8	36.0%

Values in millions of US dollars (MM US\$)

Volume of 91-100% Concentrate by Region and Application

Total (all ethyl ester)

	Dietary Supplements			Pharmaceuticals		
	2022	2023	Change	2022	2023	Change
Australasia	-	-	-	-	-	-
Canada	-	-	-	-	-	-
China	18	18	-	-	-	-
Europe	-	-	-	11	18	65.0%
Japan	-	-	-	485	483	-0.4%
Mexico	-	-	-	-	-	-
Rest of the World	-	-	-	-	-	-
Asia-Pacific	-	-	-	-	-	-
Rest of Asia	-	-	-	-	-	-
South America	-	-	-	-	-	-
USA	36	39	7.5%	835	817	-2.1%

Volumes in metric tons (mT)

Value of 91-100% Concentrate by Region and Application

Total (all ethyl ester)

	Dietary Supplements			Pharmaceuticals		
	2022	2023	Change	2022	2023	Change
Australasia	-	-	-	-	-	-
Canada	-	-	-	-	-	-
China	\$1.0	\$1.3	39.6%	-	-	-
Europe	-	-	-	\$2.2	\$3.3	53.5%
Japan	-	-	-	\$43.5	\$43.3	-0.4%
Mexico	-	-	-	-	-	-
Rest of the World	-	-	-	-	-	-
Asia-Pacific	-	-	-	-	-	-
Rest of Asia	-	-	-	-	-	-
South America	-	-	-	-	-	-
USA	\$2.1	\$3.0	38.8%	\$163.0	\$151.6	-7.0%

Values in millions of US dollars (MM US\$)

Common Refined

Volume, by Region and Application

	Dietary Supplements			Food and Beverage			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	1,148	1,144	-0.3%	6	6	-3.5%	15	15	3.2%
Canada	1,290	1,260	-2.3%	140	143	2.0%	32	34	6.5%
China	5,455	5,918	8.5%	270	281	4.0%	-	-	-
Europe	3,905	3,405	-12.8%	494	506	2.3%	370	384	3.7%
Japan	1,801	1,819	1.0%	1,641	1,703	3.8%	74	77	4.2%
Mexico	1,841	1,872	1.7%	10	10	1.0%	15	16	8.0%
Rest of the World	1,099	1,112	1.2%	67	71	6.2%	15	15	4.1%
Asia-Pacific	6,136	5,848	-4.7%	126	133	5.8%	6	6	5.3%
Rest of Asia	1,862	1,918	3.0%	39	41	5.8%	1	1	1.4%
South America	2,752	2,816	2.3%	17	18	6.5%	8	8	5.2%
USA	9,019	8,216	-8.9%	699	670	-4.2%	269	284	5.8%

Volumes in metric tons (mT)

Common Refined

Value, by Region and Application

	Dietary Supplements			Food and Beverage			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	\$6.5	\$10.1	54.6%	< 0.1	< 0.1	20.0%	\$0.1	\$0.1	-
Canada	\$7.2	\$10.9	51.4%	\$0.9	\$1.9	125.6%	\$0.3	\$0.4	33.3%
China	\$32.0	\$46.6	45.6%	\$2.4	\$3.2	31.5%	-	-	-
Europe	\$23.3	\$31.5	35.3%	\$3.4	\$5.3	59.1%	\$2.7	\$4.2	55.4%
Japan	\$9.9	\$11.9	20.5%	\$11.4	\$15.1	32.2%	\$0.8	\$1.0	33.3%
Mexico	\$10.9	\$17.2	57.6%	\$0.1	\$0.1	-14.3%	\$0.2	\$0.2	11.1%
Rest of the World	\$6.5	\$10.2	56.9%	\$0.5	\$0.8	61.7%	\$0.1	\$0.2	6.7%
Asia-Pacific	\$34.5	\$52.2	51.3%	\$0.8	\$1.4	75.9%	< 0.1	< 0.1	40.0%
Rest of Asia	\$10.7	\$17.1	59.7%	\$0.3	\$0.4	37.5%	< 0.1	< 0.1	100.0%
South America	\$15.7	\$24.9	58.6%	\$0.2	\$0.2	37.5%	< 0.1	\$0.1	11.1%
USA	\$53.1	\$95.9	80.7%	\$4.8	\$9.1	90.4%	\$1.8	\$3.8	109.5%

Values in millions of US dollars (MM US\$)

Algae

Volume, by Region and Application

	Infant Formula			Dietary Supplements			Food and Beverage			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	10	10	1.0%	6	6	1.7%	13	14	3.2%	-	-	-
Canada	8	8	0.3%	10	10	6.8%	18	19	5.7%	-	-	-
China	1,089	1,158	6.4%	28	30	6.0%	176	183	4.3%	-	-	-
Europe	117	118	1.2%	361	388	7.6%	344	354	2.9%	-	-	-
Japan	-	-	-	2	2	-4.8%	13	13	0.8%	-	-	-
Mexico	5	5	4.9%	-	-	-	75	81	8.5%	-	-	-
Rest of the World	-	-	-	<1	<1	-	4	4	1.9%	-	-	-
Asia-Pacific	436	468	7.3%	150	151	0.6%	238	252	6.0%	-	-	-
Rest of Asia	21	22	4.0%	2	3	4.0%	50	54	8.1%	-	-	-
South America	43	44	2.3%	2	2	5.7%	96	105	9.3%	-	-	-
USA	902	915	1.4%	651	709	8.9%	455	461	1.3%	2	2	5.8%

Volumes in metric tons (mT)

Algae

Value, by Region and Application

	Infant Formula			Dietary Supplements			Food and Beverage			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	\$0.4	\$0.4	-2.4%	\$0.4	\$0.4	-5.0%	\$0.7	\$0.7	-5.4%	-	-	-
Canada	\$0.3	\$0.3	-3.2%	\$0.7	\$0.6	-1.5%	\$1.0	\$1.0	-2.0%	-	-	-
China	\$44.9	\$46.4	3.3%	\$1.9	\$1.9	-2.1%	\$9.8	\$9.5	-3.8%	-	-	-
Europe	\$4.8	\$4.7	-1.9%	\$24.5	\$24.3	-0.7%	\$19.2	\$18.3	-5.0%	-	-	-
Japan	-	-	-	\$0.1	\$0.1	-15.4%	\$0.7	\$0.7	-6.9%	-	-	-
Mexico	\$0.2	\$0.2	5.3%	-	-	-	\$4.2	\$4.2	0.2%	-	-	-
Rest of the World	-	-	-	< 0.1	< 0.1	-	\$0.2	\$0.2	-4.8%	-	-	-
Asia-Pacific	\$18.0	\$18.7	4.2%	\$10.2	\$9.5	-7.1%	\$13.3	\$13.0	-2.2%	-	-	-
Rest of Asia	\$0.9	\$0.9	1.1%	\$0.2	\$0.2	-5.9%	\$2.8	\$2.8	-0.4%	-	-	-
South America	\$1.8	\$1.8	-0.6%	\$0.1	\$0.1	-	\$5.4	\$5.4	0.9%	-	-	-
USA	\$37.2	\$36.6	-1.6%	\$44.2	\$44.4	0.5%	\$25.5	\$23.8	-6.5%	\$0.1	\$0.1	-

Values in millions of US dollars (MM US\$)

Tuna

Volume, by Region and Application

	Infant Formula			Food and Beverage			Dietary Supplements		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	14	14	3.0%	7	7	3.7%	6	6	1.9%
Canada	12	12	3.4%	-	-	-	29	30	2.4%
China	982	1,017	3.6%	102	108	5.8%	97	101	3.7%
Europe	857	884	3.2%	12	12	1.9%	65	66	1.2%
Japan	79	80	1.2%	214	233	8.9%	245	254	3.4%
Rest of the World	263	274	4.2%	24	25	4.3%	34	35	5.3%
Asia-Pacific	1,228	1,281	4.3%	51	54	5.0%	89	90	1.2%
USA	97	99	2.1%	30	29	-2.6%	101	100	-1.0%

Volumes in metric tons (mT)

Tuna

Value, by Region and Application

	Infant Formula			Food and Beverage			Dietary Supplements		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	\$0.4	\$0.4	7.5%	\$0.3	\$0.3	10.0%	< 0.1	< 0.1	-
Canada	\$0.3	\$0.4	8.6%	-	-	-	\$0.4	\$0.4	7.7%
China	\$28.6	\$30.9	8.2%	\$4.6	\$5.1	10.7%	\$1.3	\$1.4	8.3%
Europe	\$25.0	\$26.9	7.8%	\$0.5	\$0.6	5.7%	\$0.9	\$0.9	4.5%
Japan	\$2.3	\$2.4	5.6%	\$9.7	\$11.0	14.0%	\$3.3	\$3.6	7.8%
Rest of the World	\$7.7	\$8.3	8.8%	\$1.1	\$1.2	8.3%	\$0.5	\$0.5	8.7%
Asia-Pacific	\$35.8	\$38.9	8.9%	\$2.3	\$2.5	9.5%	\$1.2	\$1.3	5.8%
USA	\$2.8	\$3.0	6.7%	\$1.4	\$1.4	1.5%	\$1.4	\$1.4	2.9%

Values in millions of US dollars (MM US\$)

Miscellaneous Pet Food

Volume, by Region and Application

	Pet Nutrition		
	2022	2023	Change
Canada	408	433	6.1%
China	1,206	1,473	22.1%
Europe	10,864	11,211	3.2%
South America	702	754	7.4%
USA	8,545	8,887	4.0%

Volumes in metric tons (mT)

Value, by Region and Application

	Pet Nutrition		
	2022	2023	Change
Canada	\$1.4	\$2.3	66.9%
China	\$4.0	\$7.7	94.7%
Europe	\$36.3	\$58.9	62.2%
South America	\$2.3	\$4.0	69.2%
USA	\$28.6	\$46.7	63.4%

Values in millions of US dollars (MM US\$)

Krill

Volume, by Region and Application

	Dietary Supplements		
	2022	2023	Change
Australasia	75	77	3.0%
Canada	50	50	1.7%
China	54	126	134.0%
Europe	127	130	2.9%
Japan	14	14	2.8%
Mexico	9	13	42.5%
Rest of the World	30	31	4.0%
Asia-Pacific	85	88	3.0%
Rest of Asia	34	34	1.3%
South America	8	8	4.2%
USA	347	364	5.1%

Volumes in metric tons (mT)

Value, by Region and Application

	Dietary Supplements		
	2022	2023	Change
Australasia	\$7.4	\$7.7	3.0%
Canada	\$6.2	\$6.3	1.8%
China	\$3.5	\$9.2	158.0%
Europe	\$12.6	\$13.0	2.9%
Japan	\$1.4	\$1.4	3.0%
Mexico	\$0.9	\$1.3	42.9%
Rest of the World	\$3.0	\$3.1	4.0%
Asia-Pacific	\$8.5	\$8.8	3.0%
Rest of Asia	\$3.4	\$3.5	1.2%
South America	\$0.8	\$0.8	3.8%
USA	\$34.8	\$36.6	5.1%

Values in millions of US dollars (MM US\$)

Salmon

Volume, by Region and Application

	Dietary Supplements			Pet Nutrition			Food and Beverage		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	21	22	1.0%	-	-	-	-	-	-
Canada	211	216	2.1%	55	56	1.9%	-	-	-
China	66	73	10.8%	43	42	-2.8%	-	-	-
Europe	611	631	3.3%	1,523	1,528	0.3%	42	41	-2.0%
Japan	71	73	2.6%	-	-	-	-	-	-
Mexico	12	12	2.8%	-	-	-	-	-	-
Rest of the World	47	49	3.0%	-	-	-	-	-	-
Asia-Pacific	449	463	3.2%	-	-	-	10	10	2.1%
South America	-	-	-	102	111	8.5%	-	-	-
USA	633	647	2.3%	1,508	1,493	-1.0%	37	39	6.2%

Volumes in metric tons (mT)

Salmon

Value, by Region and Application

	Dietary Supplements			Pet Nutrition			Food and Beverage		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Australasia	\$0.1	\$0.1	40.0%	-	-	-	-	-	-
Canada	\$1.5	\$2.1	38.0%	\$0.4	\$0.7	62.5%	-	-	-
China	\$0.8	\$1.1	41.2%	\$0.3	\$0.5	53.3%	-	-	-
Europe	\$10.8	\$14.9	38.5%	\$10.6	\$16.9	59.4%	\$0.8	\$1.0	31.2%
Japan	\$1.2	\$1.6	37.5%	-	-	-	-	-	-
Mexico	\$0.2	\$0.3	40.0%	-	-	-	-	-	-
Rest of the World	\$0.8	\$1.1	37.5%	-	-	-	-	-	-
Asia-Pacific	\$8.2	\$11.4	38.2%	-	-	-	\$0.2	\$0.3	35.0%
South America	-	-	-	\$0.9	\$1.5	73.3%	-	-	-
USA	\$8.5	\$11.7	37.2%	\$10.6	\$16.7	57.5%	\$0.6	\$0.8	41.7%

Values in millions of US dollars (MM US\$)

Cod Liver

Volume, by Region and Application

	Dietary Supplements			Food and Beverage		
	2022	2023	Change	2022	2023	Change
Australasia	93	121	29.8%	-	-	-
Canada	58	48	-17.0%	-	-	-
China	206	265	28.8%	-	-	-
Europe	4,813	4,599	-4.4%	79	80	1.9%
Japan	15	19	26.9%	-	-	-
Mexico	166	123	-26.0%	-	-	-
Rest of the World	125	262	109.3%	-	-	-
Asia-Pacific	117	127	8.4%	-	-	-
Rest of Asia	200	298	49.1%	-	-	-
South America	242	131	-45.9%	-	-	-
USA	823	718	-12.7%	93	94	1.3%

Volumes in metric tons (mT)

Value, by Region and Application

	Dietary Supplements			Food and Beverage		
	2022	2023	Change	2022	2023	Change
Australasia	\$1.0	\$1.3	30.6%	-	-	-
Canada	\$0.5	\$0.6	23.7%	-	-	-
China	\$1.9	\$2.5	32.9%	-	-	-
Europe	\$38.4	\$50.2	30.8%	\$0.6	\$0.9	40.1%
Japan	< 0.1	\$0.1	56.0%	-	-	-
Mexico	\$1.3	\$1.7	30.0%	-	-	-
Rest of the World	\$0.8	\$2.6	236.5%	-	-	-
Asia-Pacific	\$1.5	\$1.6	7.5%	-	-	-
Rest of Asia	\$1.9	\$3.2	70.1%	-	-	-
South America	\$1.6	\$1.0	-32.5%	-	-	-
USA	\$10.8	\$9.8	-9.3%	\$1.2	\$1.3	5.4%

Values in millions of US dollars (MM US\$)

Menhaden

Volume, by Region and Application

	Pet Nutrition			Food and Beverage			Dietary Supplements		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Europe	1,441	1,457	1.1%	27	26	-5.4%	12	11	-5.3%
USA	8,799	9,168	4.2%	155	150	-3.1%	67	66	-2.9%

Volumes in metric tons (mT)

Value, by Region and Application

	Pet Nutrition			Food and Beverage			Dietary Supplements		
	2022	2023	Change	2022	2023	Change	2022	2023	Change
Europe	\$3.2	\$5.5	71.4%	\$0.1	\$0.2	60.0%	< 0.1	< 0.1	50.0%
USA	\$19.2	\$33.9	76.7%	\$0.5	\$0.8	63.5%	\$0.2	\$0.3	61.9%

Values in millions of US dollars (MM US\$)

Mussel

Volume, by Region and Application

	Dietary Supplements		
	2022	2023	Change
Australasia	1	1	3.7%
China	<1	<1	2.5%
Europe	1	1	3.0%
Japan	3	3	4.2%
Asia-Pacific	2	2	4.6%
USA	5	5	5.0%

Volumes in metric tons (mT)

Value, by Region and Application

	Dietary Supplements		
	2022	2023	Change
Australasia	\$2.2	\$2.3	2.7%
China	\$1.7	\$1.7	1.2%
Europe	\$2.8	\$2.9	2.1%
Japan	\$6.5	\$6.7	3.1%
Asia-Pacific	\$4.6	\$4.8	4.2%
USA	\$10.0	\$10.4	4.1%

Values in millions of US dollars (MM US\$)

Squid

Volume, by Region and Application

	Dietary Supplements			Food and Beverage		
	2022	2023	Change	2022	2023	Change
Europe	277	320	15.3%	11	12	1.8%
USA	720	766	6.5%	-	-	-

Volumes in metric tons (mT)

Value, by Region and Application

	Dietary Supplements			Food and Beverage		
	2022	2023	Change	2022	2023	Change
Europe	\$3.3	\$3.8	13.3%	\$0.1	\$0.1	-
USA	\$9.2	\$9.7	5.3%	-	-	-

Values in millions of US dollars (MM US\$)

Calanus

Volume, by Region and Application

	Dietary Supplements		
	2022	2023	Change
Europe	15	17	12.7%
USA	12	14	12.0%

Volumes in metric tons (mT)

Value, by Region and Application

	Dietary Supplements		
	2022	2023	Change
Europe	\$4.1	\$4.6	12.4%
USA	\$3.4	\$3.8	11.2%

Values in millions of US dollars (MM US\$)

Pollock

Volume, by Region and Application

Dietary Supplements			
	2022	2023	Change
USA	100	102	2.5%

Volumes in metric tons (mT)

Value, by Region and Application

Dietary Supplements			
	2022	2023	Change
USA	\$0.4	\$0.5	27.5%

Values in millions of US dollars (MM US\$)

Hoki

Volume, by Region and Application

	Dietary Supplements		
	2022	2023	Change
Australasia	13	13	-6.2%
China	8	7	-6.4%
Europe	30	28	-6.1%
USA	41	38	-6.3%

Volumes in metric tons (mT)

Value, by Region and Application

	Dietary Supplements		
	2022	2023	Change
Australasia	< 0.1	< 0.1	-11.1%
China	< 0.1	< 0.1	-
Europe	\$0.2	\$0.2	-5.6%
USA	\$0.2	\$0.2	-11.1%

Values in millions of US dollars (MM US\$)

Geographies

USA

Volume, by Source and Application

	Dietary Supplements			Pharmaceuticals			Pet Nutrition			Infant Formula			Food and Beverage			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Calanus	12	14	12.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cod Liver	823	718	-12.7%	-	-	-	-	-	-	-	-	-	93	94	1.3%	-	-	-
Common Refined	9,019	8,216	-8.9%	-	-	-	-	-	-	-	-	-	699	670	-4.2%	269	284	5.8%
Concentrates	8,304	8,433	1.5%	1,318	1,300	-1.4%	-	-	-	-	-	-	1	1	-3.2%	39	38	-3.2%
Hoki	41	38	-6.3%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Krill	347	364	5.1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Menhaden	67	66	-2.9%	-	-	-	8,799	9,168	4.2%	-	-	-	155	150	-3.1%	-	-	-
Mussel	5	5	5.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pollock	100	102	2.5%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	633	647	2.3%	-	-	-	1,508	1,493	-1.0%	-	-	-	37	39	6.2%	-	-	-
Algae	651	709	8.9%	-	-	-	-	-	-	902	915	1.4%	455	461	1.3%	2	2	5.8%
Squid	720	766	6.5%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuna	101	100	-1.0%	-	-	-	-	-	-	97	99	2.1%	30	29	-2.6%	-	-	-
Miscellaneous Pet Food	-	-	-	-	-	-	8,545	8,887	4.0%	-	-	-	-	-	-	-	-	-

Volumes in metric tons (mT)

USA

Value, by Region and Application

	Dietary Supplements			Pharmaceuticals			Pet Nutrition			Infant Formula			Food and Beverage			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Calanus	\$3.4	\$3.8	11.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cod Liver	\$10.8	\$9.8	-9.3%	-	-	-	-	-	-	-	-	-	\$1.2	\$1.3	5.4%	-	-	-
Common Refined	\$53.1	\$95.9	80.7%	-	-	-	-	-	-	-	-	-	\$4.8	\$9.1	90.4%	\$1.8	\$3.8	109.5%
Concentrates	\$167.9	\$235.7	40.4%	\$189.9	\$178.5	-6.0%	-	-	-	-	-	-	<0.1	<0.1	-	\$0.7	\$0.8	5.4%
Hoki	\$0.2	\$0.2	-11.1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Krill	\$34.8	\$36.6	5.1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Menhaden	\$0.2	\$0.3	61.9%	-	-	-	\$19.2	\$33.9	76.7%	-	-	-	\$0.5	\$0.8	63.5%	-	-	-
Mussel	\$10.0	\$10.4	4.1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pollock	\$0.4	\$0.5	27.5%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	\$8.5	\$11.7	37.2%	-	-	-	\$10.6	\$16.7	57.5%	-	-	-	\$0.6	\$0.8	41.7%	-	-	-
Algae	\$44.2	\$44.4	0.5%	-	-	-	-	-	-	\$37.2	\$36.6	-1.6%	\$25.5	\$23.8	-6.5%	\$0.1	\$0.1	-
Squid	\$9.2	\$9.7	5.3%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuna	\$1.4	\$1.4	2.9%	-	-	-	-	-	-	\$2.8	\$3.0	6.7%	\$1.4	\$1.4	1.5%	-	-	-
Miscellaneous Pet Food	-	-	-	-	-	-	\$28.6	\$46.7	63.4%	-	-	-	-	-	-	-	-	-

Values in millions of US dollars (MM US\$)

Europe

Volume, by Source and Application

	Dietary Supplements			Pet Nutrition			Infant Formula			Pharmaceuticals			Food and Beverage			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Calanus	15	17	12.7%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cod Liver	4,813	4,599	-4.4%	-	-	-	-	-	-	-	-	-	79	80	1.9%	-	-	-
Common Refined	3,905	3,405	-12.8%	-	-	-	-	-	-	-	-	-	494	506	2.3%	370	384	3.7%
Concentrates	3,987	4,098	2.8%	-	-	-	-	-	-	455	456	0.3%	-	-	-	219	222	1.4%
Hoki	30	28	-6.1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Krill	127	130	2.9%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Menhaden	12	11	-5.3%	1,441	1,457	1.1%	-	-	-	-	-	-	27	26	-5.4%	-	-	-
Mussel	1	1	3.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	611	631	3.3%	1,523	1,528	0.3%	-	-	-	-	-	-	42	41	-2.0%	-	-	-
Algae	361	388	7.6%	-	-	-	117	118	1.2%	-	-	-	344	354	2.9%	-	-	-
Squid	277	320	15.3%	-	-	-	-	-	-	-	-	-	11	12	1.8%	-	-	-
Tuna	65	66	1.2%	-	-	-	857	884	3.2%	-	-	-	12	12	1.9%	-	-	-
Miscellaneous Pet Food	-	-	-	10,864	11,211	3.2%	-	-	-	-	-	-	-	-	-	-	-	-

Volumes in metric tons (mT)

Europe

Value, by Region and Application

	Dietary Supplements			Pet Nutrition			Infant Formula			Pharmaceuticals			Food and Beverage			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Calanus	\$4.1	\$4.6	12.4%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cod Liver	\$38.4	\$50.2	30.8%	-	-	-	-	-	-	-	-	-	\$0.6	\$0.9	40.1%	-	-	-
Common Refined	\$23.3	\$31.5	35.3%	-	-	-	-	-	-	-	-	-	\$3.4	\$5.3	59.1%	\$2.7	\$4.2	55.4%
Concentrates	\$83.2	\$107.3	28.9%	-	-	-	-	-	-	\$27.6	\$28.4	3.0%	-	-	-	\$3.5	\$3.9	11.0%
Hoki	\$0.2	\$0.2	-5.6%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Krill	\$12.6	\$13.0	2.9%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Menhaden	< 0.1	< 0.1	50.0%	\$3.2	\$5.5	71.4%	-	-	-	-	-	-	\$0.1	\$0.2	60.0%	-	-	-
Mussel	\$2.8	\$2.9	2.1%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	\$10.8	\$14.9	38.5%	\$10.6	\$16.9	59.4%	-	-	-	-	-	-	\$0.8	\$1.0	31.2%	-	-	-
Algae	\$24.5	\$24.3	-0.7%	-	-	-	\$4.8	\$4.7	-1.9%	-	-	-	\$19.2	\$18.3	-5.0%	-	-	-
Squid	\$3.3	\$3.8	13.3%	-	-	-	-	-	-	-	-	-	\$0.1	\$0.1	-	-	-	-
Tuna	\$0.9	\$0.9	4.5%	-	-	-	\$25.0	\$26.9	7.8%	-	-	-	\$0.5	\$0.6	5.7%	-	-	-
Miscellaneous Pet Food	-	-	-	\$36.3	\$58.9	62.2%	-	-	-	-	-	-	-	-	-	-	-	-

Values in millions of US dollars (MM US\$)

China

Volume, by Source and Application

	Dietary Supplements			Infant Formula			Food and Beverage			Pet Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	206	265	28.8%	-	-	-	-	-	-	-	-	-
Common Refined	5,455	5,918	8.5%	-	-	-	270	281	4.0%	-	-	-
Concentrates	3,072	3,364	9.5%	-	-	-	-	-	-	-	-	-
Hoki	8	7	-6.4%	-	-	-	-	-	-	-	-	-
Krill	54	126	134.0%	-	-	-	-	-	-	-	-	-
Mussel	<1	<1	2.5%	-	-	-	-	-	-	-	-	-
Salmon	66	73	10.8%	-	-	-	-	-	-	43	42	-2.8%
Algae	28	30	6.0%	1,089	1,158	6.4%	176	183	4.3%	-	-	-
Tuna	97	101	3.7%	982	1,017	3.6%	102	108	5.8%	-	-	-
Miscellaneous Pet Food	-	-	-	-	-	-	-	-	-	1,206	1,473	22.1%

Volumes in metric tons (mT)

China

Value, by Region and Application

	Dietary Supplements			Infant Formula			Food and Beverage			Pet Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	\$1.9	\$2.5	32.9%	-	-	-	-	-	-	-	-	-
Common Refined	\$32.0	\$46.6	45.6%	-	-	-	\$2.4	\$3.2	31.5%	-	-	-
Concentrates	\$50.1	\$59.3	18.4%	-	-	-	-	-	-	-	-	-
Hoki	< 0.1	< 0.1	-	-	-	-	-	-	-	-	-	-
Krill	\$3.5	\$9.2	158.0%	-	-	-	-	-	-	-	-	-
Mussel	\$1.7	\$1.7	1.2%	-	-	-	-	-	-	-	-	-
Salmon	\$0.8	\$1.1	41.2%	-	-	-	-	-	-	\$0.3	\$0.5	53.3%
Algae	\$1.9	\$1.9	-2.1%	\$44.9	\$46.4	3.3%	\$9.8	\$9.5	-3.8%	-	-	-
Tuna	\$1.3	\$1.4	8.3%	\$28.6	\$30.9	8.2%	\$4.6	\$5.1	10.7%	-	-	-
Miscellaneous Pet Food	-	-	-	-	-	-	-	-	-	\$4.0	\$7.7	94.7%

Values in millions of US dollars (MM US\$)

Asia-Pacific

Volume, by Source and Application

	Dietary Supplements			Infant Formula			Food and Beverage			Pharmaceuticals			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	117	127	8.4%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	6,136	5,848	-4.7%	-	-	-	126	133	5.8%	-	-	-	6	6	5.3%
Concentrates	1,738	1,385	-20.3%	-	-	-	-	-	-	196	197	0.9%	115	125	8.6%
Krill	85	88	3.0%	-	-	-	-	-	-	-	-	-	-	-	-
Mussel	2	2	4.6%	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	449	463	3.2%	-	-	-	10	10	2.1%	-	-	-	-	-	-
Algae	150	151	0.6%	436	468	7.3%	238	252	6.0%	-	-	-	-	-	-
Tuna	89	90	1.2%	1,228	1,281	4.3%	51	54	5.0%	-	-	-	-	-	-

Volumes in metric tons (mT)

Asia-Pacific

Value, by Region and Application

	Dietary Supplements			Infant Formula			Food and Beverage			Pharmaceuticals			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	\$1.5	\$1.6	7.5%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	\$34.5	\$52.2	51.3%	-	-	-	\$0.8	\$1.4	75.9%	-	-	-	<0.1	<0.1	40.0%
Concentrates	\$27.9	\$24.4	-12.8%	-	-	-	-	-	-	\$11.8	\$11.9	0.9%	\$1.6	\$1.9	18.9%
Krill	\$8.5	\$8.8	3.0%	-	-	-	-	-	-	-	-	-	-	-	-
Mussel	\$4.6	\$4.8	4.2%	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	\$8.2	\$11.4	38.2%	-	-	-	\$0.2	\$0.3	35.0%	-	-	-	-	-	-
Algae	\$10.2	\$9.5	-7.1%	\$18.0	\$18.7	4.2%	\$13.3	\$13.0	-2.2%	-	-	-	-	-	-
Tuna	\$1.2	\$1.3	5.8%	\$35.8	\$38.9	8.9%	\$2.3	\$2.5	9.5%	-	-	-	-	-	-

Values in millions of US dollars (MM US\$)

Japan

Volume, by Source and Application

	Pharmaceuticals			Dietary Supplements			Food and Beverage			Clinical Nutrition			Infant Formula		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	-	-	-	15	19	26.9%	-	-	-	-	-	-	-	-	-
Common Refined	-	-	-	1,801	1,819	1.0%	1,641	1,703	3.8%	74	77	4.2%	-	-	-
Concentrates	806	804	-0.2%	871	891	2.3%	-	-	-	147	155	5.5%	-	-	-
Krill	-	-	-	14	14	2.8%	-	-	-	-	-	-	-	-	-
Mussel	-	-	-	3	3	4.2%	-	-	-	-	-	-	-	-	-
Salmon	-	-	-	71	73	2.6%	-	-	-	-	-	-	-	-	-
Algae	-	-	-	2	2	-4.8%	13	13	0.8%	-	-	-	-	-	-
Tuna	-	-	-	245	254	3.4%	214	233	8.9%	-	-	-	79	80	1.2%

Volumes in metric tons (mT)

Japan

Value, by Region and Application

	Pharmaceuticals			Dietary Supplements			Food and Beverage			Clinical Nutrition			Infant Formula		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	-	-	-	< 0.1	\$0.1	56.0%	-	-	-	-	-	-	-	-	-
Common Refined	-	-	-	\$9.9	\$11.9	20.5%	\$11.4	\$15.1	32.2%	\$0.8	\$1.0	33.3%	-	-	-
Concentrates	\$61.5	\$61.4	-0.3%	\$14.4	\$20.0	38.4%	-	-	-	\$2.3	\$2.6	15.0%	-	-	-
Krill	-	-	-	\$1.4	\$1.4	3.0%	-	-	-	-	-	-	-	-	-
Mussel	-	-	-	\$6.5	\$6.7	3.1%	-	-	-	-	-	-	-	-	-
Salmon	-	-	-	\$1.2	\$1.6	37.5%	-	-	-	-	-	-	-	-	-
Algae	-	-	-	\$0.1	\$0.1	-15.4%	\$0.7	\$0.7	-6.9%	-	-	-	-	-	-
Tuna	-	-	-	\$3.3	\$3.6	7.8%	\$9.7	\$11.0	14.0%	-	-	-	\$2.3	\$2.4	5.6%

Values in millions of US dollars (MM US\$)

Canada

Volume, by Source and Application

	Dietary Supplements			Clinical Nutrition			Pet Nutrition			Food and Beverage			Infant Formula		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	58	48	-17.0%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	1,290	1,260	-2.3%	32	34	6.5%	-	-	-	140	143	2.0%	-	-	-
Concentrates	1,277	1,334	4.5%	298	309	3.4%	-	-	-	-	-	-	-	-	-
Krill	50	50	1.7%	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	211	216	2.1%	-	-	-	55	56	1.9%	-	-	-	-	-	-
Algae	10	10	6.8%	-	-	-	-	-	-	18	19	5.7%	8	8	0.3%
Tuna	29	30	2.4%	-	-	-	-	-	-	-	-	-	12	12	3.4%
Miscellaneous Pet Food	-	-	-	-	-	-	408	433	6.1%	-	-	-	-	-	-

Volumes in metric tons (mT)

Canada

Value, by Region and Application

	Dietary Supplements			Clinical Nutrition			Pet Nutrition			Food and Beverage			Infant Formula		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	\$0.5	\$0.6	23.7%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	\$7.2	\$10.9	51.4%	\$0.3	\$0.4	33.3%	-	-	-	\$0.9	\$1.9	125.6%	-	-	-
Concentrates	\$24.9	\$33.2	33.5%	\$4.4	\$5.0	13.0%	-	-	-	-	-	-	-	-	-
Krill	\$6.2	\$6.3	1.8%	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	\$1.5	\$2.1	38.0%	-	-	-	\$0.4	\$0.7	62.5%	-	-	-	-	-	-
Algae	\$0.7	\$0.6	-1.5%	-	-	-	-	-	-	\$1.0	\$1.0	-2.0%	\$0.3	\$0.3	-3.2%
Tuna	\$0.4	\$0.4	7.7%	-	-	-	-	-	-	-	-	-	\$0.3	\$0.4	8.6%
Miscellaneous Pet Food	-	-	-	-	-	-	\$1.4	\$2.3	66.9%	-	-	-	-	-	-

Values in millions of US dollars (MM US\$)

Rest of Asia

Volume, by Source and Application

	Dietary Supplements			Food and Beverage			Pharmaceuticals			Infant Formula			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	200	298	49.1%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	1,862	1,918	3.0%	39	41	5.8%	-	-	-	-	-	-	1	1	1.4%
Concentrates	1,567	1,687	7.7%	-	-	-	22	22	1.8%	-	-	-	39	42	8.5%
Krill	34	34	1.3%	-	-	-	-	-	-	-	-	-	-	-	-
Algae	2	3	4.0%	50	54	8.1%	-	-	-	21	22	4.0%	-	-	-

Volumes in metric tons (mT)

Value, by Region and Application

	Dietary Supplements			Food and Beverage			Pharmaceuticals			Infant Formula			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	\$1.9	\$3.2	70.1%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	\$10.7	\$17.1	59.7%	\$0.3	\$0.4	37.5%	-	-	-	-	-	-	< 0.1	< 0.1	100.0%
Concentrates	\$23.6	\$32.3	37.3%	-	-	-	\$1.2	\$1.2	1.7%	-	-	-	\$0.7	\$0.8	19.7%
Krill	\$3.4	\$3.5	1.2%	-	-	-	-	-	-	-	-	-	-	-	-
Algae	\$0.2	\$0.2	-5.9%	\$2.8	\$2.8	-0.4%	-	-	-	\$0.9	\$0.9	1.1%	-	-	-

Values in millions of US dollars (MM US\$)

South America

Volume, by Source and Application

	Dietary Supplements			Food and Beverage			Pet Nutrition			Pharmaceuticals			Infant Formula			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	242	131	-45.9%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	2,752	2,816	2.3%	17	18	6.5%	-	-	-	-	-	-	-	-	-	8	8	5.2%
Concentrates	136	237	74.3%	-	-	-	-	-	-	16	17	3.9%	-	-	-	-	-	-
Krill	8	8	4.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	-	-	-	-	-	-	102	111	8.5%	-	-	-	-	-	-	-	-	-
Algae	2	2	5.7%	96	105	9.3%	-	-	-	-	-	-	43	44	2.3%	-	-	-
Miscellaneous Pet Food	-	-	-	-	-	-	702	754	7.4%	-	-	-	-	-	-	-	-	-

Volumes in metric tons (mT)

South America

Value, by Region and Application

	Dietary Supplements			Food and Beverage			Pet Nutrition			Pharmaceuticals			Infant Formula			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	\$1.6	\$1.0	-32.5%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	\$15.7	\$24.9	58.6%	\$0.2	\$0.2	37.5%	-	-	-	-	-	-	-	-	-	< 0.1	\$0.1	11.1%
Concentrates	\$2.5	\$6.2	148.4%	-	-	-	-	-	-	\$0.9	\$2.6	186.7%	-	-	-	-	-	-
Krill	\$0.8	\$0.8	3.8%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	-	-	-	-	-	-	\$0.9	\$1.5	73.3%	-	-	-	-	-	-	-	-	-
Algae	\$0.1	\$0.1	-	\$5.4	\$5.4	0.9%	-	-	-	-	-	-	\$1.8	\$1.8	-0.6%	-	-	-
Miscellaneous Pet Food	-	-	-	-	-	-	\$2.3	\$4.0	69.2%	-	-	-	-	-	-	-	-	-

Values in millions of US dollars (MM US\$)

Rest of the World

Volume, by Source and Application

	Dietary Supplements			Infant Formula			Clinical Nutrition			Food and Beverage			Pharmaceuticals		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	125	262	109.3%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	1,099	1,112	1.2%	-	-	-	15	15	4.1%	67	71	6.2%	-	-	-
Concentrates	225	246	9.4%	-	-	-	123	131	6.5%	-	-	-	36	38	5.1%
Krill	30	31	4.0%	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	47	49	3.0%	-	-	-	-	-	-	-	-	-	-	-	-
Algae	<1	<1	-	-	-	-	-	-	-	4	4	1.9%	-	-	-
Tuna	34	35	5.3%	263	274	4.2%	-	-	-	24	25	4.3%	-	-	-

Volumes in metric tons (mT)

Rest of the World

Value, by Region and Application

	Dietary Supplements			Infant Formula			Clinical Nutrition			Food and Beverage			Pharmaceuticals		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	\$0.8	\$2.6	236.5%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	\$6.5	\$10.2	56.9%	-	-	-	\$0.1	\$0.2	6.7%	\$0.5	\$0.8	61.7%	-	-	-
Concentrates	\$3.9	\$5.6	42.3%	-	-	-	\$2.2	\$2.5	16.6%	-	-	-	\$2.0	\$2.1	5.0%
Krill	\$3.0	\$3.1	4.0%	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	\$0.8	\$1.1	37.5%	-	-	-	-	-	-	-	-	-	-	-	-
Algae	< 0.1	< 0.1	-	-	-	-	-	-	-	\$0.2	\$0.2	-4.8%	-	-	-
Tuna	\$0.5	\$0.5	8.7%	\$7.7	\$8.3	8.8%	-	-	-	\$1.1	\$1.2	8.3%	-	-	-

Values in millions of US dollars (MM US\$)

Australasia

Volume, by Source and Application

	Dietary Supplements			Pharmaceuticals			Food and Beverage			Infant Formula			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	93	121	29.8%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	1,148	1,144	-0.3%	-	-	-	6	6	-3.5%	-	-	-	15	15	3.2%
Concentrates	293	301	2.9%	22	22	2.9%	-	-	-	-	-	-	-	-	-
Hoki	13	13	-6.2%	-	-	-	-	-	-	-	-	-	-	-	-
Krill	75	77	3.0%	-	-	-	-	-	-	-	-	-	-	-	-
Mussel	1	1	3.7%	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	21	22	1.0%	-	-	-	-	-	-	-	-	-	-	-	-
Algae	6	6	1.7%	-	-	-	13	14	3.2%	10	10	1.0%	-	-	-
Tuna	6	6	1.9%	-	-	-	7	7	3.7%	14	14	3.0%	-	-	-

Volumes in metric tons (mT)

Australasia

Value, by Region and Application

	Dietary Supplements			Pharmaceuticals			Food and Beverage			Infant Formula			Clinical Nutrition		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	\$1.0	\$1.3	30.6%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	\$6.5	\$10.1	54.6%	-	-	-	< 0.1	< 0.1	20.0%	-	-	-	\$0.1	\$0.1	-
Concentrates	\$4.7	\$6.5	39.1%	\$1.3	\$1.4	3.1%	-	-	-	-	-	-	-	-	-
Hoki	< 0.1	< 0.1	-11.1%	-	-	-	-	-	-	-	-	-	-	-	-
Krill	\$7.4	\$7.7	3.0%	-	-	-	-	-	-	-	-	-	-	-	-
Mussel	\$2.2	\$2.3	2.7%	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	\$0.1	\$0.1	40.0%	-	-	-	-	-	-	-	-	-	-	-	-
Algae	\$0.4	\$0.4	-5.0%	-	-	-	\$0.7	\$0.7	-5.4%	\$0.4	\$0.4	-2.4%	-	-	-
Tuna	< 0.1	< 0.1	-	-	-	-	\$0.3	\$0.3	10.0%	\$0.4	\$0.4	7.5%	-	-	-

Values in millions of US dollars (MM US\$)

Mexico

Volume, by Source and Application

	Dietary Supplements			Food and Beverage			Pharmaceuticals			Clinical Nutrition			Infant Formula		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	166	123	-26.0%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	1,841	1,872	1.7%	10	10	1.0%	-	-	-	15	16	8.0%	-	-	-
Concentrates	84	151	80.0%	-	-	-	20	21	3.7%	-	-	-	-	-	-
Krill	9	13	42.5%	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	12	12	2.8%	-	-	-	-	-	-	-	-	-	-	-	-
Algae	-	-	-	75	81	8.5%	-	-	-	-	-	-	5	5	4.9%

Volumes in metric tons (mT)

Value, by Region and Application

	Dietary Supplements			Food and Beverage			Pharmaceuticals			Clinical Nutrition			Infant Formula		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	\$1.3	\$1.7	30.0%	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	\$10.9	\$17.2	57.6%	\$0.1	\$0.1	-14.3%	-	-	-	\$0.2	\$0.2	11.1%	-	-	-
Concentrates	\$1.4	\$3.3	134.5%	-	-	-	\$1.3	\$1.4	9.2%	-	-	-	-	-	-
Krill	\$0.9	\$1.3	42.9%	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	\$0.2	\$0.3	40.0%	-	-	-	-	-	-	-	-	-	-	-	-
Algae	-	-	-	\$4.2	\$4.2	0.2%	-	-	-	-	-	-	\$0.2	\$0.2	5.3%

Applications

Dietary Supplements

Volume, by Source and Region

	USA			Europe			China			Asia-Pacific			Rest of Asia			Canada		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Calanus	12	14	12.0%	15	17	12.7%	-	-	-	-	-	-	-	-	-	-	-	-
Cod Liver	823	718	-12.7%	4,813	4,599	-4.4%	206	265	28.8%	117	127	8.4%	200	298	49.1%	58	48	-17.0%
Common Refined	9,019	8,216	-8.9%	3,905	3,405	-12.8%	5,455	5,918	8.5%	6,136	5,848	-4.7%	1,862	1,918	3.0%	1,290	1,260	-2.3%
Concentrates	8,304	8,433	1.5%	3,987	4,098	2.8%	3,072	3,364	9.5%	1,738	1,385	-20.3%	1,567	1,687	7.7%	1,277	1,334	4.5%
Hoki	41	38	-6.3%	30	28	-6.1%	8	7	-6.4%	-	-	-	-	-	-	-	-	-
Krill	347	364	5.1%	127	130	2.9%	54	126	134.0%	85	88	3.0%	34	34	1.3%	50	50	1.7%
Menhaden	67	66	-2.9%	12	11	-5.3%	-	-	-	-	-	-	-	-	-	-	-	-
Mussel	5	5	5.0%	1	1	3.0%	<1	<1	2.5%	2	2	4.6%	-	-	-	-	-	-
Pollock	100	102	2.5%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	633	647	2.3%	611	631	3.3%	66	73	10.8%	449	463	3.2%	-	-	-	211	216	2.1%
Algae	651	709	8.9%	361	388	7.6%	28	30	6.0%	150	151	0.6%	2	3	4.0%	10	10	6.8%
Squid	720	766	6.5%	277	320	15.3%	-	-	-	-	-	-	-	-	-	-	-	-
Tuna	101	100	-1.0%	65	66	1.2%	97	101	3.7%	89	90	1.2%	-	-	-	29	30	2.4%

Volumes in metric tons (mT)

	Japan			South America			Australasia			Mexico			Rest of the World		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Calanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cod Liver	15	19	26.9%	242	131	-45.9%	93	121	29.8%	166	123	-26.0%	125	262	109.3%
Common Refined	1,801	1,819	1.0%	2,752	2,816	2.3%	1,148	1,144	-0.3%	1,841	1,872	1.7%	1,099	1,112	1.2%
Concentrates	871	891	2.3%	136	237	74.3%	293	301	2.9%	84	151	80.0%	225	246	9.4%
Hoki	-	-	-	-	-	-	13	13	-6.2%	-	-	-	-	-	-
Krill	14	14	2.8%	8	8	4.2%	75	77	3.0%	9	13	42.5%	30	31	4.0%
Menhaden	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mussel	3	3	4.2%	-	-	-	1	1	3.7%	-	-	-	-	-	-
Pollock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	71	73	2.6%	-	-	-	21	22	1.0%	12	12	2.8%	47	49	3.0%
Algae	2	2	-4.8%	2	2	5.7%	6	6	1.7%	-	-	-	<1	<1	-
Squid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuna	245	254	3.4%	-	-	-	6	6	1.9%	-	-	-	34	35	5.3%

Volumes in metric tons (mT)

Dietary Supplements

Value, by Source and Region

	USA			Europe			China			Asia-Pacific			Rest of Asia			Canada		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Calanus	\$3.4	\$3.8	11.2%	\$4.1	\$4.6	12.4%	-	-	-	-	-	-	-	-	-	-	-	-
Cod Liver	\$10.8	\$9.8	-9.3%	\$38.4	\$50.2	30.8%	\$1.9	\$2.5	32.9%	\$1.5	\$1.6	7.5%	\$1.9	\$3.2	70.1%	\$0.5	\$0.6	23.7%
Common Refined	\$53.1	\$95.9	80.7%	\$23.3	\$31.5	35.3%	\$32.0	\$46.6	45.6%	\$34.5	\$52.2	51.3%	\$10.7	\$17.1	59.7%	\$7.2	\$10.9	51.4%
Concentrates	\$167.9	\$235.7	40.4%	\$83.2	\$107.3	28.9%	\$50.1	\$59.3	18.4%	\$27.9	\$24.4	-12.8%	\$23.6	\$32.3	37.3%	\$24.9	\$33.2	33.5%
Hoki	\$0.2	\$0.2	-11.1%	\$0.2	\$0.2	-5.6%	< 0.1	< 0.1	-	-	-	-	-	-	-	-	-	-
Krill	\$34.8	\$36.6	5.1%	\$12.6	\$13.0	2.9%	\$3.5	\$9.2	158.0%	\$8.5	\$8.8	3.0%	\$3.4	\$3.5	1.2%	\$6.2	\$6.3	1.8%
Menhaden	\$0.2	\$0.3	61.9%	< 0.1	< 0.1	50.0%	-	-	-	-	-	-	-	-	-	-	-	-
Mussel	\$10.0	\$10.4	4.1%	\$2.8	\$2.9	2.1%	\$1.7	\$1.7	1.2%	\$4.6	\$4.8	4.2%	-	-	-	-	-	-
Pollock	\$0.4	\$0.5	27.5%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	\$8.5	\$11.7	37.2%	\$10.8	\$14.9	38.5%	\$0.8	\$1.1	41.2%	\$8.2	\$11.4	38.2%	-	-	-	\$1.5	\$2.1	38.0%
Algae	\$44.2	\$44.4	0.5%	\$24.5	\$24.3	-0.7%	\$1.9	\$1.9	-2.1%	\$10.2	\$9.5	-7.1%	\$0.2	\$0.2	-5.9%	\$0.7	\$0.6	-1.5%
Squid	\$9.2	\$9.7	5.3%	\$3.3	\$3.8	13.3%	-	-	-	-	-	-	-	-	-	-	-	-
Tuna	\$1.4	\$1.4	2.9%	\$0.9	\$0.9	4.5%	\$1.3	\$1.4	8.3%	\$1.2	\$1.3	5.8%	-	-	-	\$0.4	\$0.4	7.7%

Values in millions of US dollars (MM US\$)

	Japan			South America			Australasia			Mexico			Rest of the World		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Calanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cod Liver	< 0.1	\$0.1	56.0%	\$1.6	\$1.0	-32.5%	\$1.0	\$1.3	30.6%	\$1.3	\$1.7	30.0%	\$0.8	\$2.6	236.5%
Common Refined	\$9.9	\$11.9	20.5%	\$15.7	\$24.9	58.6%	\$6.5	\$10.1	54.6%	\$10.9	\$17.2	57.6%	\$6.5	\$10.2	56.9%
Concentrates	\$14.4	\$20.0	38.4%	\$2.5	\$6.2	148.4%	\$4.7	\$6.5	39.1%	\$1.4	\$3.3	134.5%	\$3.9	\$5.6	42.3%
Hoki	-	-	-	-	-	-	< 0.1	< 0.1	-11.1%	-	-	-	-	-	-
Krill	\$1.4	\$1.4	3.0%	\$0.8	\$0.8	3.8%	\$7.4	\$7.7	3.0%	\$0.9	\$1.3	42.9%	\$3.0	\$3.1	4.0%
Menhaden	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mussel	\$6.5	\$6.7	3.1%	-	-	-	\$2.2	\$2.3	2.7%	-	-	-	-	-	-
Pollock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	\$1.2	\$1.6	37.5%	-	-	-	\$0.1	\$0.1	40.0%	\$0.2	\$0.3	40.0%	\$0.8	\$1.1	37.5%
Algae	\$0.1	\$0.1	-15.4%	\$0.1	\$0.1	-	\$0.4	\$0.4	-5.0%	-	-	-	< 0.1	< 0.1	-
Squid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuna	\$3.3	\$3.6	7.8%	-	-	-	< 0.1	< 0.1	-	-	-	-	\$0.5	\$0.5	8.7%

Values in millions of US dollars (MM US\$)

Pharmaceuticals

Volume, by Source and Region

	USA			Japan			Europe			Asia-Pacific			South America		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Concentrates	1,318	1,300	-1.4%	806	804	-0.2%	455	456	0.3%	196	197	0.9%	16	17	3.9%

Volumes in metric tons (mT)

	Rest of the World				Mexico			Australasia			Rest of Asia					
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	
Concentrates	36	38	5.1%	20	21	3.7%	22	22	2.9%	22	22	1.8%				

Volumes in metric tons (mT)

Pharmaceuticals

Value, by Source and Region

	USA			Japan			Europe			Asia-Pacific			South America		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Concentrates	\$189.9	\$178.5	-6.0%	\$61.5	\$61.4	-0.3%	\$27.6	\$28.4	3.0%	\$11.8	\$11.9	0.9%	\$0.9	\$2.6	186.7%

Values in millions of US dollars (MM US\$)

	Rest of the World			Mexico			Australasia			Rest of Asia		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Concentrates	\$2.0	\$2.1	5.0%	\$1.3	\$1.4	9.2%	\$1.3	\$1.4	3.1%	\$1.2	\$1.2	1.7%

Values in millions of US dollars (MM US\$)

Infant Formula

Volume, by Source and Region

	China			Asia-Pacific			USA			Europe			Rest of the World			Japan		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Algae	1,089	1,158	6.4%	436	468	7.3%	902	915	1.4%	117	118	1.2%	-	-	-	-	-	-
Tuna	982	1,017	3.6%	1,228	1,281	4.3%	97	99	2.1%	857	884	3.2%	263	274	4.2%	79	80	1.2%

Volumes in metric tons (mT)

	South America			Rest of Asia			Australasia			Canada			Mexico		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Algae	43	44	2.3%	21	22	4.0%	10	10	1.0%	8	8	0.3%	5	5	4.9%
Tuna	-	-	-	-	-	-	14	14	3.0%	12	12	3.4%	-	-	-

Volumes in metric tons (mT)

Infant Formula

Value, by Source and Region

	China			Asia-Pacific			USA			Europe			Rest of the World			Japan		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Algae	\$44.9	\$46.4	3.3%	\$18.0	\$18.7	4.2%	\$37.2	\$36.6	-1.6%	\$4.8	\$4.7	-1.9%	-	-	-	-	-	-
Tuna	\$28.6	\$30.9	8.2%	\$35.8	\$38.9	8.9%	\$2.8	\$3.0	6.7%	\$25.0	\$26.9	7.8%	\$7.7	\$8.3	8.8%	\$2.3	\$2.4	5.6%

Values in millions of US dollars (MM US\$)

	South America			Rest of Asia			Australasia			Canada			Mexico		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Algae	\$1.8	\$1.8	-0.6%	\$0.9	\$0.9	1.1%	\$0.4	\$0.4	-2.4%	\$0.3	\$0.3	-3.2%	\$0.2	\$0.2	5.3%
Tuna	-	-	-	-	-	-	\$0.4	\$0.4	7.5%	\$0.3	\$0.4	8.6%	-	-	-

Values in millions of US dollars (MM US\$)

Pet Nutrition

Volume, by Source and Region

	USA			Europe			China			South America			Canada		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Menhaden	8,799	9,168	4.2%	1,441	1,457	1.1%	-	-	-	-	-	-	-	-	-
Salmon	1,508	1,493	-1.0%	1,523	1,528	0.3%	43	42	-2.8%	102	111	8.5%	55	56	1.9%
Miscellaneous Pet Food	8,545	8,887	4.0%	10,864	11,211	3.2%	1,206	1,473	22.1%	702	754	7.4%	408	433	6.1%

Volumes in metric tons (mT)

Value, by Source and Region

	USA			Europe			China			South America			Canada		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Menhaden	\$19.2	\$33.9	76.7%	\$3.2	\$5.5	71.4%	-	-	-	-	-	-	-	-	-
Salmon	\$10.6	\$16.7	57.5%	\$10.6	\$16.9	59.4%	\$0.3	\$0.5	53.3%	\$0.9	\$1.5	73.3%	\$0.4	\$0.7	62.5%
Miscellaneous Pet Food	\$28.6	\$46.7	63.4%	\$36.3	\$58.9	62.2%	\$4.0	\$7.7	94.7%	\$2.3	\$4.0	69.2%	\$1.4	\$2.3	66.9%

Values in millions of US dollars (MM US\$)

Food and Beverage

Volume, by Source and Region

	USA			Japan			Europe			China			Asia-Pacific			South America		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	93	94	1.3%	-	-	-	79	80	1.9%	-	-	-	-	-	-	-	-	-
Common Refined	699	670	-4.2%	1,641	1,703	3.8%	494	506	2.3%	270	281	4.0%	126	133	5.8%	17	18	6.5%
Concentrates	1	1	-3.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Menhaden	155	150	-3.1%	-	-	-	27	26	-5.4%	-	-	-	-	-	-	-	-	-
Salmon	37	39	6.2%	-	-	-	42	41	-2.0%	-	-	-	10	10	2.1%	-	-	-
Algae	455	461	1.3%	13	13	0.8%	344	354	2.9%	176	183	4.3%	238	252	6.0%	96	105	9.3%
Squid	-	-	-	-	-	-	11	12	1.8%	-	-	-	-	-	-	-	-	-
Tuna	30	29	-2.6%	214	233	8.9%	12	12	1.9%	102	108	5.8%	51	54	5.0%	-	-	-

Volumes in metric tons (mT)

	Mexico			Rest of Asia			Canada			Rest of the World			Australasia		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	10	10	1.0%	39	41	5.8%	140	143	2.0%	67	71	6.2%	6	6	-3.5%
Concentrates	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Menhaden	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Algae	75	81	8.5%	50	54	8.1%	18	19	5.7%	4	4	1.9%	13	14	3.2%
Squid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuna	-	-	-	-	-	-	-	-	-	24	25	4.3%	7	7	3.7%

Volumes in metric tons (mT)

Food and Beverage

Value, by Source and Region

	USA			Japan			Europe			China			Asia-Pacific			South America		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	\$1.2	\$1.3	5.4%	-	-	-	\$0.6	\$0.9	40.1%	-	-	-	-	-	-	-	-	-
Common Refined	\$4.8	\$9.1	90.4%	\$11.4	\$15.1	32.2%	\$3.4	\$5.3	59.1%	\$2.4	\$3.2	31.5%	\$0.8	\$1.4	75.9%	\$0.2	\$0.2	37.5%
Concentrates	< 0.1	< 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Menhaden	\$0.5	\$0.8	63.5%	-	-	-	\$0.1	\$0.2	60.0%	-	-	-	-	-	-	-	-	-
Salmon	\$0.6	\$0.8	41.7%	-	-	-	\$0.8	\$1.0	31.2%	-	-	-	\$0.2	\$0.3	35.0%	-	-	-
Algae	\$25.5	\$23.8	-6.5%	\$0.7	\$0.7	-6.9%	\$19.2	\$18.3	-5.0%	\$9.8	\$9.5	-3.8%	\$13.3	\$13.0	-2.2%	\$5.4	\$5.4	0.9%
Squid	-	-	-	-	-	-	\$0.1	\$0.1	-	-	-	-	-	-	-	-	-	
Tuna	\$1.4	\$1.4	1.5%	\$9.7	\$11.0	14.0%	\$0.5	\$0.6	5.7%	\$4.6	\$5.1	10.7%	\$2.3	\$2.5	9.5%	-	-	-

Values in millions of US dollars (MM US\$)

	Mexico			Rest of Asia			Canada			Rest of the World			Australasia		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Cod Liver	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Common Refined	\$0.1	\$0.1	-14.3%	\$0.3	\$0.4	37.5%	\$0.9	\$1.9	125.6%	\$0.5	\$0.8	61.7%	< 0.1	< 0.1	20.0%
Concentrates	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Menhaden	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salmon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Algae	\$4.2	\$4.2	0.2%	\$2.8	\$2.8	-0.4%	\$1.0	\$1.0	-2.0%	\$0.2	\$0.2	-4.8%	\$0.7	\$0.7	-5.4%
Squid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuna	-	-	-	-	-	-	-	-	-	\$1.1	\$1.2	8.3%	\$0.3	\$0.3	10.0%

Values in millions of US dollars (MM US\$)

Clinical Nutrition

Volume, by Source and Region

	Europe			Canada			USA			Japan			Rest of the World		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Common Refined	370	384	3.7%	32	34	6.5%	269	284	5.8%	74	77	4.2%	15	15	4.1%
Concentrates	219	222	1.4%	298	309	3.4%	39	38	-3.2%	147	155	5.5%	123	131	6.5%
Algae	-	-	-	-	-	-	2	2	5.8%	-	-	-	-	-	-

Volumes in metric tons (mT)

	Asia-Pacific			Rest of Asia			Mexico			Australasia			South America		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Common Refined	6	6	5.3%	1	1	1.4%	15	16	8.0%	15	15	3.2%	8	8	5.2%
Concentrates	115	125	8.6%	39	42	8.5%	-	-	-	-	-	-	-	-	-
Algae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Volumes in metric tons (mT)

Clinical Nutrition

Value, by Source and Region

	Europe			Canada			USA			Japan			Rest of the World		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Common Refined	\$2.7	\$4.2	55.4%	\$0.3	\$0.4	33.3%	\$1.8	\$3.8	109.5%	\$0.8	\$1.0	33.3%	\$0.1	\$0.2	6.7%
Concentrates	\$3.5	\$3.9	11.0%	\$4.4	\$5.0	13.0%	\$0.7	\$0.8	5.4%	\$2.3	\$2.6	15.0%	\$2.2	\$2.5	16.6%
Algae	-	-	-	-	-	-	\$0.1	\$0.1	-	-	-	-	-	-	-

Values in millions of US dollars (MM US\$)

	Asia-Pacific			Rest of Asia			Mexico			Australasia			South America		
	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change	2022	2023	Change
Common Refined	< 0.1	< 0.1	40.0%	< 0.1	< 0.1	100.0%	\$0.2	\$0.2	11.1%	\$0.1	\$0.1	-	< 0.1	\$0.1	11.1%
Concentrates	\$1.6	\$1.9	18.9%	\$0.7	\$0.8	19.7%	-	-	-	-	-	-	-	-	-
Algae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Values in millions of US dollars (MM US\$)

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