

The European market potential for edible seaweed

The demand for edible seaweeds is increasing in Europe. Seaweeds have many beneficial properties that can cater to European consumers. An increasing demand for supplements in Europe, rising health-consciousness and a growing demand for alternative proteins are major drivers of the edible seaweed market in Europe.

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1. Product description

Seaweed refers to a number of species of macroscopic, multicellular and marine algae which grow along rocky shorelines around the world. Seaweed varies in colour from red to black.

Edible seaweed is divided into several categories such as red algae, green algae and brown algae. Most edible seaweed is marine seaweed, which is part of many coastal cuisines. In general, seaweed is high in iodine and fibre. Table 1 shows a list of the most common edible seaweeds.

Table 1 Common edible seaweed

Red algae	Green algae	Brown algae	Blue-green algae
Carola (Callophyllis spp.)	Chlorella (Chlorella sp.)	Kelp (Laminariales)	
Carrageen moss (Mastocarpus stellatus)	Gutweed (Ulva intestinalis)	Arame (Eisenia bicyclis)	Aphanizomenon flos-aquae
Dulse (Palmaria palmata)	Sea grapes or green caviar (Caulerpa lentillifera)	Badderlocks (Alaria esculenta)	Arthrospira platensis (Spirulina)
Eucheuma	Sea lettuce (Ulva spp.)	Cochayuyo (Durvillaea antarctica)	
Eucheuma spinosum		Ecklonia cava	
Eucheuma cottonii		Kombu (Saccharina japonica)	
Gelidiella (Gelidiella acerosa)		Oarweed (Laminaria digitata)	

Ogonori (Gracilaria)		Sea palm Postelsia palmaeformis	
Gracilaria edulis		Sea whip (Nereocystis luetkeana)	
Gracilaria corticata		Sugar kelp (Saccharina latissima)	
Grapestone Mastocarpus papillatus		Wakame (Undaria pinnatifida)	
Hypnea		Hiromi (Undaria undarioides)	
Irish moss (Chondrus crispus)		Grapestone (Mastocarpus papillatus)	
Laverbread (Porphyra laciniata/Porphyra umbilicalis)		<i>Fucales</i>	
Gim (Pyropia, Porphyra)		Bladderwrack (Fucus vesiculosus)	
Nori (Porphyra)		Channelled wrack (Pelvetia canaliculata)	
		Hijiki or Hiziki (Sargassum fusiforme)	
		Limu Kala (Sargassum echinocarpum)	
		Sargassum	
		Sargassum cinetum	
		Sargassum vulgare	
		Spiral wrack (Fucus spiralis)	

		Thongweed (Himanthalia elongata)	
		<i>Ectocarpales</i>	
		Mozuku (Cladosiphon okamuranus)	

Source: Wikipedia

In recent years, there is an increasing demand for blue-green microalgae such as spirulina and chlorella. They have antioxidant, anti-inflammatory, anti-allergenic and anti-viral properties. There are around 7,500 species of green-blue algae; they are the most primitive life forms and have been consumed by humans throughout history. Blue-green algae contains numerous bioactive components such as carotenoids, linoleum acid, phycocyanin, iron, phosphorus, chlorophyll and fibres.

Spirulina and chlorella are common forms of blue-green algae. They are part of medicine in Japan, Mexico and some African countries. Spirulina and chlorella are cultivated instead of wild-harvested. Their production involves safety and control mechanisms.

Spirulina is a biomass of a blue-green algae or cyanobacteria. The most common species of spirulina are *Spirulina platensis* (SP), *Spirulina maxima* (SM) and *Spirulina fusiformis* (SF). Human consumption of spirulina dates back to the 14th century.

Scientists are looking at spirulina as part of the solution to malnutrition and food security. Spirulina consists of 65% protein. The type of protein is similar to animal protein, but it is high in polyunsaturated fats.

Spirulina is high in vitamin B12 and is recommended as a supplemental source of this vitamin to vegans. However, some research shows that the human body cannot digest the B12 vitamin in spirulina. Nonetheless, it is considered a sustainable source of protein which can be used as a meat alternative. It is also a good source of iron and zinc, while it can also be used as a treatment for anaemia.

Spirulina has the highest concentration of the antioxidant evercetin; it can be used to alleviate the symptoms of sinusitis and asthma. It can be also used to relieve inflammation associated with arthritis, as it contains phycocyanin.

Chlorella is a genus of green algae that have a spherical shape. The cultivation of chlorella involves relatively limited resources. Some of the main applications of the genus *Chlorella* are in biofuels (biodiesel, biomethane and biohydrogen), cosmetics (skincare), supplementary foods (polyunsaturated fatty acids), pigments (carotenoids and chlorophyll) and waste-water treatments (reduction of chemical oxygen demand and bioremediation).

There are many nutritional benefits of chlorella. It contains around 50% complete protein with around 70% net protein digestibility. It can be used to detoxify the body of heavy metals such as cadmium, lead, mercury and uranium. Other benefits include boosting the immune system, having antioxidant properties, improving the glucose uptake in cells, reducing blood pressure, improving insulin resistance, preventing gastric ulcers, reducing fibromyalgia pain and protecting against radiation poisoning.

Chlorella is high in chlorophyll, B vitamins, vitamin E, folate, calcium, magnesium, zinc, potassium, iron and phosphorus. It also contains trace minerals such as omega-3 fatty acids, while it has mucopolysaccharides, beta-carotene and nucleic acids as well.

Spirulina and chlorella are traded under HS code 1212210000, which refers to Seaweeds and other algae fit for human consumption. This report examines spirulina and chlorella applications in the health products industry within Europe.

Tip:

Conduct research on the health benefits of seaweeds. Visit websites such as [sciencedirect.com](https://www.sciencedirect.com) and [NCBI](https://www.ncbi.nlm.nih.gov/) or platforms such as [Google Scholar](https://scholar.google.com/) to look for scientific papers.

2. What makes Europe an interesting market for seaweed?

Europe is an attractive market for seaweed from developing countries. Seaweeds such as spirulina and chlorella can capitalise on some of the new trends in the alternative protein market. The increasing demand for natural and high-quality supplements in Europe creates an opportunity for suppliers of seaweed from developing countries. There is a rising demand for nutraceuticals as well as a growing vegan and vegetarian population in Europe. As a result, there are good opportunities for spirulina and chlorella on the European market.

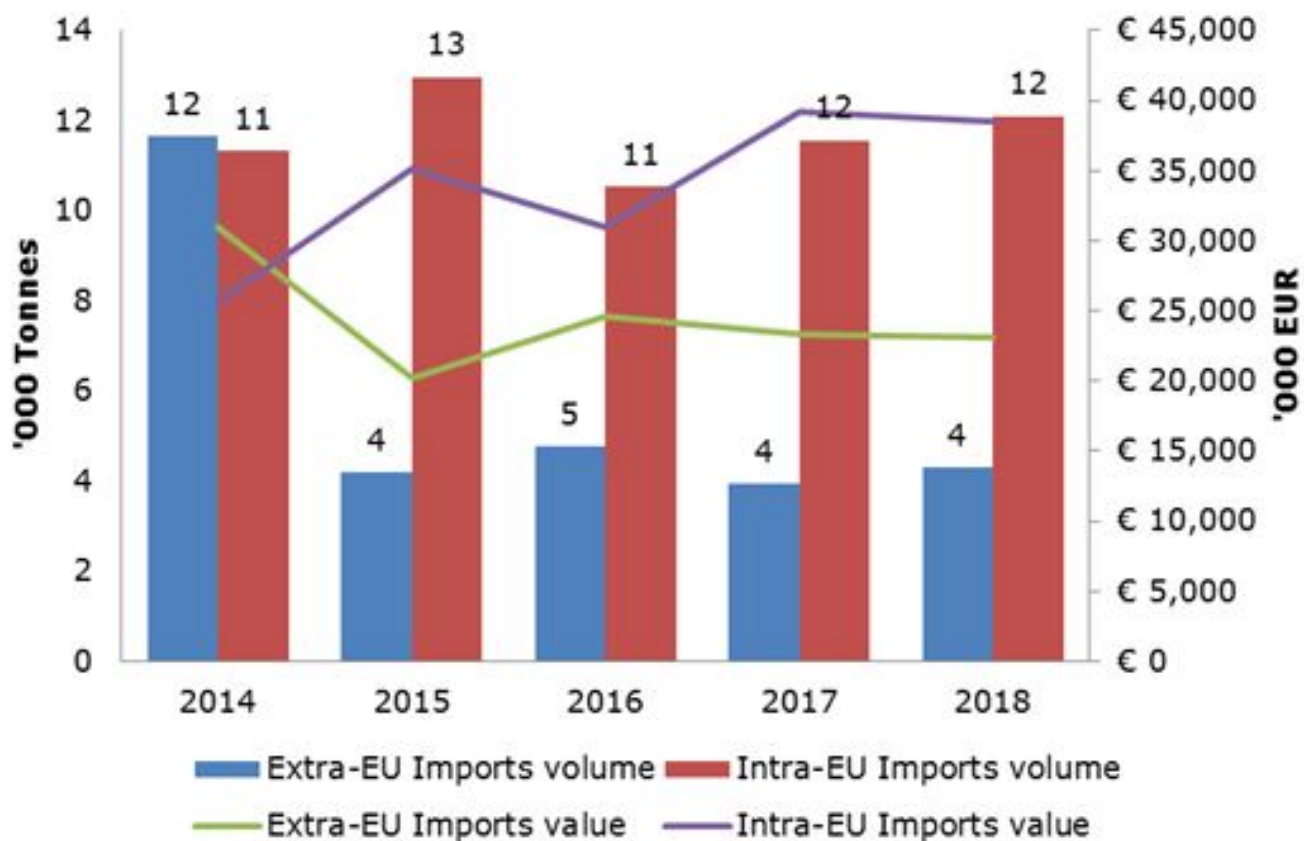
Around 70% of spirulina is produced in [China, India and Taiwan](#). Other producers include the United States, Thailand, Pakistan, South Africa and Myanmar. The production of spirulina is also [promoted by various governmental initiatives](#) in India and South Africa. Producers in developing countries have opportunities to supply spirulina.

[Chlorella is produced](#) in open ponds within countries such as Germany, Japan, China, the Czech Republic and Taiwan. Its estimated annual production is about 5,000 tonnes.

Suppliers of spirulina and chlorella from developing countries may face competition from large-scale manufacturers such as China. Exporters from developing countries should make sure that the quality of their ingredients is high and consistent. This way, they could gain an advantage over spirulina and chlorella that is marketed at competitive prices.

Table 1 shows the imports of edible seaweeds to Europe. The volume of imported seaweed for human consumption from outside of the EU decreased by 66% between 2014 and 2018. This decrease was mainly due to a shortage of supply. The volume of imported seaweed from outside of the EU has been stable since 2015. The demand for edible seaweed in Europe is expected to grow further over the forecast period. A lack of supply dampens the volume of imports to the European market.

Figure 1: Imports of seaweeds and other algae fit for human consumption to the EU, 2014–2018, in 1,000 tonnes and in € 1,000



The value of imported seaweed for human consumption increased by 19% between 2012 and 2018, in spite of decreasing volumes. This increase is because of the rising demand and the undersupply of edible seaweed in Europe, which has increased the prices. The value of imports is expected to increase because of the growing health-conscious lifestyle among European consumers.

Spirulina is seen as a sustainable and high-quality replacement for meat protein. With the growing vegan and vegetarian population in Europe, the demand for spirulina is expected to rise in Europe over the coming years. [The European market for plant-based protein](#) is expected to be worth USD 2.6 billion by 2024. It is projected to increase at a compound annual growth rate of 7.4% between 2019 and 2024.

According to Market Data Forecast, the [European nutraceutical market](#) was worth almost USD 42 billion in 2018. This market is projected to be worth USD 58.5 billion by 2023. Nutraceuticals are becoming a part of consumers' everyday life. As the incidence of lifestyle-related illnesses in Europe is rising, consumers are looking at preventive measures to improve their health.

The life expectancy of the European population is also increasing and consumers are looking at new ways to stay healthy as they age. High disposable incomes enable them to invest in high-quality nutraceutical products.

According to industry sources, the demand for spirulina and chlorella is growing in Europe. The [European market for spirulina](#) is forecast to grow at a compound annual growth rate of 8.7% between 2019 and 2025. According to Zion Market Research, the global chlorella market was worth USD 49 million in 2017. It is forecast to reach USD 68 million by 2024. Chlorella is in demand because of its health properties; it has the ability to rid the human body of heavy metals and ash content.

The rise in the demand for health and wellness products is expected to drive the demand for highly nutritious algae, such as spirulina and chlorella. Suppliers of spirulina and chlorella should make the most of the demand for high-quality edible seaweeds on the European market. Many importers face quality problems due to cheap spirulina and chlorella imported from China. European importers place a lot of emphasis on quality because of

stringent EU regulations and the consumer demand for high-quality products. The importance of this factor is expected to grow in future.

Tips:

For more information on opportunities in the European sector for health products, see the [CBI market statistics and outlook](#).

Visit trade fair that focus on vegan and vegetarian lifestyle in Europe. Examples include [Veggie World](#) and [VegFest](#).

3. Which European countries offer the most opportunities for seaweed?

The European countries that offer seaweed suppliers the most opportunities are the UK, France, Germany, Austria, Spain and Italy. The UK imports the majority of seaweed in Europe, with France in second place. These countries lead, as they have a significant health product industry. Seaweed is also used by many ethnic food manufacturers in the UK.

Table 2 Leading importers of seaweed for human consumption to Europe, 2018

2018	Import Volumes in '000 tonnes	5-yr volume growth	Value of Imports in m EUR	5-yr value growth	Exporters	Important Market Players
UK	7.6	41%	14.05	57%	Spain (83.4%), USA (7%), Belgium (2.3%), Iceland (2.1%), Philippines (1.6%)	Super Nutrients, Indigo Herbs
France	3.0	-72%	10.01	-50%	Chile (48.5%), Peru (16.6%), Ireland (11.9%)	Nexira, Solgar France

Germany	1.6	44%	7.00	84%	Ireland (44%), Netherlands (19.3%), China (8.7%)	Dr. Behr GmbH, Bio Import Europa
Austria	1.3	42%	3.90	65%	Germany (53.1%), Italy (25.5%), Ireland (13.3%)	LEMBERONA Handel GmbH
Spain	0.5	-3%	3.89	-4%	Portugal (45.5%), France (13.6%), Germany (9.3%)	Robis, MARNYS, Edificio Artaza Etxea
Italy	0.5	-5%	4.51	6%	Ireland (27%), China (20.4%), Germany (13%), France (12.8%)	Consonni Bioalghe Srls

Source: Eurostat

Table 2 shows leading importers of edible seaweed in Europe. The UK is the leading importer in Europe; it reported the highest increase in seaweed for human consumption between 2012 and 2018.

UK

The UK has a fast-growing vegan population. According to the [Vegan Society](#), the UK launched more vegan products than any other country in the world during 2018. According to [a survey conducted by Just Eat](#), the demand for vegetarian options increased by 987% in 2017. More than 80% of edible seaweed imports come from intra-EU trade. Spain is the major importer.

While the UK is an important importer, Brexit may disrupt the demand for spirulina and chlorella. Especially in case of a no-deal scenario, it may take some time to renegotiate trade deals with countries that are currently supplying seaweed.

France

France, the second-largest importer, has reported a significant decrease in the imports of edible seaweeds.

Between 2014 and 2018, the imports decreased in value and volume. Over this period, the volume of imported seaweed from Chile decreased by 68%. Reasons behind this decrease include poor harvests caused by weather conditions and the undersupply of edible seaweeds. There is a growing demand for edible seaweeds on the Asian market. Exporters of spirulina and chlorella from developing countries can use this demand as an opportunity to supply edible seaweeds such as spirulina and chlorella to Europe. However, Chile still remains the leading exporter of edible seaweeds to France. Peru and Ireland are also important. Around 75% of imported seaweed comes from extra-EU trade.

France is also a significant producer and supplier of edible seaweeds; it supplies Europe with seaweeds that are mainly grown in Brittany. There is also some commercial production of spirulina in France. It is estimated that the [French production of spirulina](#) was about 20 tonnes in 2014, while consumption was around 200 tonnes.

Despite domestic production, the French market relies on imports. Nexira is the main importer, while Solgar is an important producer of seaweed supplements. The French supplement market was worth EUR 1.9 billion in 2018. Suppliers of spirulina and chlorella from developing countries should take advantage of this opportunity to target French buyers. It is expected that the demand for spirulina and chlorella will further increase in future.

Germany

Germany is the third-largest importer of seaweed. The imports of seaweeds for human consumption have increased at double-digit growth rates. Around 85% of edible seaweed imports are from within the EU. Ireland is the leading exporter, followed by the Netherlands and China.

Germany has the largest consumer market in Europe. The country also has a growing vegan and vegetarian population. It is estimated that there are around 9.3 million vegans and vegetarians in Germany. According to Nielsen, around 31% of Germans are choosing to eat less meat. The demand for plant-based proteins is rising.

There are some chlorella producers in Germany: Aglomed, RO-V-AL and Agrinova are important producers. Organic chlorella is gaining popularity in Germany. There is also some production of spirulina in Germany. The German-French company AKAL Food produces Ecocert-certified spirulina. The production of spirulina requires higher temperatures than chlorella. Suppliers of spirulina from developing countries have better natural conditions to produce spirulina than European countries.

The demand for high-quality edible algae is expected to continue to grow in Germany. In particular, the demand for organic chlorella and spirulina is likely to rise. Suppliers of spirulina and chlorella from developing countries should look to certify their products in order to meet consumer needs.

Austria

The imports of edible seaweeds to Austria have been on the rise. Austria has a similar market to Germany. There is a high level of awareness among Austrian consumers, who demand high-quality products. The imports of edible seaweeds have been increasing. This trend can present an opportunity for exporters of spirulina and chlorella from developing countries.

More than 90% of edible seaweed imports are from intra-EU trade. The main exporters are Germany, Italy and Ireland.

Although Austria does not have a big large consumer market, Austrian consumers have a high level of awareness and are health-conscious. Lemberona Handel GmbH is a leading importer of organic edible seaweeds. Spirulix and Ecoduna are domestic manufacturers of spirulina and chlorella.

It is expected that the popularity of spirulina and chlorella among Austrian consumers will increase in future. The consumer demand is driven by growing awareness.

Spain

Spain recorded a slight decrease in seaweed imports for human consumption. More than 90% of edible seaweeds are from intra-EU trade. The main exporters are Portugal, France, Germany and the Netherlands.

Edible seaweed is popular in some coastal areas of Spain. There is also some domestic production of spirulina. ASN Espirulina is an important producer. Neoalgae is a Spanish project that focuses on the production of microalgae for food, cosmetics and feed applications.

Despite the fact that Spanish imports of edible seaweeds slightly decreased, the potential for spirulina and chlorella exports from developing countries remains high.

Italy

The imports of edible seaweed to Italy increased slightly between 2014 and 2018. However, the value of imports increased at a single-digit rate. More than half of Italian imports come from intra-EU trade.

Italy has one of the largest consumer markets in Europe. The Italian market for organic products is also one of the most important. Suppliers of spirulina as well as chlorella from developing countries should take advantage of this trend and consider supplying certified edible microalgae.

It is expected that the demand for high-quality spirulina and chlorella will increase in future. Growing awareness of health issues is likely to be the major driver.

The most attractive markets for exporters from developing countries are in Western Europe. This fact is because they have some of the largest consumer markets. In addition, these consumers tend to have high awareness and chose high-quality products that are beneficial to their health.

The demand for seaweeds for human consumption is expected to continue to grow in the foreseeable future. A major driver is the growing sustainable production of spirulina and chlorella, as well as increasingly health-conscious consumers in Europe. The growing market for plant-based foods is also creating opportunities for spirulina and chlorella in Europe. Climate change influences product quality, because it affects salinity or oxygen levels as well as pH, making water acidic. The optimum pH for spirulina is between 9-11, when it is alkaline.

However, there are also obstacles to market growth. A lack of supply as well as quality issues are curbing growth in the spirulina and chlorella market within Europe. The prices of high-quality seaweeds are rising, making these seaweeds less affordable to European consumers.

Tip:

Focus on Western European countries when supplying spirulina and chlorella. These countries import the largest volumes of seaweeds for human consumption. Western European countries have the largest supplement markets and have robust processing sectors.

4. Which trends offer opportunities on the European market?

The demand for seaweeds such as chlorella and spirulina in Europe is driven by various factors. Seaweeds are a sustainable source of high-quality protein and offer a wide range of nutritional benefits. The production of seaweed also puts less of a strain on resources and offers a sustainable solution to meet the nutritional needs of the European population.

Growing demand for plant-based protein

Europe has a growing market for plant-based proteins. European consumers are eating less meat and are seeking alternative sources of protein. According to the German Federal Office for Agriculture and Food, [the consumption of pork in Germany decreased by 10%](#) between 2011 and 2016. Meat consumption per capita in Germany decreased by 8 kg in the last 2 decades.

Many consumers are turning away from meat because of ethical and environmental reasons. Meat production involves high resource use (land and water) and produces greenhouse gases. Although consumers are turning away from meat products, some plant-based proteins do not contain complete proteins with all eight amino acids. Spirulina and chlorella provide a solution to these issues, offering many opportunities as alternative proteins to health-conscious and environmentally conscious consumers in Europe.

There is an opportunity for spirulina suppliers from developing countries. Manufacturers in Europe are keen to meet the consumer demand for plant-based proteins, especially with the growing numbers of vegan, vegetarian and flexitarian consumers. Seaweed suppliers can use both nutritional and environmental claims for seaweed when approaching buyers.

Tips:

Stay up to date with vegan trends and see websites as well as associations such as [the Vegan Society](#) and the [Vegetarian Society](#).

Educate buyers on the potential of seaweed as sustainable and high-quality protein. Use statistics and scientific data to show how seaweed compares with meat and other types of plant-based protein. Use this information in your marketing materials.

Read the [CBI study of exporting plant proteins for health products to Europe](#). You can find more information on regulations and competition here.

For more information on plant-based protein trends, see the [CBI trends](#) study.

Sustainable production of seaweed

There is a growing demand for sustainably sourced products on the European market. Apart from its nutritional benefits, seaweed offers many environmental benefits. Seaweeds absorb CO₂ from the atmosphere and reduce the acidification of water.

Seaweed production also puts less of a strain on resources such as agricultural land and water. It can provide an alternative livelihood to coastal communities as well. With the majority of fisheries depleted, seaweed cultivation presents employment opportunities.

Chinese company [Inner Mongolia Rejuve Biotech](#) is one of the largest producers of spirulina and chlorella in China. It produces more than 1,100 tonnes of food-grade spirulina powder and over 100 tonnes of spirulina tablets a year on 630,000 m².

The sustainability aspect of seaweed production will gain importance in future. As European consumers are looking for environmentally friendly products, the low environmental footprint of seaweed will become more attractive to both buyers and consumers.

Tip:

If your seaweed is not certified, promote the sustainable and ethical aspects of your production process. Use certification and scientific data to back up your claims. The most relevant certification is [ASC-MSC Seaweed Standard](#). There is a growing importance of marketing stories that refer to sustainable production methods and practices. Using these stories may help you when approaching European buyers.

Increase in chronic diseases within Europe

The ageing population in Europe goes hand in hand with the increase in chronic diseases. A longer life expectancy does not always equate to better health. According to the Alliance of Chronic Diseases, cancer, chronic respiratory diseases and diabetes are the leading cause of mortality in Europe. They represent 77% of the total disease burden and 86% of all deaths.

The ageing population is leading European consumers to look for products that can help improve their immune systems. Microalgae such as spirulina and chlorella offer viable solutions to European consumers because of their broad nutritional profile and their ability to alleviate symptoms of various chronic diseases. Seaweed are also a greener and more natural alternative to pharmaceuticals.

The demand for spirulina and chlorella is expected to increase in future due to the increasing rates of chronic diseases among the European population.

Tips:

Do not make any medicinal claims for your seaweeds for health purposes when approaching buyers or in your marketing materials. Instead, focus on their nutritional value. Substantiate your claims with scientific data.

Stay up to date with trends in nutrition and supplements by checking websites such as [Nutra Ingredients](#).

Educate yourself on the EU health claims regulation. See the list of [permitted health claims](#) under the EU law.

See our [CBI study of buyer requirements](#) for natural ingredients for health products to find more information on claims and Novel Food legislation.

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