

The European market potential for chlorella and spirulina for health products

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The European market for chlorella and spirulina in health products is growing. Both chlorella and spirulina have become popular ingredients due to their nutritional benefits. This makes them increasingly sought after by food supplement manufacturers and health-conscious consumers in Europe. Key markets for both microalgae include the United Kingdom, France, Germany and Italy, where the demand for natural food supplements and plant-based products is high, and there is a well-established nutraceutical industry and robust infrastructure for imports.

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1. Product description

This factsheet focuses on two species of microalgae: chlorella and spirulina, and specifically on their use in health products. To learn about their uses in food products, see our study on [seaweed extracts for food](#). Both species also have applications in the cosmetic and animal feed sectors.

The botanical name of chlorella is *Chlorella vulgaris* Beijerinck (also: *Chlorella pyrenoidosa* or *Chlorella communis*). Spirulina is known as *Spirulina maxima* (also: *Arthrospira maxima*), *Spirulina major* (also: *Arthrospira major*) and *Spirulina platensis*.

Chlorella and spirulina, together with a wide range of other marine algae, are traded under HS-code 121221(90): 'Seaweeds and other algae fit for human consumption'.

Nutritional information and health benefits

Chlorella and spirulina are both known for their high nutritional value, high protein levels, and antioxidant and anti-inflammatory properties. They also [have several differences](#):

- Chlorella is higher in omega-3 fatty acids, vitamin A, riboflavin, iron and zinc than spirulina;
- Spirulina has a higher percentage of protein, and more thiamine and copper;
- [Spirulina contains gamma-linolenic acid](#), while chlorella contains alpha-linolenic acid.

The table below summarises the nutritional information and health benefits for both algae in more detail.

Table 1: Nutritional profiles of Chlorella and Spirulina

Chlorella	Spirulina
<p>Chlorella is a good source of:</p> <ul style="list-style-type: none"> • Protein (50-60%, including all 9 essential amino acids) • Vitamin A • Zinc • Iron • Phosphorus • Magnesium <p>It is also a source of B-vitamins, including riboflavin (B2), thiamine (B1), and folate (B9), and contains a wide range of antioxidants such as omega-3s, vitamin C and carotenoids.</p> <p>Potential health benefits of chlorella include:</p> <ul style="list-style-type: none"> • Detoxifying the body of heavy metals • Reducing blood pressure and cholesterol levels • Boosting the immune system • Anti-inflammatory effects 	<p>Spirulina is a good source of:</p> <ul style="list-style-type: none"> • Protein (60-70%) • Thiamine (vitamin B1) • Riboflavin (vitamin B2) • Niacin (vitamin B3) • Copper • Iron <p>Spirulina also contains vitamins E, C and B6, as well as magnesium, plant-based protein phycocyanin and antioxidants.</p> <p>Potential health benefits of chlorella include:</p> <ul style="list-style-type: none"> • Reducing blood pressure and cholesterol levels • Boosting the immune system • Anti-inflammatory effects

Source: ProFound, 2023, based on [chlorella health benefits](#) & [spirulina health benefits](#)

Uses

In health products, both algae are used as food supplements in the following forms:

- Capsules / tablets, which contain chlorella or spirulina powder or extracts. An example is [Bioglan organic Spirulina capsules](#).
- Pure powder, such as [Naturya organic chlorella powder](#). The powder is typically added to yogurts, juices, smoothies and other drinks and dishes.

Chlorella or spirulina are not listed in the [European Union herbal monographs](#) and are not used in herbal medicinal products.

Figure 1: Examples of spirulina and chlorella products in the European health segment



Source: Holland & Barrett, 2023

Tips:

Take care when making health claims about your products as health claims are regulated in the European Union (EU). Check the [European Union \(EU\) portal on health claims](#) to see what is permitted with respect to chlorella and spirulina. You can search the database by using the trade or botanical names.

Note that not all species are permitted in food supplements. Check positive lists of species which are allowed to be used in food supplements (such as: the [BELFRIT list](#)), or check with health authorities and/or experts what is allowed under EU regulations.

Familiarise yourself with the nutritional profile and the beneficial health properties of your product, such as its protein and chlorophyll content. This is important because these are two properties that European buyers are interested in.

Visit the [Spirulina Source](#) website to see their comprehensive database of scientific studies on the health and medical benefits of spirulina consumption. The website is an online resource centre for spirulina and offers access to scientific studies, as well as resources such as videos, books, slideshows, and a global database of spirulina producers and enterprises.

2. What makes Europe an interesting market for chlorella and spirulina?

No specific Europe-wide data on the import of chlorella and spirulina are available. The data presented here include all seaweeds and other algae that are suitable for human consumption, including spirulina and chlorella. In 2022, Europe imported 294,000 tonnes of seaweed at €94 million. This was an average fall in volume of 5.3% compared to 2018, while the total value of imports increased by 6.4% over the same period. This increase is explained by rising demand and the undersupply of edible seaweed in Europe, which led to higher prices.

In 2022, 49% of the value of total European imports came from emerging market economies, compared to 33% in 2018. This rise was mainly due to increasing imports from Chile, Korea, Tanzania, China and the Philippines. The main importers of seaweeds in 2022 were the United Kingdom (UK), Norway, Denmark, the Netherlands, Austria and Spain. The fluctuations in import volumes to the UK in 2020 and 2021 are explained by the effects of Brexit.

Source: ITC Trade Map, 2023

Growing spirulina and chlorella market in Europe

Worldwide, the market for chlorella and spirulina is growing for both products, thanks to higher awareness of their health benefits and increased interest in healthy living in markets such as the USA and Europe. Note that growing demand comes not only from the health sector but also from specific industries like natural food colours, which spirulina is used for.

With respect to spirulina specifically, the [global market is predicted to reach \\$1.2 billion by 2030](#), growing at an average annual rate of nearly 11% between 2023 and 2030. The [European spirulina market is expected to grow at an average year-to-year rate of over 13%](#) between 2023 and 2030, reaching nearly \$157 million by 2030.

The [global chlorella market is expected to grow at an average annual rate of 7.0% from 2023 to 2030](#), reaching \$336 million by 2030. The [European chlorella market is expected to grow at an average annual rate of 7.2%](#) between 2023 and 2030, amounting to \$240 million by 2030.

Several factors are driving the growth of the spirulina and chlorella market in Europe:

- Growing number of vegans and vegetarians in Europe: [Approximately 75 million European consumers buy vegan or vegetarian foods](#) and this number is rising. As a result, the market for plant-based protein is growing fast. The [sales value of plant-based foods in Europe](#) increased by 21% between 2020 and 2022,

amounting to a total value of €5.8 billion.

European consumers continue to [be willing to include more plant-based foods into their diets](#). The [plant-based food market in Europe is projected to grow](#) at an average annual rate of 10.2% between 2022 and 2028. This, combined with the [ongoing investments and innovations in plant-based foods](#), is creating lucrative opportunities for exporters of chlorella and spirulina. The five [most innovative countries with respect to product launches for plant-based foods](#) are the UK, Portugal, the Netherlands, Germany and Austria.

- The increasing demand for natural food supplements: The European population is increasingly health conscious, resulting in a growing demand for nutritional supplements that boost the immune system. The European nutrition and supplement market is [expected to grow at an average annual rate of 5.8%](#) from 2022 to 2030. In 2030, the market is expected to reach over \$61.8 billion. This creates opportunities for [spirulina and chlorella, because both promote immune system functioning](#). The demand for food supplements is highest in Western Europe, particularly in Germany, France, Italy and the UK.

In addition, Europe is an interesting market for exporters of spirulina and chlorella because it is home to some of the most prominent product and ingredient manufacturers in the global nutraceutical industry. As a result, innovation and the development of new products based on spirulina and chlorella can flourish [within the European market](#).

Tips:

See the CBI study [What is the demand for natural ingredients for health products on the European market](#) to get more information about European markets and products in the natural ingredients for Health Products sector.

Check online sources such as the [ITC Trade Map](#) or the [EU Access2Markets](#) for more statistics on seaweeds.

Do your own market research on trends for seaweeds for health. Check online magazines such as [Nutra Ingredients](#), [Nutraceuticals World](#) or [Vitafoods Insights](#) and stay up-to-date on trends, market requirements, product launches, mergers and acquisitions.

3. Which European countries offer most opportunities for chlorella and spirulina?

There are some great opportunities for chlorella and spirulina in several European countries. These markets feature strong demand for natural food supplements and plant-based products, and most also have well-established nutraceutical industry, a focus on research and innovation, and strong infrastructure for imports. The leading markets are the UK, France, Germany, Italy, Denmark and Norway. While competition in France, Italy, and Germany does exist due to local production, these markets also present opportunities. The presence of a local microalgae industry promotes the use of microalgae across various sectors and enhances consumer recognition and awareness of its benefits.

UK: large importer of seaweeds

The UK is an attractive market for exporters of chlorella and spirulina for several reasons. First, it is the leading importer of edible seaweed for human consumption in Europe. The total value of imports reached over €11 million in 2022. The countries with the largest share of UK imports (by value) were South Korea (29%), China (20%), Philippines (15%) and Iceland (10%). The diversity of sourcing origins creates a favourable environment for exporting and marketing chlorella and spirulina.

The UK also has a well-established and innovative food and supplement industry. There is a wide range of food products and supplements available on the UK market containing spirulina and/or chlorella. Examples of food products in which spirulina and chlorella are included for health purposes include the [spirulina-infused beverage from Daily Dose Juice](#) and [chlorella fortified noodles made by Sun Chlorella](#). UK brands offering spirulina and/or chlorella powder and tablets include [Green Origins](#) and [Naturya](#).

In addition, the UK is home to a growing health-conscious population which creates opportunities for both types of microalgae. According to Public Health England, [61% of people in Britain made changes to their diet to consume healthier foods](#) in 2022. In addition, the UK is the largest market for plant-based food in Europe. The UK has a [large number of vegetarian and vegan consumers](#), driving up the demand for plant-based protein such as spirulina and chlorella.

Germany: the largest consumer market

Germany is a big market for spirulina and chlorella exporters for several reasons. First, Germany is the largest consumer market in Europe, and natural and organic products are very popular on the German market. The country has a very large number of health-conscious consumers. In 2019, [spending on health supplements in Germany surpassed €400 billion and continuous to grow](#).

This continuous growth is reflected in high demand for food supplements. The [food supplements market in Germany was valued at €2.7 billion in retail sales in 2021](#), marking an increase of 2.1% compared to the year before. This market is flourishing due to increasing health consciousness, the pursuit of self-improvement, and the desire to grow old in a healthy manner. It is estimated that one [third of the German population consumes pills, powders or capsules as part of their daily routine](#). Examples of German brands that produce supplements containing spirulina and/or chlorella include [BioNutra](#), [nu3](#) and [Nature Love](#).

There is also growing consumer interest in plant-based products in Germany. In 2022, about [44% of German described themselves as flexitarians](#), eating less meat and opting for more plant-based substitutes. The fact that Germany is a pioneer in Europe when it comes to plant-based products provides further opportunities for the use of microalgae as substitutes for animal protein.

In general, there is strong industrial demand in Germany for a wide variety of raw materials and processed ingredients for use in health products for the domestic and international market. Germany is one of the largest importers of several natural ingredients for health products. This means it has the infrastructure in place to import and distribute chlorella and spirulina.

Be aware, however, that your microalgae will be competing with spirulina and chlorella produced locally in Germany. The [German Algae Cooperative \(DAG\)](#) is Europe's largest association of microalgae producers. It consists of 11 companies that cultivate mainly spirulina and to a lesser extent chlorella, several of which are organic certified. DAG owns the [Grood Good Green Food](#) brand, with spirulina and/or chlorella flakes, powder and tablets.

France: an important market for natural food supplements

France is an attractive market for exporters of chlorella and spirulina as it has a large and growing consumer market for plant-based food supplements. In fact, [France is one of the largest European markets for food supplements](#).

In 2022, the [French food supplements market was worth €2.6 billion](#), up 3.0% compared to the year before. This market is expected to continue growing in the years to come, [at an average year-to-year rate of 6.1% from 2023 to 2028](#). This growth is partly driven by the popularity of online distribution channels. There are many chlorella and spirulina food supplements available on the market in France. Examples of brands include [Natura Force](#) and [Nutri & Co](#).

One of the reasons spirulina is popular on the French market is because France is the main spirulina producer in

Europe. The country has its own [French Federation of Spirulina](#) and local production reaches [about 45 tonnes per year](#), while an [estimated 400 tonnes of spirulina are consumed per year](#). Most spirulina is still imported, therefore, especially from China, India and the US. Although this underlines the opportunities for exporters, caution is also required. In France there is a steady trend towards favouring locally sourced products, both among health product manufacturers as well as consumers. Over 25% of French consumers say they [prefer food supplements and their ingredients to be sourced within France](#).

Although the French market provides opportunities for exporters of spirulina and chlorella, good marketing is increasingly important. [Natural and organic products are valued](#), while high-quality and sustainability aspects can also give products the edge among consumers and industry players alike.

Italy: exploring the potential applications of spirulina

Italy's annual demand for microalgae, mainly spirulina and chlorella, is [estimated at about 200 tonnes](#). Currently, there are [20 microalgae producers in Italy](#), with a capacity to supply around [25 tonnes annually](#). High-quality microalgae are currently sourced from France and Spain, while standard-quality products at lower prices are imported from Asia, particularly China.

Italy has shown significant interest in exploring the potential applications of microalgae. In 2018 the [Italian Association for the Study and Applications of Microalgae \(AISAM\)](#) was established. This non-profit association aims to promote scientific research and youth training and to support Italian companies in the sector, encouraging exchange and cooperation in the production, processing, and use of microalgal biomass. The [Italian Organic Spirulina Union \(USBI\)](#) was founded to enhance the quality and innovation of independent Italian growers of spirulina.

A growing number of Italian companies offer products containing spirulina and/or chlorella. For instance, [Il Nuovo Fresco](#) is a brand offering food products containing spirulina, including sauces and pastas. Most companies offer food supplements containing the microalgae, however, such as [AlgaVenice](#) and [Naturando](#).

Italy is the leading food supplements market in Europe. The sector in Italy has [grown at an average annual rate of 9.5%](#) over the last 10 years, [reaching €3.8 billion in 2020](#). In 2021, [over 58% of the Italian population](#) reported being regular users of food supplements. Pharmacies are the main distribution channel, selling around 80% of food supplements.

Denmark and Norway: large Nordic seaweed importers

In 2022, Norway and Denmark were Europe's second and third-largest importers of edible seaweeds. Norway imported about 4,200 tonnes at a value of €11.6 million in 2022. Imports into Norway decreased at an average annual rate of 11% between 2018 and 2022. Imports into Denmark increased significantly during the same period, from 123 tonnes in 2018 to 2,900 tonnes (€6.5 million) in 2022. Norway imported 59% of its seaweed from Chile (probably [mainly brown seaweeds](#)) and about 25% from Iceland. Denmark on the other hand sourced about 62% of its imports from Tanzania (probably [mostly red seaweeds](#)).

Both countries have health-conscious populations and plant-based diets are increasingly being recommended by government institutions. New Nordic Nutrition Recommendations were published in July 2023 and [recommended a mostly plant-based diet](#). The [food supplement market in Denmark and Norway is relatively small](#) compared to other European markets. Nevertheless, a wide variety of health shops sell food supplements containing spirulina and/or chlorella in both countries, including [Koro](#), [Plent](#) and [Naturalis](#).

Note that you will also face direct competition from the region itself when exporting microalgae. For instance, [Aliga Microalgae](#) is a Danish food-tech company and the leading microalgae producer in Scandinavia. It focuses on developing, cultivating, and producing Chlorella algae ingredients for food, feed and dietary supplements.

Tips:

Decide which market offers the best opportunities for your company and spirulina and/or chlorella products. You can get market information from sector associations, which you can find on the website of the [European Federation of Associations of Health Product Manufacturers](#), online product portfolios of brands or distributors and retailers.

Read the CBI study [Tips for finding buyers on the European market for natural ingredients for health products](#) for valuable information on how to approach European buyers successfully.

4. Which trends offer opportunities or pose threats on the European chlorella and spirulina market for health products?

The growing consumer preference for natural and plant-based products in Europe presents an opportunity for exporters of chlorella and spirulina. Increasing awareness of their potential health benefits, such as immune support, antioxidant properties, and protein content, is also helping to boost demand. However, the local production of spirulina in Europe is creating competition for exporters from other countries. European brands often prioritise European product quality, while some consumers in Europe prioritise locally sourced products. Exporters need to ensure that their products meet the specific quality and safety requirements when differentiating themselves to compete successfully on the European market.

Growing interest in the use of algae protein to produce plant-based foods

In recent years, the plant-based protein sector in Europe has experienced a lot of innovation. There has been an increased interest in using microalgae to produce plant-based foods, due to their high nutritional content.

Numerous companies are actively developing novel applications and processing techniques for spirulina and chlorella. For instance, in 2022 multinational [International Flavors & Fragrances \(IFF\)](#) partnered with [SimpliiGood](#) (Israel) to create a smoked salmon alternative made entirely from fresh spirulina. Another example is the multinational Bühler Group, which is actively investing in finding ways to [integrate novel algae ingredients into attractive products](#), such as adding algae to pasta to increase its protein content.

However, a lot more progress is still required to [integrate these ingredients fully into mainstream human consumption](#). Challenges include the absence of standardised quality norms and competition from alternative protein sources like soy.

Increased interest in healthy living opens doors for chlorella and spirulina

An increasing desire to live healthily is driving the demand for health products. European consumers use health products to prevent diseases and to feel good - by adding supplements to their regular diet, for example. The following developments are creating opportunities for microalgae like chlorella and spirulina:

- Growing demand for food supplements that support the immune system: The market for immune health supplements in Europe was estimated at \$11.8 billion in 2020 and is expected to [grow by 6.2% annually from 2021 to 2026](#). Vitamin supplements made up about 33% of the market in 2020, closely followed by herbal extracts at 30%. Although smaller in size, the market for algae is also full of opportunities. In fact, chlorella and spirulina are already increasingly popular [as they have immune system](#) benefits.
- Growing need for weight management: Rising rates of obesity and an increasing awareness of the importance of healthy lifestyles is leading to a rising demand for weight-loss supplements. The [European market is expected to grow by 9.0% annually from 2022 to 2027](#), reaching \$114 billion in 2027. According to the latest data from the World Health Organisation, [30-70% of all adults in the European Union](#) are

overweight, and 10-30% are clinically obese. Chlorella and [spirulina have nutritional benefits that can contribute to weight loss](#).

- Growing demand for sports nutrition: The European sports nutrition market is projected to register an [average year-to-year growth of 8.4% from 2022 to 2027](#). Many athletes are looking for natural sources of protein. One company that offers sports nutrition products containing spirulina and/or chlorella is [MyProtein](#) (UK).

Sustainability is increasingly important

In Europe, buyers have become much more interested in the sustainability of the natural resources that they use. At the same time, consumers are increasingly aware of the effect that their purchasing behaviour has on social and environmental conditions in production countries. Consumers increasingly demand sustainable products and want to know where their products are coming from.

Chlorella and spirulina are well-positioned to meet this sustainability trend. These microalgae [require no land, fertilisers or freshwater](#) to be cultivated, and microalgae production actually absorbs carbon dioxide (CO₂) from the air, which helps reduce water acidification. In the light of the [European Green Deal](#) and the EU's effort to achieve carbon-neutrality by 2050, this aspect of algae production is very important. It can also offer alternative job opportunities for people living in coastal communities. As most fisheries become depleted, cultivating algae is an interesting new way to create employment opportunities.

The use and promotion of the circular economy model in cultivating microalgae has also been on the rise. This means that spirulina and/or chlorella producers emphasise the efficient use of resources by creating a closed-loop system. These systems help recycle and reuse the waste streams that are generated during cultivation, such as carbon dioxide, nutrients, and water. These waste streams are redirected back into the production process, minimising environmental impact and maximising resource efficiency. Plant nutrition company Haifa Group and food-tech specialist SimpliiGood by AlgaeCore Technologies [apply the circular economy model to their production](#) methods.

Compliance with specific sustainability standards is also key in some market segments. For instance, there is growing consumer demand for organic products across Europe. This trend is expected to continue. European buyers are therefore demanding organic ingredients, including spirulina and chlorella, for their natural health products. Other than organic products, certification is not common for spirulina or chlorella. There are exceptions, however. For instance, two producers (from the United States and Japan) have certified their chlorella cultivation under the principles of [the Marine Stewardship Council and Aquaculture Stewardship Council certification standard for seaweeds](#).

Growing competition from Europe and laboratory-controlled cultivation

The potential of microalgae such as chlorella and spirulina is widely recognised. Apart from opportunities, this is creating challenges and an increasingly competitive landscape. Most [commercially available microalgae is grown in shallow bodies of water such as lakes and ponds](#). However, chlorella and spirulina can also be cultivated in fully controlled laboratories or bioreactors. European companies are tapping into this trend. Today, [European spirulina producers are predominantly located in France](#) (with 147 companies), followed by Italy (19), Germany (15), and Spain (15).

To boost the algae sector in Europe, the EU has recently funded the [IDEA project](#) (2017-2023). Spirulina and chlorella are among the species selected. The goals of the project are to produce final compounds for applications in food, animal feed, and cosmetics, reduce the cost of production and make production more sustainable by valorising by-products such as wastewater and CO₂. The project involves partners from Belgium, Germany, France, the Netherlands and Ireland.

Also, in November 2022, the European Commission prepared its algae initiative '[Towards a strong and sustainable EU algae sector](#)'. This is the beginning of a set of measures to increase the sustainable production, safe consumption, and innovative use of algae. It is expected to promote local [production](#), while discouraging

the import of cheaper and less sustainable microalgae products, primarily from Asia.

This will make it even more important for exporters to find their unique selling point and stand out from the competition. It will help to show potential buyers how your product meets a market need and how it compares to products already on the market. For example, you can focus on the quality or composition of your product or develop a marketing story based on its source. The positive effect that a spirulina and/or chlorella value chain can have on incomes and the local economy in coastal communities could be an interesting marketing angle. For instance, see how the Kenyan company [Tiwani Spirulina](#) markets their company.

Figure 3: Location of spirulina production plants in Europe



Source: [Knowledge Centre for Bioeconomy](#)

Tips:

Stay up-to-date on the latest vegan trends by visiting websites and associations such as [the Vegan Society](#) and [the Vegetarian Society](#), which provide information about vegan and vegetarian diets.

Highlight the sustainable and ethical aspects of your production process. Buyers might ask you to support your claims with certification or documentation on your sourcing practices and/or your Corporate Social Responsibility (CSR) practices.

Explore the option of getting certified for your company. This could help guarantee buyers that your product meets environmental and/or social standards. However, before applying for certifications, always talk to (potential) buyers about whether they would be interested in spirulina and/or chlorella that is certified as sustainably produced. If you are already certified, tell prospective buyers about the certification that you have. Show this clearly on your company website and in your marketing material.

Do not make any medicinal claims regarding your chlorella or spirulina in your product documentation or marketing materials if you are targeting the market for weight management or immune support. These products are sold as food supplements, which means they may not carry medicinal claims.

Gustavo Ferro and Lisanne Groothuis of [ProFound – Advisers In Development](#) carried out this study on behalf of CBI.

Please review our [market information disclaimer](#).