# ScotBio pioneers allergen-free spirulina protein to transform UK sustainable food markets



# ScotBio's Spirulina Innovation: Transforming Algae into High-Value Food Ingredients

ScotBio, a pioneering Scottish biotech start-up, is poised to revolutionise the food industry with its latest innovation—a high-value food ingredient derived from spirulina, a blue-green microalgae celebrated for its "superfood" attributes. This new product emerges from a collaboration with researchers at the Scottish Centre for Food Development and Innovation (SCFDI) at Queen Margaret University, marking a significant step forward in the sustainable food production landscape. With the backing of feasibility funding from the Industrial Biotechnology Innovation Centre (IBioIC), ScotBio aims to redefine the nutritional profile and commercial viability of spirulina in various food applications.

The new spirulina protein operates alongside ScotBio's flagship products, including SupaBlu—a pioneering spirulina-derived natural food colourant—and fresh, raw spirulina, which boasts three times the bioavailability of powdered forms. Such advancements are aimed at tapping into markets previously dominated by imported goods, filling a critical gap in the UK supply chain. Recently, ScotBio shifted to a purpose-built facility designed to scale up production using LED reactors, optimising conditions for consistent and nutritionally superior algae growth.

This strategic move has opened significant opportunities beyond the traditional markets associated with spirulina, such as health and wellness sectors, furnishing producers with innovative alternatives. Research conducted by ScotBio's team has evaluated the protein's functional characteristics, exploring its emulsifying and binding properties in a variety of recipes crafted based on consumer feedback. Intriguingly, results have suggested that this plant-based protein could rival the functionality of established ingredients, including egg and soy proteins. Remarkably, even when its natural colour and flavour are removed, the spirulina-derived protein maintains its effectiveness, establishing itself as a versatile option with minimal influence on final product taste or presentation.

One of the standout advantages of spirulina-derived protein is its allergen-free nature, distinguishing it from many synthetic alternatives. The controlled indoor cultivation approach also mitigates risks associated with traditional agriculture, including variability caused by weather and seasonal constraints, while significantly reducing land and resource requirements. Dr Joe Palmer, product development manager at ScotBio, expressed enthusiasm about the progress, stating, "Our process is unlocking possibilities for plant-based food products, offering a healthy and sustainable alternative to traditional ingredients." He emphasised the potential of this ingredient to create new revenue streams and investment opportunities, while addressing the growing demand for sustainable protein sources in the UK.

ScotBio's commitment to sustainability aligns with broader industry trends spotlighting the potential of algae in food production. Recent analyses indicate that the global spirulina protein market is not only burgeoning but is projected to reach a staggering $850 million by 2030, with significant growth predicted at a compound annual growth rate (CAGR) of approximately 7% from 2022 to 2030. Factors contributing to this surge include increasing consumer awareness of the health benefits associated with spirulina, as well as its integration into diverse applications ranging from dietary supplements to personal care products.

Moreover, the company is exploring additional avenues for the commercialisation of spirulina—a pivot that acknowledges the growing interest in its antiviral properties. Collaborations with institutions like the University of Edinburgh and Robert Gordon University have positioned ScotBio to investigate the extraction of natural antiviral molecules from spirulina, building on preliminary success where these extracts demonstrated effectiveness against various viruses, including coronaviruses. Comments from Dr Palmer indicate a firm belief in the untapped market potential: "We can now work on recovering and purifying these molecules as high-value ingredients."

Annelie du Plessis, the senior business engagement manager at IBioIC, highlighted the broader implications of ScotBio's achievements. "Their success illustrates the significant role biotech start-ups play in advancing environmentally friendly ingredients and contributing to a circular economy," she noted. This focus on sustainability is not merely idealistic; it has been recognised as pivotal in meeting consumer demand for cleaner, more environmentally responsible products.

In conclusion, ScotBio’s innovative approach to utilising spirulina positions the company as a noteworthy player in the evolution of sustainable food production. By unlocking new functionalities and leveraging the unique properties of this microalgae, ScotBio is not only addressing immediate market needs but also setting a precedent for future developments in the food industry, all while contributing to the growing dialogue around sustainability and health-conscious consumer choices.

## Reference Map:

* Paragraph 1 – [[1]](https://industrialnews.co.uk/scotbio-takes-algae-from-pond-to-plate-developing-protein-product/?utm_source=rss&utm_medium=rss&utm_campaign=scotbio-takes-algae-from-pond-to-plate-developing-protein-product), [[2]](https://industrialnews.co.uk/scotbio-takes-algae-from-pond-to-plate-developing-protein-product/?utm_source=rss&utm_medium=rss&utm_campaign=scotbio-takes-algae-from-pond-to-plate-developing-protein-product)
* Paragraph 2 – [[1]](https://industrialnews.co.uk/scotbio-takes-algae-from-pond-to-plate-developing-protein-product/?utm_source=rss&utm_medium=rss&utm_campaign=scotbio-takes-algae-from-pond-to-plate-developing-protein-product), [[6]](https://www.ingredientsnetwork.com/scotbio-expands-production-capability-news080933.html)
* Paragraph 3 – [[2]](https://industrialnews.co.uk/scotbio-takes-algae-from-pond-to-plate-developing-protein-product/?utm_source=rss&utm_medium=rss&utm_campaign=scotbio-takes-algae-from-pond-to-plate-developing-protein-product), [[4]](https://www.globenewswire.com/news-release/2023/11/09/2777094/0/en/Spirulina-Protein-Market-to-Reach-850Mn-Globally-by-2030-Exclusive-Report-by-The-Insight-Partners.html)
* Paragraph 4 – [[1]](https://industrialnews.co.uk/scotbio-takes-algae-from-pond-to-plate-developing-protein-product/?utm_source=rss&utm_medium=rss&utm_campaign=scotbio-takes-algae-from-pond-to-plate-developing-protein-product), [[5]](https://www.globenewswire.com/news-release/2023/05/02/2659309/0/en/Global-Spirulina-Protein-Market-Size-Share-Value-Estimated-to-Touch-USD-1-036-98-Million-by-2032-at-9-3-CAGR-Polaris-Market-Research.html)
* Paragraph 5 – [[3]](https://siliconscotland.com/scotbio-aims-to-battle-covid-19-and-future-pandemics-with-spirulina-waste/), [[5]](https://www.globenewswire.com/news-release/2023/05/02/2659309/0/en/Global-Spirulina-Protein-Market-Size-Share-Value-Estimated-to-Touch-USD-1-036-98-Million-by-2032-at-9-3-CAGR-Polaris-Market-Research.html)
* Paragraph 6 – [[1]](https://industrialnews.co.uk/scotbio-takes-algae-from-pond-to-plate-developing-protein-product/?utm_source=rss&utm_medium=rss&utm_campaign=scotbio-takes-algae-from-pond-to-plate-developing-protein-product), [[6]](https://www.ingredientsnetwork.com/scotbio-expands-production-capability-news080933.html)

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## Bibliography

1. <https://industrialnews.co.uk/scotbio-takes-algae-from-pond-to-plate-developing-protein-product/?utm_source=rss&utm_medium=rss&utm_campaign=scotbio-takes-algae-from-pond-to-plate-developing-protein-product> - Please view link - unable to able to access data
2. <https://industrialnews.co.uk/scotbio-takes-algae-from-pond-to-plate-developing-protein-product/?utm_source=rss&utm_medium=rss&utm_campaign=scotbio-takes-algae-from-pond-to-plate-developing-protein-product> - ScotBio, a Scottish biotech start-up, has developed a new, high-value food ingredient derived from spirulina, the blue-green microalgae known for its 'superfood' properties. Collaborating with the Scottish Centre for Food Development and Innovation (SCFDI) at Queen Margaret University, they assessed the functional profile of this sustainable protein-based ingredient, including its emulsifying and binding properties for various food products. The project received feasibility funding from the Industrial Biotechnology Innovation Centre (IBioIC). This protein is produced alongside ScotBio's flagship products, SupaBlu—a spirulina-derived natural food colorant—and fresh, raw spirulina, which offers three times more bioavailable nutrition than powdered spirulina. The company recently moved to a purpose-built facility to scale up production using LED reactors, creating an optimal environment for consistent, nutritionally purer algae growth. This expansion has opened significant markets beyond SupaBlu, allowing access to producers in the nutraceuticals industry, health & wellness sector, and food producers. The research team tested the protein's performance in various food applications, developing and refining recipes based on consumer feedback. Results showed that the by-product could match the functionality of current industry ingredients, including egg or soy protein concentrate. Even after removing its natural color and flavor, the protein continued to perform effectively, making it a versatile ingredient with minimal impact on taste or appearance. Unlike synthetic ingredients, spirulina-derived protein is allergen-free and does not require flavor enhancers or stabilizers to adjust taste and texture. Additionally, growing algae in a controlled, indoor environment avoids the variability and seasonality of traditional agricultural practices and requires significantly less land and resources, enabling sustainable year-round production of high-value ingredients in the UK. Dr. Joe Palmer, product development manager at ScotBio, expressed satisfaction with the progress, stating, 'Our process is unlocking possibilities for plant-based food products, offering a healthy and sustainable alternative to traditional ingredients. We are always looking for new ways to reduce waste, and with our proof of concept now validated for this new ingredient, we can scale up the process and diversify into new markets. This will be key to securing new revenue streams and investment opportunities for the company, while creating a valuable new protein source for the UK supply chain that can be produced here throughout the year.' Annelie du Plessis, senior business engagement manager at IBioIC, added, 'ScotBio's success highlights the significant role biotech start-ups play in advancing environmentally friendly ingredients and contributing to a circular economy. The development of high-value protein from Spirulina demonstrates algae's huge potential in sustainable food production and building supply chains within the UK.'
3. <https://siliconscotland.com/scotbio-aims-to-battle-covid-19-and-future-pandemics-with-spirulina-waste/> - ScotBio, a Scottish biotech company, is collaborating with the University of Edinburgh, Robert Gordon University, and the Industrial Biotechnology Innovation Centre (IBioIC) to explore the antiviral properties of spirulina extracts. The research aims to determine how waste molecules from spirulina can be extracted and used for their natural antiviral properties. Spirulina, a blue-green algae widely consumed as a superfood, is already used in the commercial production of various products, including dietary supplements and food colorants. ScotBio's intensive 'vertical farming of algae' approach helps recover valuable by-products, including plant-based proteins, while minimizing waste. By separating spirulina molecules into different chemical groups, the project has identified extracts with antiviral activity against coronaviruses, including various SARS-CoV-2 variants (the cause of COVID-19), common cold viruses, and influenza viruses. This supports earlier studies observing anti-HIV and anti-HSV (Herpes Simplex Virus) activity in similar compounds. These initial results show that spirulina molecules are broad-acting, have little toxicity towards mammalian cells, and could potentially form the basis of effective treatments against emerging human and animal viral diseases. Although antiviral agents are typically used for pharmaceuticals, they can also be added to products such as cosmetics—known as 'cosmeceuticals'—to fight against viral transmission. ScotBio is now looking at incorporating the molecule into various consumer products. Dr. Joe Palmer, product development manager at ScotBio, stated, 'Working with the project consortium has enabled us to fractionate spirulina into distinct chemical groups and then screen the extracts in a safe environment. Through that, we have identified compounds that could be particularly effective against a broad range of viruses from what was previously seen as waste. We can now work on recovering and purifying these molecules as high-value ingredients. The next step for us is to better understand the market opportunities for these molecules and to fully resolve the relationship between molecule chemistry and their antiviral mechanisms. Our aim is for this project to be a catalyst that will unlock a large and untapped market, helping in the fight against common viruses and future pandemics.' Liz Fletcher, director of business engagement and operations at IBioIC, commented, 'ScotBio is a great example of an ambitious biotechnology company with a unique product. Previous studies on common viruses have shown that spirulina extracts can have many positive effects on the immune response to infection, and it is exciting to support ScotBio in taking this research even further. Our aim is to help companies grow by providing them with the support they need to apply their technologies to new areas.'
4. <https://www.globenewswire.com/news-release/2023/11/09/2777094/0/en/Spirulina-Protein-Market-to-Reach-850Mn-Globally-by-2030-Exclusive-Report-by-The-Insight-Partners.html> - The global spirulina protein market is experiencing significant growth, with projections estimating it will reach $850 million by 2030, growing at a compound annual growth rate (CAGR) of approximately 7% from 2022 to 2030. Spirulina, a type of blue-green algae, is rich in essential amino acids, making it a popular ingredient in human nutrition. The rising awareness of the health benefits of spirulina is driving the global market, as consumers seek sustainable protein sources. Spirulina protein is widely available in powder form and is extensively used in dietary supplements due to its high nutritional value. It is also used in personal care products as an anti-aging, brightening, and anti-acne agent. The rising demand for spirulina protein across various application areas significantly propels the market growth. Key players in the spirulina market include Algenol, Cyanotech Corporation, Allmicroalgae, Givaudan, Corbion NV, Medikonda Nutrients, DIC CORPORATION, Far East Microalgae Industries Co Ltd, and Bluetec Naturals Co., Ltd, among others.
5. <https://www.globenewswire.com/news-release/2023/05/02/2659309/0/en/Global-Spirulina-Protein-Market-Size-Share-Value-Estimated-to-Touch-USD-1-036-98-Million-by-2032-at-9-3-CAGR-Polaris-Market-Research.html> - The global spirulina protein market is estimated to be valued at approximately USD 426.16 million in 2022 and is projected to reach USD 1,036.98 million by 2032, growing at a compound annual growth rate (CAGR) of around 9.3% between 2023 and 2032. Spirulina, a type of algae consumed as a dietary supplement, is associated with many health benefits due to its nutritional content and powerful antioxidant characteristics. It is a rich source of protein, vitamins, iron, Vitamin B-12, minerals, carotenoids, and antioxidants. Spirulina has a bitter flavor, so it is frequently blended with yogurts, juices, and smoothies to enhance flavor. Health food stores usually provide spirulina as a supplement.
6. <https://www.ingredientsnetwork.com/scotbio-expands-production-capability-news080933.html> - ScotBio, a Scottish biotech company, has expanded its production capabilities to meet the growing demand for natural blue and green colorants derived from spirulina. The company has moved to a larger facility in Lockerbie, Scotland, to increase production levels significantly and to closely monitor outcomes in a phased manner. The new facility provides the space to scale up production and allows for further expansion. Product development and R&D continue at their headquarters at BioCity, where they are engaging with food manufacturers worldwide interested in their phycocyanin and other functional food ingredients. Tom Craig, Chairman of ScotBio, stated, 'The board and staff are continuing to deliver the milestones set out in the company's business plan. This latest scale-up phase is essential as we look to build capacity, while identifying any challenges that the increase in production may produce. We also have an outstanding team of scientists who are working on additional proprietary IP to bring added value to the business.' Based in BioCity Glasgow, ScotBio has developed a patented, vessel-based process to respond to worldwide demand for clean labels and products free of artificial colors by providing traceable, natural blue and green colorants. Natural blues and greens are produced using phycocyanin, also known as spirulina extract, an algae-derived pigment that received international regulatory approval in 2013. Phycocyanin-rich algae is traditionally grown in pond systems, which are seasonal and subject to environmental contamination, but ScotBio has developed indoor vessel-based systems that are modular and scalable, capable of meeting the demand from global food manufacturers.