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Single Cell Oil Market Forecasts to 2030 – Global Analysis By Micro-Organisms (Bacteria, Yeast, Microalgae and Fungal), Grade (Fuel Grade, Feed Grade and Food Grade), Raw Material, Application and By Geography

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Abstracts

According to Stratistics MRC, the Global Single Cell Oil Market is accounted for $68.55 million in 2024 and is expected to reach $208.40 million by 2030 growing at a CAGR of 20.36% during the forecast period. Oils made from microorganisms like yeast, fungus, and algae that are grown for their capacity to produce valuable lipids are referred to as single cell oil (SCO). These microbial oils are environmentally friendly substitutes for conventional plant and animal-based oils, with benefits like quick production, adaptable fatty acid composition, and low water and land consumption. SCOs are useful in food, feed, medicine, and bio fuel applications because they are especially high in omega-3 and omega-6 fatty acids.

According to the International Energy Agency (IEA), biofuels represented approximately 3.6% of the global transport energy demand in 2021, primarily for road transport. Under the Net Zero Scenario, the contribution of biofuels to transport is likely to quadruple to 15% by 2030, amounting to almost one-fifth of the total fuel demand for road transport alone.

Market Dynamics:

Driver:

Growing interest in sustainable oils

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The hunt for alternative lipid sources has accelerated due to growing environmental sustainability consciousness and deforestation, habitat destruction, and greenhouse gas emissions caused by conventional oil extraction. Because single cell oils (SCOs), which are made from microorganisms like algae, fungi, and yeast, require less land and water than fish, soybean, or palm oils, they present a promising alternative. The food, cosmetic, and pharmaceutical industries are among those investigating SCO as a sustainable substitute due to its capacity to generate high-value lipids without the environmental problems associated with conventional oil sources.

Restraint:

Limited production on a commercial scale

Scaling up single-cell oil production is still very difficult, even with advances in technology. Keeping ideal growth conditions, guaranteeing steady lipid accumulation, and effectively extracting the oils without sacrificing yield or quality are some of the challenges that impede the shift from laboratory-scale to industrial-scale production. The complexity of large-scale production is increased by the fact that many microorganisms require carefully regulated fermentation conditions, such as temperature, pH, and nutrient availability. Additionally, downstream processing—this includes drying, oil extraction, and cell harvesting—remains costly and energy-intensive.

Opportunity:

Growing interest in alternative and sustainable oils

The increasing environmental concerns surrounding conventional oils like palm and soybean oil have driven demand for sustainable alternatives. Single-cell oils (SCOs), which are made from bacteria, fungi, and microalgae, offer an environmentally friendly alternative because they can be made without requiring a lot of land or deforestation. In food, cosmetics, and industrial applications, SCOs have become viable alternatives to palm oil and other vegetable oils as industries look for environmentally friendly, sustainable lipid sources. Furthermore, they are also appropriate for applications that call for particular lipid profiles due to their adaptable fatty acid compositions, which increase their appeal on the international market.

Threat:

Significant competition from traditional oils

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The global edible oil and lipid markets are dominated by low-cost, widely available oils such as palm oil, soybean oil, and fish oil. These oils are hard to replace because of their established industry relationships, economies of scale, and well-established supply chains. Furthermore, while SCOs are still relatively new and unknown to the majority of manufacturers and consumers, traditional oils have a well-established customer base. To compete with current products, single-cell oils must demonstrate their superior functionality and cost-effectiveness, even in niche markets like biofuels, food fortification, and omega-3 supplements. Moreover, adoption of SCO may continue to be restricted to specialized applications in the absence of distinct price advantages or unique benefits.

Covid-19 Impact:

The COVID-19 pandemic affected supply chains, production, and demand dynamics in a number of industries, with varying effects on the single cell oil (SCO) market. At first, SCO production and distribution were impacted by labor shortages, global supply chain disruptions, and raw material shortages, which resulted in delays and higher expenses. The pandemic did, however, also increase consumer demand for immune-boosting supplements, nutraceutical, and functional foods, which sparked interest in SCOs high in omega-3 fatty acids (DHA & EPA) as sustainable substitutes for fish oil.

The Microalgae segment is expected to be the largest during the forecast period

The Microalgae segment is expected to account for the largest market share during the forecast period due to its high lipid content, superior omega-3 fatty acid composition (DHA & EPA), and extensive use in food, nutraceuticals, and aquaculture. Microalgae-based oils are a sustainable and vegan-friendly substitute for fish and krill oil, increasing their popularity in animal feed, dietary supplements, and functional foods. The market's dominance has been further bolstered by the growing demand for plant-based and sustainable lipid sources, as well as by developments in bioprocessing and large-scale algal cultivation. Furthermore, government initiatives and investments in bio-based solutions have also accelerated research and commercial adoption, further solidifying microalgae's position as a leader in the SCO market.

The Fish Oil Substitute segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the Fish Oil Substitute segment is predicted to witness the

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highest growth rate, driven by the rising demand for sustainable, plant-based omega-3 sources in food, nutraceuticals, and aquaculture. Microalgae-based SCOs are a popular option because industries are actively looking for alternative lipid sources rich in DHA and EPA due to worries about overfishing, marine pollution, and diminishing fish oil supplies. Demand is also being fueled by the growing popularity of vegetarian and vegan diets as well as heightened awareness of ethical sourcing and environmental sustainability. Moreover, developments in large-scale algal cultivation and microbial fermentation are increasing the cost-effectiveness and efficiency of production, making SCOs a competitive alternative to conventional fish oil in a variety of sectors, such as aquafeed, dietary supplements, and functional foods.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share, driven by substantial investments in biotechnology and sustainable lipid production, as well as the strong consumer demand for plant-based omega-3 supplements, nutraceuticals, and functional foods. The food and dietary supplement industries in the area are well-established, and vegan and alternative oils are becoming more and more popular than conventional fish and vegetable oils. The market is also growing as a result of government support for bio-based industries, developments in microbial fermentation, and robust R&D efforts by major players like DSM, Corbion, and Cargill. Additionally, North America's market dominance is further cemented by the growing use of SCOs in biofuels, pharmaceuticals, and aquaculture feed.

Region with highest CAGR:

Over the forecast period, the Europe region is anticipated to exhibit the highest CAGR, driven by stringent sustainability laws, growing demand for plant-based substitutes, and biotechnology breakthroughs. Because of the region's strong emphasis on lowering dependency on conventional fish and vegetable oils, microalgae-based SCOs are being used more frequently in functional foods, pharmaceuticals, and aquaculture. Market expansion is further supported by the fact that nations like Germany, France, and the UK are at the forefront of biotechnology research and fermentation-based lipid production. Furthermore, the expansion of SCO applications in food, feed, and biofuels in Europe is being accelerated by growing consumer awareness of vegan and sustainable omega-3 sources, as well as government incentives for bio-based industries and renewable energy sources.

Key players in the market

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Some of the key players in Single Cell Oil market include Alltech Biotechnology Pvt. LTD, Hubei Xinhe Biotechnology Co. Ltd., Novozymes A/S, Royal DSM NV, Corbion N.V., Archer Daniels Midland (ADM), Cellana Inc, Goerlich Pharma GmbH, Evonik Industries AG, Cargill Incorporated, Xiamen Huison Biotech Co.Ltd., Bioriginal Food & Science Corp., Chevron Corporation, Omega Protein Corporation and TerraVia Holdings, Inc.

Key Developments:

In April 2024, Corbion and Kingswood Capital Management, LP (“Kingswood”), a middle-market private equity firm with significant experience in corporate carve-outs have completed the earlier announced sale of Corbion's emulsifiers business. Kingswood acquired the emulsifier business from Corbion for a cash purchase price of $362M, with expected net cash proceeds of approximately $275M, post tax and transaction costs.

In December 2023, ADM announced that it has reached an agreement to acquire UK-based FDL, a leading developer and producer of premium flavor and functional ingredient systems. FDL, with projected 2023 sales of approximately $120 million, operates three production facilities and two customer innovation centers, all in the United Kingdom.

In December 2022, Novozymes and Chr. Hansen have entered into an agreement to create a leading global biosolutions partner through a statutory merger of the two companies. The combination is expected to unleash the full potential of biological solutions and generate significant value for all stakeholders and society at large.

Micro-Organisms Covered:

- Bacteria
- Yeast
- Microalgae
- Fungal

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Grades Covered:

- Fuel Grade
- Feed Grade
- Food Grade

Raw Materials Covered:

- Sugarcane Mill
- Agro-Industrial Waste

Applications Covered:

- Bio-Fuel Feedstock
- Fish Oil Substitute
- Functional Oils
- Animal Feed
- Infant Formulae
- Pharmaceutical Products
- Aquaculture

Regions Covered:

- North America
  - US

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- Canada
- Mexico

Europe

- Germany
- UK
- Italy
- France
- Spain
- Rest of Europe

Asia Pacific

- Japan
- China
- India
- Australia
- New Zealand
- South Korea
- Rest of Asia Pacific

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- Argentina
- Brazil

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Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:
- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2022, 2023, 2024, 2026, and 2030
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

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All the customers of this report will be entitled to receive one of the following free customization options:

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Comprehensive profiling of additional market players (up to 3)

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SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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