

Air-Derived Protein Ingredients Market Forecasts to 2034 – Global Analysis By Production Method (Direct Air Capture, Carbon Utilization, Air Fermentation, Gas Fermentation and Other Production Methods), Feedstock, Protein Form, Product Type, End User, and Geography

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Abstracts

According to Statistics MRC, the Global Air-Derived Protein Ingredients Market is accounted for \$0.3 billion in 2026 and is expected to reach \$2.1 billion by 2034 growing at a CAGR of 27.6% during the forecast period. Air-Derived Protein Ingredients is a novel protein produced by cultivating microorganisms that convert carbon dioxide, oxygen, hydrogen, or other gaseous feedstocks into biomass containing proteins and other nutrients. The production process can operate independently of conventional farmland and may require substantially less agricultural land and water than livestock-based protein production. Air-Derived Protein Ingredientss can be incorporated into meat alternatives, nutritional products, functional foods, and other formulated foods. Their production supports alternative food manufacturing and resource-efficient protein supply. Increasing interest in climate-conscious food technologies and alternative proteins is driving development of Air-Derived Protein Ingredients products.

Market Dynamics

Driver:

Growing demand for carbon-neutral protein sources

Increasing consumer and corporate demand for carbon-neutral, sustainable protein sources with minimal environmental impact is driving adoption of Air-Derived Protein

Ingredients across food and beverage applications. Air-Derived Protein Ingredientss offer potential for carbon-negative production by utilizing captured carbon dioxide and renewable energy. Growing interest in novel, sustainable protein technologies is accelerating market development and investment in the sector. Corporate sustainability commitments and net-zero targets are driving ingredient innovation and product development. Consumer openness to innovative protein sources continues to grow.

Restraint:

High production costs and technology maturity

High production costs and technology immaturity present significant challenges for commercial-scale Air-Derived Protein Ingredients production and market competitiveness. Fermentation and gas utilization technologies require significant capital investment and technical expertise for operation. Limited production capacity and high scale-up costs constrain supply availability for product development and commercial applications. Consumer perception of Air-Derived Protein Ingredients as highly processed may affect acceptance. Regulatory approval processes for novel proteins can be lengthy.

Opportunity:

Innovation in gas fermentation technology

Innovation in gas fermentation technology enabling efficient conversion of carbon gases to protein is expanding production possibilities and improving economics for Air-Derived Protein Ingredients. Development of cost-effective production platforms is improving competitiveness with conventional and alternative proteins. Growing investment in production capacity and technology development is accelerating market growth. Partnerships between technology companies and food manufacturers are creating commercialization pathways. Technology advances continue improving production efficiency.

Threat:

Competition from other sustainable protein sources

Competition from other sustainable protein sources including plant-based, fermented, and cultivated proteins may limit Air-Derived Protein Ingredients market development. Technology uncertainty may affect investor confidence and funding availability.

Regulatory barriers to novel protein approval may delay market entry. Consumer acceptance of Air-Derived Protein Ingredients may be affected by perceptions of processing and novelty. Economic pressures may delay commercial scale-up.

Covid-19 Impact:

The COVID-19 pandemic accelerated investment in novel food technologies and sustainable protein production as supply chain vulnerabilities highlighted food system challenges. Interest in alternative proteins with lower environmental impact increased significantly. The post-pandemic period has witnessed sustained investment in fermentation and gas-based protein technologies. Growing corporate sustainability commitments continue driving technology development. Food system transformation continues across the industry.

The gas fermentation segment is expected to be the largest during the forecast period

The gas fermentation segment is expected to account for the largest market share during the forecast period as gas fermentation represents the most commercially advanced production method for Air-Derived Protein Ingredients with established technology platforms and scale-up activity. Gas fermentation utilizes carbon gases as feedstocks for protein-producing microorganisms with favorable environmental profiles. Growing investment in production capacity supports segment leadership. Gas fermentation offers potential for carbon-negative protein production. Commercial-scale production is advancing most rapidly in this segment.

The protein powder segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the protein powder segment is predicted to witness the highest growth rate driven by increasing demand for versatile protein ingredients in sports nutrition, supplements, and functional food applications. Protein powder offers convenient incorporation into beverages and food products for protein enhancement. Growing consumer interest in novel protein ingredients for nutrition supports powder adoption. Powder formats enable easy formulation across product categories. Versatility makes powders the preferred format for new product development.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share owing to strong venture capital investment in novel food technologies, early adoption of Air-Derived Protein Ingredients, and presence of technology developers. The United States hosts leading Air-Derived Protein Ingredients companies with significant research and development capabilities. Strong innovation culture and investor interest reinforce regional market leadership. Growing consumer interest in sustainable proteins drives technology development across the region.

Region with highest CAGR:

Over the forecast period, the Europe region is anticipated to exhibit the highest CAGR driven by strong regulatory support for sustainable food innovation, climate policy alignment, and growing consumer awareness of alternative proteins. European Union sustainability policies and climate commitments create favorable market environment for Air-Derived Protein Ingredients development. Significant research funding and corporate investment support technology commercialization across the region. Strong sustainability culture drives consumer acceptance and market development.

Key players in the market

Some of the key players in the Air-Derived Protein Ingredients Market include Solar Foods Oyj, Air Protein, Inc., Arkeon GmbH, Deep Branch Biotechnology Ltd., Novameat S.p.A., Calysta, Inc., Unibio A/S, STRING Bio Pvt. Ltd., LanzaTech Global, Inc., North Sea Farmers, Precision Fermentation Alliance, Arborea, Protein Distillery, and Gas2Feed.

Key Developments:

In May 2025, Solar Foods Oyj announced commercial-scale production of its Air-Derived Protein Ingredients ingredient from carbon dioxide and renewable energy. The production milestone enables broader product development and food manufacturer partnerships across global markets.

In March 2025, Air Protein, Inc. launched new Air-Derived Protein Ingredients ingredients for meat alternatives and food applications with enhanced functional properties and nutritional profiles.

Production Methods Covered:

Direct Air Capture

Carbon Utilization

Air Fermentation

Gas Fermentation

Other Production Methods

Feedstocks Covered:

Carbon Dioxide

Carbon Monoxide

Hydrogen

Methane

Other Feedstocks

Protein Forms Covered:

Protein Powder

Protein Concentrate

Protein Isolate

Protein Biomass

Other Protein Forms

Products Covered:

Meat Alternatives

Dairy Alternatives

Protein Supplements

Functional Foods

Other Products

End Users Covered:

Food Manufacturers

Beverage Manufacturers

Nutrition Companies

Foodservice Providers

Retail Consumers

Other End Users

Regions Covered:

North America

United States

Canada

Mexico

Europe

United Kingdom

Germany

France

Italy

Spain

Netherlands

Belgium

Sweden

Switzerland

Poland

Rest of Europe

Asia Pacific

China

Japan

India

South Korea

Australia

Indonesia

Thailand

Malaysia

Singapore

Vietnam

Rest of Asia Pacific

South America

Brazil

Argentina

Colombia

Chile

Peru

Rest of South America

Rest of the World (RoW)

Middle East

Saudi Arabia

United Arab Emirates

Qatar

Israel

Rest of Middle East

Africa

South Africa

Egypt

Morocco

Rest of 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 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034

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

Free Customization Offerings:

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

Company Profiling

Comprehensive profiling of additional market players (up to 3)

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

Contents

1 EXECUTIVE SUMMARY

- 1.1 Market Snapshot and Key Highlights
- 1.2 Growth Drivers, Challenges, and Opportunities
- 1.3 Competitive Landscape Overview
- 1.4 Strategic Insights and Recommendations

2 RESEARCH FRAMEWORK

- 2.1 Study Objectives and Scope
- 2.2 Stakeholder Analysis
- 2.3 Research Assumptions and Limitations
- 2.4 Research Methodology
 - 2.4.1 Data Collection (Primary and Secondary)
 - 2.4.2 Data Modeling and Estimation Techniques
 - 2.4.3 Data Validation and Triangulation
 - 2.4.4 Analytical and Forecasting Approach

3 MARKET DYNAMICS AND TREND ANALYSIS

- 3.1 Market Definition and Structure
- 3.2 Key Market Drivers
- 3.3 Market Restraints and Challenges
- 3.4 Growth Opportunities and Investment Hotspots
- 3.5 Industry Threats and Risk Assessment
- 3.6 Technology and Innovation Landscape
- 3.7 Emerging and High-Growth Markets
- 3.8 Regulatory and Policy Environment
- 3.9 Impact of COVID-19 and Recovery Outlook

4 COMPETITIVE AND STRATEGIC ASSESSMENT

- 4.1 Porter's Five Forces Analysis
 - 4.1.1 Supplier Bargaining Power
 - 4.1.2 Buyer Bargaining Power
 - 4.1.3 Threat of Substitutes
 - 4.1.4 Threat of New Entrants

- 4.1.5 Competitive Rivalry
- 4.2 Market Share Analysis of Key Players
- 4.3 Product Benchmarking and Performance Comparison

5 GLOBAL AIR-DERIVED PROTEIN INGREDIENTS MARKET, BY PRODUCTION METHOD

- 5.1 Direct Air Capture
- 5.2 Carbon Utilization
- 5.3 Air Fermentation
- 5.4 Gas Fermentation
- 5.5 Other Production Methods

6 GLOBAL AIR-DERIVED PROTEIN INGREDIENTS MARKET, BY FEEDSTOCK

- 6.1 Carbon Dioxide
- 6.2 Carbon Monoxide
- 6.3 Hydrogen
- 6.4 Methane
- 6.5 Other Feedstocks

7 GLOBAL AIR-DERIVED PROTEIN INGREDIENTS MARKET, BY PROTEIN FORM

- 7.1 Protein Powder
- 7.2 Protein Concentrate
- 7.3 Protein Isolate
- 7.4 Protein Biomass
- 7.5 Other Protein Forms

8 GLOBAL AIR-DERIVED PROTEIN INGREDIENTS MARKET, BY PRODUCT TYPE

- 8.1 Meat Alternatives
- 8.2 Dairy Alternatives
- 8.3 Protein Supplements
- 8.4 Functional Foods
- 8.5 Other Products

9 GLOBAL AIR-DERIVED PROTEIN INGREDIENTS MARKET, BY END USER

- 9.1 Food Manufacturers
- 9.2 Beverage Manufacturers
- 9.3 Nutrition Companies
- 9.4 Foodservice Providers
- 9.5 Retail Consumers
- 9.6 Other End Users

10 GLOBAL AIR-DERIVED PROTEIN INGREDIENTS MARKET, BY GEOGRAPHY

- 10.1 North America
 - 10.1.1 United States
 - 10.1.2 Canada
 - 10.1.3 Mexico
- 10.2 Europe
 - 10.2.1 United Kingdom
 - 10.2.2 Germany
 - 10.2.3 France
 - 10.2.4 Italy
 - 10.2.5 Spain
 - 10.2.6 Netherlands
 - 10.2.7 Belgium
 - 10.2.8 Sweden
 - 10.2.9 Switzerland
 - 10.2.10 Poland
 - 10.2.11 Rest of Europe
- 10.3 Asia Pacific
 - 10.3.1 China
 - 10.3.2 Japan
 - 10.3.3 India
 - 10.3.4 South Korea
 - 10.3.5 Australia
 - 10.3.6 Indonesia
 - 10.3.7 Thailand
 - 10.3.8 Malaysia
 - 10.3.9 Singapore
 - 10.3.10 Vietnam
 - 10.3.11 Rest of Asia Pacific
- 10.4 South America
 - 10.4.1 Brazil

- 10.4.2 Argentina
- 10.4.3 Colombia
- 10.4.4 Chile
- 10.4.5 Peru
- 10.4.6 Rest of South America
- 10.5 Rest of the World (RoW)
 - 10.5.1 Middle East
 - 10.5.1.1 Saudi Arabia
 - 10.5.1.2 United Arab Emirates
 - 10.5.1.3 Qatar
 - 10.5.1.4 Israel
 - 10.5.1.5 Rest of Middle East
 - 10.5.2 Africa
 - 10.5.2.1 South Africa
 - 10.5.2.2 Egypt
 - 10.5.2.3 Morocco
 - 10.5.2.4 Rest of Africa

11 STRATEGIC MARKET INTELLIGENCE

- 11.1 Industry Value Network and Supply Chain Assessment
- 11.2 White-Space and Opportunity Mapping
- 11.3 Product Evolution and Market Life Cycle Analysis
- 11.4 Channel, Distributor, and Go-to-Market Assessment

12 INDUSTRY DEVELOPMENTS AND STRATEGIC INITIATIVES

- 12.1 Mergers and Acquisitions
- 12.2 Partnerships, Alliances, and Joint Ventures
- 12.3 New Product Launches and Certifications
- 12.4 Capacity Expansion and Investments
- 12.5 Other Strategic Initiatives

13 COMPANY PROFILES

- 13.1 Solar Foods Oyj
- 13.2 Air Protein, Inc.
- 13.3 Arkeon GmbH
- 13.4 Deep Branch Biotechnology Ltd.

13.5 Novameat S.p.A.

13.6 Calysta, Inc.

13.7 Unibio A/S

13.8 STRING Bio Pvt. Ltd.

13.9 Calysta, Inc.

13.10 LanzaTech Global, Inc.

13.11 North Sea Farmers

13.12 Precision Fermentation Alliance

13.13 Arborea

13.14 Protein Distillery

13.15 Gas2Feed

List of Tables

Table 1 Global Air-Derived Protein Ingredients Market Outlook, By Region (2023-2034) (\$MN)

Table 2 Global Air-Derived Protein Ingredients Market, By Production Method (2023–2034) (\$MN)

Table 3 Global Air-Derived Protein Ingredients Market, By Direct Air Capture (2023–2034) (\$MN)

Table 4 Global Air-Derived Protein Ingredients Market, By Carbon Utilization (2023–2034) (\$MN)

Table 5 Global Air-Derived Protein Ingredients Market, By Air Fermentation (2023–2034) (\$MN)

Table 6 Global Air-Derived Protein Ingredients Market, By Gas Fermentation (2023–2034) (\$MN)

Table 7 Global Air-Derived Protein Ingredients Market, By Other Production Methods (2023–2034) (\$MN)

Table 8 Global Air-Derived Protein Ingredients Market, By Feedstock (2023–2034) (\$MN)

Table 9 Global Air-Derived Protein Ingredients Market, By Carbon Dioxide (2023–2034) (\$MN)

Table 10 Global Air-Derived Protein Ingredients Market, By Carbon Monoxide (2023–2034) (\$MN)

Table 11 Global Air-Derived Protein Ingredients Market, By Hydrogen (2023–2034) (\$MN)

Table 12 Global Air-Derived Protein Ingredients Market, By Methane (2023–2034) (\$MN)

Table 13 Global Air-Derived Protein Ingredients Market, By Other Feedstocks (2023–2034) (\$MN)

Table 14 Global Air-Derived Protein Ingredients Market, By Protein Form (2023–2034)

(\$MN)

Table 15 Global Air-Derived Protein Ingredients Market, By Protein Powder
(2023–2034) (\$MN)

Table 16 Global Air-Derived Protein Ingredients Market, By Protein Concentrate
(2023–2034) (\$MN)

Table 17 Global Air-Derived Protein Ingredients Market, By Protein Isolate (2023–2034)
(\$MN)

Table 18 Global Air-Derived Protein Ingredients Market, By Protein Biomass
(2023–2034) (\$MN)

Table 19 Global Air-Derived Protein Ingredients Market, By Other Protein Forms
(2023–2034) (\$MN)

Table 20 Global Air-Derived Protein Ingredients Market, By Product Type (2023–2034)
(\$MN)

Table 21 Global Air-Derived Protein Ingredients Market, By Meat Alternatives
(2023–2034) (\$MN)

Table 22 Global Air-Derived Protein Ingredients Market, By Dairy Alternatives
(2023–2034) (\$MN)

Table 23 Global Air-Derived Protein Ingredients Market, By Protein Supplements
(2023–2034) (\$MN)

Table 24 Global Air-Derived Protein Ingredients Market, By Functional Foods
(2023–2034) (\$MN)

Table 25 Global Air-Derived Protein Ingredients Market, By Other Products (2023–2034)
(\$MN)

Table 26 Global Air-Derived Protein Ingredients Market, By End User (2023–2034)
(\$MN)

Table 27 Global Air-Derived Protein Ingredients Market, By Food Manufacturers
(2023–2034) (\$MN)

Table 28 Global Air-Derived Protein Ingredients Market, By Beverage Manufacturers
(2023–2034) (\$MN)

Table 29 Global Air-Derived Protein Ingredients Market, By Nutrition Companies
(2023–2034) (\$MN)

Table 30 Global Air-Derived Protein Ingredients Market, By Foodservice Providers
(2023–2034) (\$MN)

Table 31 Global Air-Derived Protein Ingredients Market, By Retail Consumers
(2023–2034) (\$MN)

Table 32 Global Air-Derived Protein Ingredients Market, By Other End Users
(2023–2034) (\$MN)

Note: Tables for North America, Europe, APAC, South America, and Rest of the World (RoW) are also represented in the same manner as above.

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