LIPID UNIVERSE

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New US Dietary Guidelines : More Whole Foods, Less Ultra Processed Food

Trade News

Important Figures

A Review on Algal Oils as a Sustainable Source of Essential Omega-3

Health News

Cinnamon (*Cinnamomum zeylanicum*) Essential Oil

Members' Page

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Editor-in-chief desk.....



Dear Friends,

It is a pleasure to place before you the first issue of our fourteenth volume. A journal that completes thirteen years owes its longevity entirely to its readers and contributors, and I begin the new volume by thanking both.

The year has opened with a development that few in our fraternity can ignore. The revised Dietary Guidelines for Americans have inverted the familiar food pyramid, given animal proteins and fats a place alongside fruits and vegetables, and named olive oil, butter and beef tallow among cooking fats. Equally notable is what has not changed: the ceiling on saturated fat remains at ten per cent of daily calories. The guidance has drawn sharp comment from distinguished nutrition scientists, and our members would do well to read the full discussion in this issue rather than the headlines. For those of us in the edible oil sector, the lesson is not that one fat has triumphed over another, but that dietary advice now travels faster than the evidence behind it. Our responsibility as oil technologists is to keep the conversation anchored in composition, processing quality and honest labelling.

Technology, meanwhile, continues to reward patience. The enzymatic fat-splitting route launched by Novonesis with thyssenkrupp Uhde runs at 70 °C and atmospheric pressure against the 260 °C and 60 bar of conventional splitting towers, with a claimed reduction in capital expenditure of up to sixty per cent. For Indian oleochemical units weighing brownfield expansion against energy costs, this deserves close study.

On the sustainability front, the reported unravelling of the Amazon Soy Moratorium is a sobering reminder that voluntary commitments survive only as long as the economics permit them; buyers in importing countries, including ours, will increasingly have to verify what they once took on trust.

The trade section also records the easing of Chinese restrictions on Canadian canola and the USDA's projection of a seventeen per cent rise in soybean oil going to biofuel, taking that figure to 17.3 billion pounds. The old question returns in a new form: how much of the world's vegetable oil should move to the fuel tank, and at what price to the cooking pot. The Important Figures tables in this issue give members the numbers with which to form their own view, and I commend them particularly to those tracking India's import dependence.

Two contributions look beyond the conventional oilseed basket. The review on algal oils as a sustainable source of omega-3 sets out the case for microalgae as a vegan, contaminant-free and scalable alternative to fish oil, along with the extraction routes now under development. It is complemented in our Health News pages by the Scottish work converting spent distillery barley into omega-3-rich algae, and by the report on hickory nut oil from Minnesota - a wild tree being coaxed towards commercial oilseed status.

Our Laugh and Loud column, which reminds us that good chemistry and good humour have always kept company.

I invite members to send in review articles, plant experiences and technical notes for forthcoming issues. Our pages are open, and the strength of this news letter has always been that its content comes from those who work in the industry rather than merely write about it.

Warm regards,

Yours truly

C.S. Joshi

Editor-in-Chief, Lipid Universe

Editor-in-chief desk.....

Editor's desk.....



Dear Readers,

Why dietary recommendations change over time? This question may well come to our minds. It is because of that nutrition science is an evolving field that continuously updates based on research, better technology, and deeper understanding of human biology. The 2025-2030 Dietary Guidelines for Americans released in January 2026, introduce an inverted food pyramid centred on the theme " eat real food", shifting focus toward higher protein intake, full- fat dairy, and whole foods while sharply cutting down recommendations for grains and processed items.

The guidelines heavyly target ultra- processed foods (factory - made foods with added chemicals, high sodium, and fake sugars). They promote whole , nutrient dense foods in their natural state, and cutting out artificial or zero - calorie chemical sweeteners completely alongside added sugars..

Another interrogative about why Algae oil is a great choice ? Because of that it's a superior, plant based choice that provides EPA and DHA, the same active omega-3 fatty acids found in fish oil. Completely plant-based making it ideal for Vegans, vegetarians and people with fish or seafood allergies. Algae oil is rich in DHA and EPA, the two crucial omega-3s that support heart, brain and eye health.

Modern biotechnological methods - such as enzymatic extraction and ultrasonication - maximize purity and oil yield while lowering environmental footprints. It is grown in controlled environments, it is free from ocean - derived toxins like heavy metals and microplastics, and it's production does not contribute to overfishing.

May be mentioned that our Trade news and Health news will be very informative to our Readers. In the multi - billion - dollar lipid industry which spans functional foods, dietary supplements, biotecnology, neutraceuticals and pharmaceuticals - trade news and health news act as the dual engines.

While trade news focuses on the commercial, corporate expansions, supply chain updates, consumer demand on food and non- food uses of lipid products, and regulatory operations of the market ; health news bridges nutritional, medical aspects of lipids, tracking academic studies and scientific breakthroughs with public awareness.

In this issue, Readers will also find a compact article on Cinnamon Essential Oil, and Members' page, interesting and informative.

With heartiest regards,

Dr. S. Adhikari
Editor

Editor's desk.....

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NEW US DIETARY GUIDELINES : MORE WHOLE FOODS, LESS ULTRA PROCESSED FOOD



If you're eating several servings of fruits and vegetables daily, avoiding ultra processed foods and baking your chicken instead of frying it, you're already following some of the newly updated Dietary Guidelines for Americans.

The guidance released Wednesday largely retains some of the previous advice while also making room for US Health and Human Services Secretary Robert F. Kennedy Jr.'s **"Make America Healthy Again" movement** — urging Americans to eat whole foods, healthy fats and more protein, and to limit consumption of added sugar and preservatives.

"There's some really good things about it that can really make a difference," said Dr. Marion Nestle, the Paulette Goddard Professor Emerita of Nutrition, Food Studies and Public Health at New York University.

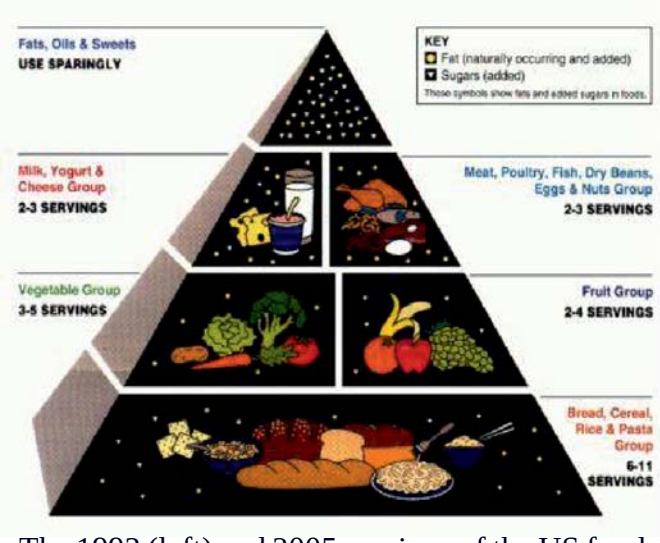
But other parts of the new guidance are "muddled, inconsistent, ideological, retro and hard to understand," Nestle said. The recommendations also come with a new inverted food pyramid that's the most significant shift from the outdated icon long held in Americans' collective memory of how various food groups should be prioritized.

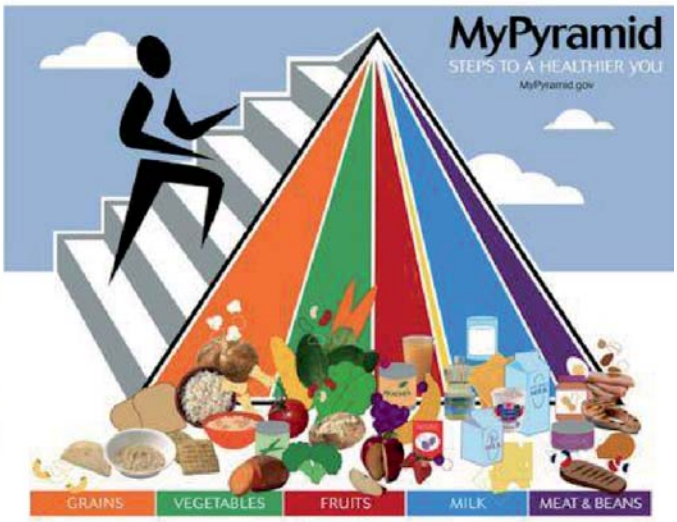
To help clear up any confusion over these new guidelines, here's how Nestle and other experts suggest you eat for your health and well-being.

A history of the US food pyramid

The US Department of Agriculture first promoted the food pyramid in 1992, adapting a concept **developed in Sweden** in the 1970s. Every five years, HHS and the USDA update the dietary guidelines.

In ascending order of serving sizes, the original US food pyramid recommended that fats, oils and sweets be used sparingly, and that dairy products, proteins and nuts be equal components of one's diet.





The 1992 (left) and 2005 versions of the US food pyramid. USDA

Vegetables and fruits were the next largest category, then grains. The 2005 visual was largely similar, but lessened the amount of protein recommended and added an icon representing physical activity.

The 2005 pyramid with the vertical rays "was really confusing, even more confusing than the one they put out today," said Dr. Jerold Mande, CEO of Nourish Science, a nongovernmental organization focused on nutrition crises in the United States. Mande was formerly a senior policy official at the USDA and the US Food and Drug Administration.

"None of that was intuitive or clear to people," Mande added.

When the USDA released the 2010 to 2015 dietary guidelines in 2011, it traded the food pyramid for MyPlate. From then until now, the image of a plate divided into sections has more clearly depicted what serving sizes should look like in an actual meal.

In the 2025-2030 guidelines, the pyramid is back but both the shape and some of its recommendations are now inverted: Animal proteins and fats — from





The 2011 MyPlate (left) and the newly released 2026 food pyramid. USDA

both animals and plants — get just as much space at the top as vegetables and fruits, indicating the emphasis on more protein intake. The new visual also moves whole grains to the bottom, though the actual guidebook doesn't recommend consuming a significantly lower amount of grains than produce. The guidelines recommend two to four daily servings of whole grains, three servings of vegetables and two servings of fruit.

The inverted pyramid is more straightforward in a technical sense, Mande said. But in terms of health guidance, it's "the most egregious aspect of the new guidelines," said Dr. Walter Willett, a professor of epidemiology and nutrition at Harvard T.H. Chan School of Public Health in Boston. "The emphasis on high intake of dairy foods and meat is inconsistent with the evidence … showing that plant sources of protein such as nuts, soy foods, and other legumes reduce risk of cardiovascular disease when compared to red meat."

Eat whole foods

The guidelines encourage **increasing your intake** of a variety of whole, fibrous and colorful foods, which include fruits, vegetables, grains, nuts and seeds, and legumes.

"This is something that is absolutely a worthy goal," said Dr. Alison Steiber, a registered dietitian nutritionist and the chief mission, impact and strategy officer for the Academy of Nutrition and Dietetics.



Regularly consuming fresh fruits and vegetables is linked with better health and disease outcomes.

Catherine Delahaye/Digital Vision/Getty Images

Quality whole grains include brown rice, rolled or steel-cut oats, quinoa, farro, and whole wheat. Adults should consume 22 to 34 grams of fiber daily depending on age and sex, according to **the previous edition** of the dietary guidelines.

While previous guidelines recommended 4.5 cups, or nine servings total, of fruits and vegetables daily, the new guidelines nearly halve that, Nestle said. "I don't know where that came from," she said. "If you want a healthy microbiome, you need fiber. You have got to feed those bacteria, and the fiber does that."

To learn about appropriate serving sizes of all these foods and more, you can view the **American Heart Association's guidance**.

Consume less ultra processed food

The guidelines also encourage reducing your consumption of highly processed foods, which aligns with what many health experts advise.

That's because studies have linked **ultra processed foods** with numerous health issues and diseases including type 2 diabetes, cardiovascular disease, obesity, cancer, depression, cognitive decline and more. The products are manufactured using industrial techniques and some ingredients "never or rarely used in kitchens," according to the **Food and Agriculture Organization** of the United Nations.

These foods are typically **low in fiber** and high in calories, added sugar, refined grains and fats, sodium, and additives, all of which are designed to help make food more appealing. **Additives often include** preservatives to maintain freshness and texture or resist mold and bacteria, and emulsifiers



I'm saving more money next year by meal prepping. Here's everything I use to do it

to prevent ingredients from naturally separating. Other common additives include fragrance and flavor enhancers and agents for anti-foaming, bleaching, bulking, gelling and glazing.

In addition to eating more whole foods to avoid ultraprocessed foods, you should also read ingredient labels when you shop and pay attention to how foods make you feel. Ultra processed foods can **leave you wanting more**, whereas whole foods are more satiating.

Healthy fats and dairy intake

The dietary guidelines also instruct Americans to incorporate healthy fats, including those from meats, poultry, eggs, omega 3-rich seafood, nuts and seeds, full-fat dairy, olives, and avocado. The updated guide also suggests olive oil, butter **and beef tallow** for cooking, though the latter two aren't sufficient sources of essential fatty acids, Nestle said. "I don't have any trouble with eating full-fat dairy products if you don't eat too much of it," Nestle said.

Steiber agreed. "There is **a body of science** that is beginning to emerge that seems to indicate whole-fat dairy products are less of a risk for **cardiometabolic disease**," she said. "Yogurt has maybe the best data."

In terms of saturated fat, which primarily comes from animals, historical guidance to limit intake to up to 10% of daily calories remains unchanged in the latest guidelines. This is especially important if you have any cardiovascular issues such as high cholesterol, high blood pressure or a family history of cardiovascular disease, said Mande, who is also an adjunct professor of nutrition at the Harvard T.H. Chan School of Public Health.

For people with those risk factors, low-fat or fat-free dairy products can be better options. High dairy intake is also associated with adverse health effects including a higher risk of prostate cancer, Willett, who is also a professor of medicine at Harvard Medical School in Boston, said.

What about protein?

While the new guidelines increase the recommended daily intake of protein, "protein has never been an issue in American diets," Nestle said. In fact, most Americans are probably eating at least the newly recommended amount of protein already, Mande said. Further increasing your protein consumption therefore isn't necessary.

Both animals and plants are generally sufficient sources of protein, experts said — including unprocessed, lean meats, poultry and seafood, and beans, lentils, chickpeas, and tofu.

But other components and health effects of meat influence how often you should eat it and how much. Though red meat is included on the list of animal proteins the new guidelines recommend — a deviation from previous guidance — experts suggest eating no more than a few servings weekly.

Instead of 0.8 grams of protein per kilogram of body weight per day, the guidance is now 1.2 to 1.6 grams per kilogram. For someone who's 150 pounds, or 68 kilograms, the equivalent daily protein intake is 54.4 grams based on previous guidelines, and 81.6 to 109 grams considering the new recommendations.

Sodium, sugar and alcohol

The recommended sodium intake also remains the same, calling for Americans age 14 and older to limit consumption to less than 2,300 milligrams per day. Food can be made more flavorful with salt-free seasonings, herbs and spices.

In terms of added sugars, everyone "would be healthier **eating less sugar**," Nestle said. "Sugar has no nutrients other than calories." The **American Heart Association** recommends limiting added sugar intake to less than 6% of daily calories — 36 grams for men and 26 grams for women.

The updated dietary guidelines also advise **minimizing alcohol consumption** in general but don't provide specific limits. **The AHA recommends** no more than two drinks per day for men and one drink daily for women.

How applicable all this guidance is to your life can shift with any changes in your health status, health and fitness goals, and more, Steiber said. Working with your doctor or a dietitian to determine what's best for you is important, especially if you're considering making significant changes.

Source: CNN Health

Novonesis and ThyssenKrupp Uhde launch enzymatic fat-splitting solution for scalable and more sustainable fatty acid production

Novonesis has partnered with ThyssenKrupp Uhde, a major chemical technology solution provider, to help the oleochemical industry accelerate the transition to more efficient and sustainable manufacturing of fatty acids using BioSolutions.



Fatty acid producers have long faced pressure as shifting market demands collide with the long lead times and high CAPEX of conventional thermal fat splitting towers. To address these challenges, Novonesis and thyssenkrupp Uhde are jointly launching an enzymatic fat-splitting process using the Novonesis Lipura® Split enzyme.

This collaboration redefines fatty acid production, enabling producers to significantly reduce energy consumption, improve production flexibility, and enhance overall process efficiency. Compared to conventional splitting at 260°C and 60 bar pressure, the gentler enzymatic process runs at 70°C and atmospheric pressure.

From lab to plant

This new approach to fat-splitting is designed for safe and scalable implementation, supported by a dedicated pilot plant that allows producers to validate performance under real-world conditions.

The pilot facility serves as a critical bridge between laboratory innovation and full-scale industrial deployment, ensuring that producers can confidently transition to more sustainable and cost-effective operations.

"Our partnership with Novonesis demonstrates the power of collaboration to shape a more sustainable future. This joint innovation enables our customers to achieve economic gains while advancing their environmental goals," says Nadja Håkansson, Member of the Executive Board / COO thyssenkrupp Decarbon Technologies & CEO thyssenkrupp Uhde.

A more efficient path forward

The Novonesis-Uhde process is adaptable to both existing operations and new capacity plants. The solution can cut capital expenditure (CAPEX) by up to 60%, shorten time to market and scale production from 50 TPD to help producers navigate changing market needs.

"With this collaboration, we make it simpler for customers to move from conventional fat splitting to an enzymatic alternative – one built for a dynamic landscape of rising energy costs, evolving sustainability standards, and increasing pressure for production flexibility. This shift not only benefits fatty-acid producers' agility and profitability, it also paves the way toward a more sustainable future for the oleochemical industry," says Hans Ole-Klingenberg, Vice President, Global Marketing, Household & Industrial Biosolutions, Novonesis.

Source: Novonesis

Exclusive: Soy trading firms to abandon Amazon protection pact in Brazil

A tract of Amazon jungle burning as it is being cleared by loggers and farmers in Canarana, Mato Grosso state, Brazil

Some of the world's largest soybean traders are preparing to break their agreement to curb deforestation of the Amazon rainforest to preserve tax benefits in



Brazil's top farm state, two people with direct knowledge of the matter told Reuters.

The firms exiting the so-called Amazon Soy Moratorium, which has saved millions of acres of tropical forest over nearly two decades, are looking to shield themselves from a new state law in Mato Grosso, the sources said on condition of anonymity.

Starting in January, the state will strip tax incentives from companies taking part in the conservation program. Mato Grosso grew some 51 million metric tons of soybeans in 2025, more than Argentina.

A preliminary report from state auditors in April found that grains traders had benefited from tax incentives worth about 4.7 billion reais ($840 million) between 2019 and 2024.

ADM and Bunge were the top beneficiaries of tax incentives, receiving about 1.5 billion reais ($269 million) each, said Sergio Ricardo, head of the Mato Grosso state audit court.

U.S.-based ADM, Bunge and Cargill, as well as China's Cofco and Brazil's Amaggi, are signatories of the pact with facilities in Mato Grosso that have benefited from state tax incentives. It was not clear which of the firms would break immediately from the moratorium.

Cargill referred questions to industry group Abiove, which did not respond to requests for comment. ADM, Bunge, Cofco, Amaggi and grain exporter group Anec did not respond to questions.

"Most companies will choose not to lose the tax incentives and will withdraw from the agreement," said one of the sources, adding that the departures would effectively end a pact signed in 2006 with the federal government and conservation groups.

The moratorium is considered one of the most important forces slowing deforestation rates in the Brazilian Amazon over the past two decades as it bars signatories from buying soybeans from farmers who plant on land deforested after July 2008.

Researchers estimate that an area of the rainforest the size of Ireland would have been lost to soy farms in Brazil without the moratorium and related conservation efforts, compared to the pace of expansion in neighboring countries such as Bolivia.

The Mato Grosso law, which lawmakers passed in 2023, is the latest example of a global retreat from pacts and policies to curb climate change, even as temperatures break records, driven by rising fossil fuel use and deforestation. Critics of the soy moratorium say that the pact restricts the market and hurts farmers. Farming groups in Mato Grosso say the protocol reduces the income and economic development of the state.

"Companies could choose to keep their zero-deforestation commitments," said Cristiane Mazzetti, who oversees the moratorium for Greenpeace. "It's a dangerous precedent, and it's not what we need in a moment of climate emergency," she added.

Brazil's federal government has argued in court against the new Mato Grosso law stripping tax breaks from traders due to their environmental commitments.

"If the Mato Grosso government really removes those incentives, we have heard that some, or many, companies will in fact abandon the moratorium for economic reasons," said Andre Lima, a senior Environment Ministry official tasked with combating deforestation. He added that firms had not officially informed the ministry of their plans.

Far-reaching Consequences

President Luiz Inacio Lula da Silva has vowed an "ecological transformation" of the Brazilian economy,

capped off with the United Nations climate summit hosted in the Amazon last month.

But in domestic politics, his leftist government is often fighting a rearguard battle to protect the world's largest rainforest from a farm lobby with the upper hand in Congress.

The unravelling of the Amazon Soy Moratorium is likely to embolden those rural powerbrokers and their allies. This year the farm lobby has successfully gutted environmental permitting laws and stripped some protections from Indigenous lands.

The trend has caught the attention of farmer groups in Europe arguing to block a free trade agreement between the European Union and South America's Mercosur due to the impact of Brazilian agribusiness on vital ecosystems.

Brazil's Supreme Court has barred some but not all of the farm lobby's agenda in Congress, based on constitutional protections for the environment and Indigenous peoples.

Environmentalists warn that the end of the soy moratorium could pave the way to dismantle other environmental protections in the world's largest soybean producer, including part of Brazil's forestry code restricting farmers from felling trees on 80% of their properties in the Amazon.

In recent years, soybean farmers pushed state lawmakers in Mato Grosso, Rondonia and Maranhao to strip tax benefits from companies taking part in environmental pacts more restrictive than Brazilian law.

It remains unclear which environmental commitments outside the soy moratorium will trigger those new state laws, which could threaten a range of other companies, including cellulose producers and meatpackers.

Brazilian antitrust agency CADE has separately opened an investigation of the soy moratorium for a potential breach of competition rules. For nearly two decades, trading firms have shared the cost of monitoring soy farms in the Amazon to avoid buying from those planting on newly deforested land.

Starting in January, CADE has ordered traders "to refrain from collecting, storing, sharing, or disseminating commercial information related to the sale, production, or acquisition of soybeans." Soy farmers in Mato Grosso have also sued grain traders for roughly $180 million over their role in the pact.

In temporary rulings, Supreme Court Justice Flavio Dino stopped the antitrust investigation, but let the Mato Grosso law take effect. Environmental groups are still trying to block the state law ahead of a final court ruling on the issue.

Source: Reuters

Canola comes off the sidelines and back in the conversation

Market reports indicate that China has eased restrictions on Canadian canola, reopening major import channels. Read more about the subject from Allison Thompson at The Money Farm.



Canola fields near Manvel, ND bask in the glow of sunset on

For much of the past year, canola has felt like the forgotten oilseed. While soybeans grabbed headlines and soybean oil quietly carried the broader complex, canola spent months trading defensively — weighed down by uncertainty, heavy supplies, and one major unanswered question: would China ever come back? This week, that question moved closer to an answer.

Market reports indicate that China has eased restrictions on Canadian canola, reopening major import channels and restoring access to one of its most important historical suppliers. Even more notable, trade sources suggest some Chinese importers have already begun

making purchases of Canadian canola for delivery after March 1.

That may not sound dramatic on the surface. But in commodity markets, direction matters as much as volume — and the direction has clearly shifted. Canola has been trading for months under the weight of uncertainty. Not because demand disappeared, but because access did. China never stopped needing oilseeds. It simply rerouted supply elsewhere. Now, that trade lane appears to be reopening.

Beijing is expected to issue its final ruling in the anti-dumping investigation on Canadian canola before March 9. Ahead of that decision, reports of tariff reductions announced last week have already provided support to futures markets. The signal being sent is clear: China wants Canada back in its oilseed supply chain.

For a country managing the world's largest hog herd and a massive poultry sector, feed security matters. Canola meal remains a valuable protein source, while canola oil plays an increasingly important role in food and industrial use. When access tightens, China adapts, but when access improves, demand tends to return quickly. That dynamic is what has traders paying close attention.

Some Chinese buyers have reportedly stepped back into the Canadian canola market for nearby spring delivery. Volumes remain limited for now, but that's not the point. Markets rarely wait for confirmation before reacting. What matters is that buying has started — before a final ruling, not after it. That tells us something important about intent.

Historically, when China reengages in a market, it does not do so timidly for long. Initial purchases often serve as logistical tests. If freight, quality, and timing align, buying can accelerate quickly. That doesn't mean prices move straight up. But it does mean the market begins to reassess risk — and that's exactly what has happened over the past several sessions. Canola is no longer trading solely off surplus stocks. It is now trading off potential demand.

That said, optimism does not erase reality. Canola supplies remain burdensome, and expectations for large ending stocks continue to hang over the market. Domestic demand has been steady, but not explosive. Export programs need to expand meaningfully to tighten the balance sheet. This is the tension the market is wrestling with.

On one hand, trade access is improving. On the other hand, bins are still full. Until exports prove durable and consistent, the supply overhang remains a ceiling on sustained rallies. The market doesn't need perfect demand — but it does need enough to stop stocks from growing. Sounds a lot like the US soybean market. That's why the next several weeks matter so much. Headlines may drive short-term volatility, but shipping data and execution will determine whether this shift becomes structural or simply emotional.

From a chart perspective, March canola futures have clearly improved. Prices are now trading above most major moving averages, and speculative buying has been a feature of recent sessions. Momentum indicators have turned higher, confirming that funds are reacting to the change in narrative. However, some technical indicators are beginning to register as overbought.

That doesn't mean the rally is over — but it does suggest the market may be getting ahead of confirmation. When momentum builds faster than fundamentals can respond, price becomes vulnerable to pullbacks. This is where the phrase "buy the rumor, sell the fact" starts creeping into conversations.

If traders have already priced in a favorable ruling before March 9, the market may struggle to extend gains unless actual export volume follows. In other words, optimism alone can only carry prices so far.

Just remember: what's happening in canola is part of a broader oilseed story. Vegetable oil demand continues to expand globally, driven by food consumption, renewable fuels, and industrial use. Soybean oil has been leading that charge for months, and canola has quietly followed — just without the spotlight.

Now, with trade barriers easing, canola is being allowed back into the global price discovery process. This matters because oilseeds do not trade in isolation. When canola strengthens, it influences soybean oil spreads. When soybean oil moves, it feeds back into soybean crush margins. And when crush margins improve, demand for oilseeds becomes harder to ignore. In other words, this isn't just about one crop. It's about

reconnection across the complex.

For producers, the message isn't to chase rallies — it's to recognize that the narrative is changing. Key signals to monitor include:

- Confirmation of sustained Chinese purchases beyond early commitments.
- Export pace through March and April.
- Basis behavior at Canadian delivery points.
- Canola oil strength relative to soybean oil.
- Market reaction following the final ruling before March 9.

If demand continues to build, the market may begin working through its surplus faster than expected. If buying stalls after the ruling, the market could struggle — reinforcing the idea that much of the move was anticipation-driven.

Either way, volatility is likely to increase.

Trade access changes behaviour. Behaviour changes price discovery. And price discovery creates opportunity — both on rallies and on pullbacks. This does not guarantee higher prices indefinitely. Large supplies still matter. Technicals still matter. Execution still matters. But canola is no longer trading as a market with no story. It has one again. And as spring approaches, that may be enough to keep canola firmly in the conversation — rather than watching it from the sidelines.

Source: Agweek.com

USDA predicts 17% boost in soybean oil use in biofuel production

The USDA released its Grains and Oilseed Outlook, predicting an increase in soybean production and planted acres for 2026-'27. The volume of soybean oil used for biofuel production is expected to increase approximately 17%.

According to the USDA, U.S. soybean supplies are projected to increase 5% in 2026-'27 on higher beginning stocks and production. Soybean planted area



is forecast to rise nearly 4 million acres, reflecting stronger profitability compared to other crops, along with expected crop rotations across the Corn Belt and the Delta. Assuming normal weather conditions, yields are expected to average 53 bushels per acre leading to a 188-million-bushel increase to production to 4.45 billion bushels.

U.S. soybean crush is projected to rise by 85 million bushels, reaching 2.655 billion, supported by rising soybean meal and oil demand. The growth in domestic soybean meal consumption is expected to moderate compared with the previous two years while exports are forecast to expand. Given normal weather, oilseed meal supplies are expected to be ample in 2026-'27, keeping soybean meal prices relatively flat with the prior marketing year *at $300 per short ton.*

Within the report, the USDA explains that the growth of soybean crush has accelerated significantly over the past several years to meet growing demand for soybean oil as a feedstock for biofuel, largely driven by U.S. EPA's Renewable Fuel Standard renewable volume obligations (RVOs) and state-level mandates. The California market has been a major destination for biofuel, with biomass-based diesel (BBD) rising from near 25% of the state's diesel fuel pool in 2020 to over 70% during the first three quarters of 2025. While the pace of growth in California is expected to moderate, the market will remain important to BBD demand, reinforced by other Low Carbon Fuel Standard states

such as Washington and New Mexico.

The USDA's forecast for soybean oil used in biofuel considers the EPA's proposed Renewable Fuel Standard RVOs for 2026 and 2027, which were announced in June 2025. A significant shift in these proposed RVOs from previous RFS regulations is the stipulation that biofuels either imported or produced domestically using foreign feedstocks will receive only half the renewable identification number (RIN) credits compared to biofuels produced within the U.S. using U.S.-based feedstocks. Given this assumption, the use of soybean oil for biofuel in 2026-'27 is expected to rise to 17.3 billion pounds, up 2.5 billion from the prior marketing year. The soybean oil price is forecast to rise to 58 cents per pound. It is important to note that if the final RVOs diverge from the June 2025 proposal, the forecast will be evaluated accordingly in future monthly WASDE reports, the USDA cautioned.

U.S. soybean exports for 2026-'27 are projected at 1.7 billion bushels, a recovery from the 2025/26 forecast of 1.58 billion bushels (or 42.9 million tons). Exports for the 2025-'26 marketing year are forecast to decline to the lowest level in 13 years, accounting for a record-low share of just 23% of global soybean trade. This reduction reflects tariff measures that curtailed shipments to China—the United States' largest export destination—which imported an average 28.7 million metric tons of U.S. soybeans during the 2021-'22 through 2023-'24 marketing years. Additionally, Argentina's temporary elimination of export taxes last September led to a counter-seasonal surge in exports in November, further impacting U.S. market share globally.

During June–November 2025, at the tail end of 2024-'25 and the beginning of 2025-'26, U.S. soybean exports to China were virtually absent; however, shipments to other markets surged to their highest levels since this same period in 2018, largely driven by lower U.S. prices relative to Brazil due to pressure from Chinese tariffs on U.S. products, according to USDA. In late October 2025, the United States and China announced a trade agreement specifying that China will purchase a minimum of 25 million metric tons of U.S. soybeans annually in 2026, 2027, and 2028—restoring trade volumes closer to pre-2025-'26 levels. At that time, U.S. soybean prices rose and the discount to Brazilian prices narrowed, reducing the earlier price advantage in non-Chinese markets.

Although U.S. soybean exports for 2026-'27 are expected to increase compared to the previous year, up 125 million to 1.7 billion, the share of U.S. exports in the global market will likely continue its long-term downward trend due to larger South American supplies. Brazil is harvesting a record soybean crop, which will bolster global stocks and extend exportable supplies into the U.S. harvest period.

With higher supplies mostly offset by higher use, soybean ending stocks for 2026-'27 are projected at 355 million bushels, nearly flat with the 2025-'26 forecast. The season-average farm price is projected at $10.30 per bushel, marginally higher than the prior marketing year.

Source: Biodiesel Magazine

Could Hickory Oil Be Minnesota's Next Agricultural Breakthrough?

Minnesota may be at the forefront of a new industry that builds resilience into the food

On an unusually warm day in late February at the University of Minnesota Landscape Arboretum, the snow beneath the oak and nut trees is littered with squirrel and wild turkey tracks. It's quiet evidence of a seasonal feast.

By late fall, most of the acorns are gone. What's left scattered on the ground are the bitternut hickories. "[The animals] don't come and get them until the spring," says Brandon Miller, an assistant professor in the university's Department of Horticultural Science, "when they've already exhausted everything else."

For generations, a bitter taste has defined the yellowbud, or bitternut, hickory. The heart-shaped nuts are high in tannins, compounds that make the raw nut so astringent, Miller says, "if you were to eat it, you'd spit it out."

That's one reason bitternut hickories haven't been a part of our global food system for more than 200 years. Historical references suggest Native Americans

made hickory nut oil for thousands of years. European settlers used it, too—as lamp oil, potentially.

But Miller believes the nut could position Minnesota at the forefront of a new specialty oil industry, one that offers small farmers a niche market, builds resilience into the food system, and complements olive oil.

Growing an Industry from a Native Tree

Miller grew up with hickories in suburban Chicago, before he began his postsecondary education studying bitternut hickories at Cornell and Iowa State universities. In 2021, he joined the U of M as an assistant professor. Minnesota also has many pecan trees, Miller says, which are from the same genus as bitternut hickories. That means they're "like sisters."

While pecans anchor a multimillion-dollar industry in the South, bitternut hickories aren't even sold at most garden centers. They are commercially inconvenient, taking a long time to develop from a seed—just a few inches a year at first.



A yellowbud hickory bud in front of a bitternut hickory

But, amid global supply pressures, the bitternut hickory may have an opening in the cooking-oil market.

The global olive oil industry has suffered through some of its worst harvests so far this decade as extreme heat and drought gripped the Mediterranean. Production declines have rippled through global markets, exposing how dependent consumers are on a handful of regions for cooking oils.

The bitternut hickory, by contrast, is native to Minnesota and found across a wide swath of the United States, all the way down to northern Florida. In the wild, it favors upland, drier sites, like at the Arboretum's oak and nut tree collection. Miller's past research found the species to be highly drought tolerant—and likely tolerant of flooding, as well.

"In Minnesota, that's a big deal," he adds. "Getting oil from this crop means we're creating more stability in our food system, that we're not so much at the whims of Mother Nature." What has taken years for Miller and his peers to discover is that the key to unlocking the bitternut hickory's commercial potential lies inside.

While the nut meat is intensely bitter, the tannins that cause that bitterness are not fat soluble. So, when a producer extracts the oil and separates it from the solids, that harshness disappears.

"That's where this opens up a whole new opportunity," Miller says.

Bitternut hickory's similarities to the pecan provide a nice benefit for oil extraction, as well. Unlike many other hickories, the bitternut has a thin, leathery husk and a relatively thin shell, making it easier to press.

Producers collect fallen nuts, grind them, and run the mash through a screw press. Oils can be hot-pressed or cold-pressed, though hot pressing generally yields more oil.

Early data suggest hickory nut oil is high in unsaturated fats and may contain tocopherols, a class of antioxidants commonly known as Vitamin E, though Miller says more research is needed to document health benefits.

The University of Minnesota has multiple grants under review to study the oil's composition and to begin breeding efforts aimed at increasing annual yields—essentially domesticating a wild tree for commercial production, much as the state's pecans were improved over generations.

A Wisconsinite's Discovery, 24 Years Later

On a farm in northern Wisconsin, Samuel Thayer grew up picking hickory nuts, mainly shagbark and yellowbud. "There's so much oil in these," he recalls thinking. "And they smelled so good." Thayer began reading about

olive pressing and realized the same principle applied to hickory nuts: Tannins are not fat soluble. If he could separate the oil from the solids, the bitterness might not matter—just as Miller discovered years later. Thayer modified a meat grinder and drew out small amounts of oil. "Oh, my goodness, that's good," he remembers thinking. The flavor was rich and buttery, "like a liquid pecan."

It changed how Thayer thought about commodity vegetable oils. "It's impossible to find fresh canola oil," he says, criticizing industrial oils that are processed for shelf stability and often stored at room temperature for long periods. After two years of research, Thayer invested $9,000 in a screw press to produce the same hickory oil he's been making for 15 years. "Think about all the people who have bought ATVs [for that same amount of money]," he says. "Those are toys. I make all the hickory nut oil for my whole family for a whole year for that same price."

Today, Thayer harvests from about 30 productive trees on his land and gathers additional nuts from 15 to 20 farms across Wisconsin and Iowa. The season stretches from mid-September to February, peaking in mid-October. By July, he can usually predict the size of the hickory nut crop.

Some years are abundant, others are sparse. The hickory oil industry remains tiny. Four producers currently sell the product, according to Thayer. An Iowa producer pressed 74 gallons last year in their second year of operation. Still, Thayer is bullish. If yellowbud hickory orchards were planted at scale, he believes per-acre oil yields could eventually exceed canola. The appeal isn't just agronomic (less need for herbicides and less soil erosion). It's also culinary.

"No one wants to dip a cracker in canola oil," Thayer laughs. "It's gross." Hickory oil, by contrast, is aromatic and sweet. One of his customers recently drank a 5-ounce bottle in a day and immediately called to order another. Thayer adds that he's already sold out of this year's hickory oil supply.

"It's weird I stumbled on this, and people are taking notice," he admits. "Maybe my grandkids will say, 'My grandpa discovered this.'"

Source: tcbmag.com

IMPORTANT FIGURES

Table 01: Soybeans: World Supply and Distribution

Thousand Metric Tons

	2022/23	2023/24	2024/25	2025/26
Production				
Brazil	162,000	154,500	172,500	180,500
United States	116,221	113,273	119,047	115,989
Argentina	25,000	48,210	51,108	49,500
China	20,284	20,840	20,650	20,900
Paraguay	10,250	11,000	10,200	12,100
India	12,411	11,875	12,882	11,027
Russia	5,996	6,800	7,050	9,000
Other	26,048	29,950	34,675	30,392
Total	378,210	396,448	428,112	429,408
Imports				
China	104,500	112,000	108,000	113,000
European Union	13,127	13,550	14,709	14,000
Mexico	6,451	6,457	6,434	6,700
Argentina	9,059	7,787	6,324	7,300
Egypt	1,993	3,321	4,543	4,900
Turkey	2,888	3,252	4,183	4,250
Thailand	3,238	3,428	4,190	4,200
Vietnam	1,858	2,265	2,609	3,050
Pakistan	571	997	1,939	3,200
Japan	3,332	3,099	3,243	3,200
Other	21,484	22,343	22,971	23,975
Total	168,501	178,499	179,145	187,775
Exports				
Brazil	95,504	104,170	103,142	115,000
United States	53,864	46,350	51,495	41,368
Paraguay	6,495	7,987	6,405	8,200
Argentina	4,185	5,114	7,874	9,000
Canada	4,240	4,861	5,551	5,287
Other	7,473	9,363	9,863	8,370
Total	171,761	177,845	184,330	187,225
Crush				
China	96,000	99,000	103,500	109,000
United States	60,199	62,196	66,546	72,257
Brazil	53,409	54,405	58,162	62,000
Argentina	30,341	36,583	43,236	42,000
European Union	14,300	14,500	15,400	15,000
India	10,300	11,300	11,300	9,975
Mexico	6,650	6,530	6,650	6,850
Russia	5,400	5,900	6,225	6,600
Egypt	2,200	3,250	4,500	4,850
Paraguay	3,450	3,000	3,700	3,800
Pakistan	650	950	1,800	3,050
Bolivia	3,300	2,600	3,250	3,100
Turkey	1,700	2,300	2,850	2,800
Thailand	2,100	2,400	2,700	3,000
Vietnam	1,250	1,400	1,850	2,200
Other	24,518	24,931	27,492	27,825
Total	315,767	331,245	359,161	374,307
Ending Stocks				
China	32,341	43,311	44,489	44,359
Brazil	36,819	29,761	37,688	37,688
Argentina	16,999	24,049	24,671	24,071
United States	7,190	9,319	8,840	8,845
European Union	1,259	1,297	1,564	1,520
Other	7,230	7,359	8,693	8,784
Total	101,838	115,096	125,945	125,267

Source : Foreign Agricultural Service / USDA Global Market Analysis

Table 02: Soybean Meal: World Supply and Distribution

Thousand Metric Tons

	2022/23	2023/24	2024/25	2025/26
Production				
China	76,032	78,408	81,972	85,674
United States	47,621	49,084	53,019	57,427
Brazil	41,488	41,859	44,383	47,492
Argentina	23,666	28,352	33,508	32,340
European Union	11,297	11,455	12,166	11,850
India	8,240	9,040	9,040	7,980
Mexico	5,255	5,159	5,255	5,411
Other	34,786	36,502	42,411	44,745
Total	248,385	259,859	281,754	292,919
Imports				
European Union	15,997	16,564	20,609	20,300
Vietnam	4,724	6,033	5,703	6,550
Indonesia	5,434	5,055	6,179	6,500
Philippines	2,824	2,967	3,189	3,500
Thailand	3,141	2,770	2,939	3,250
Mexico	1,670	1,937	2,345	2,950
Iran	1,185	2,985	2,805	2,600
United Kingdom	1,762	1,976	2,529	2,500
Colombia	1,603	1,585	2,030	2,350
Ecuador	1,771	1,891	2,268	2,400
Other	23,185	25,843	27,285	30,098
Total	63,296	69,606	77,881	82,998
Exports				
Argentina	20,764	24,891	29,780	29,000
Brazil	21,334	22,722	23,390	25,250
United States	13,196	14,564	16,396	18,597
Bolivia	2,155	1,546	2,032	2,000
Paraguay	1,992	1,683	2,176	2,200
Other	7,625	8,817	9,114	8,837
Total	67,066	74,223	82,888	85,884
Domestic Consumption				
China	75,050	77,150	80,850	84,550
United States	34,946	35,068	37,405	39,668
European Union	26,642	27,042	31,242	31,542
Brazil	20,000	20,000	20,500	21,800
Vietnam	5,785	6,640	7,295	8,095
Mexico	6,930	7,080	7,450	8,300
India	6,625	7,075	7,185	7,130
Indonesia	5,580	5,200	5,900	6,450
Thailand	4,750	4,575	4,800	5,400
Egypt	2,700	3,000	3,800	4,200
Iran	3,550	4,810	5,100	4,700
Russia	3,650	3,900	4,100	4,300
Philippines	2,930	3,000	3,220	3,530
Argentina	3,450	3,500	3,525	3,600
Japan	3,550	3,521	3,505	3,395
Other	40,884	43,538	47,244	52,048
Total	247,022	255,099	273,121	288,708
Ending Stocks				
Brazil	3,817	2,972	3,470	3,922
Argentina	2,297	2,259	2,741	2,831
European Union	510	836	1,717	1,625
China	937	794	943	1,217
Turkey	422	466	572	695
Other	6,191	6,990	8,500	8,978
Total	14,174	14,317	17,943	19,268

Source : Foreign Agricultural Service / USDA Global Market Analysis

Table 03: Soybean Oil: World Supply and Distribution

Thousand Metric Tons

	2022/23	2023/24	2024/25	2025/26
Production				
China	18,240	18,810	20,100	21,800
United States	11,897	12,289	13,253	14,048
Brazil	10,580	11,055	11,842	12,642
Argentina	5,995	7,251	8,626	8,379
European Union	2,717	2,755	2,926	2,850
India	1,854	2,034	2,034	1,796
Mexico	1,227	1,205	1,227	1,264
Other	8,215	8,610	10,057	10,577
Total	60,725	64,009	70,065	73,356
Imports				
India	3,968	3,308	5,471	5,300
Bangladesh	703	649	943	612
Morocco	514	488	626	650
European Union	641	592	757	750
Peru	535	560	612	590
Canada	147	573	550	476
Korea, South	353	447	482	460
Algeria	490	485	564	450
Colombia	242	317	384	350
United States	170	282	164	204
Other	3,213	2,830	3,631	3,658
Total	10,976	10,531	14,184	13,500
Exports				
Argentina	4,137	5,533	7,099	6,450
Brazil	2,687	1,352	1,487	1,800
China	111	104	318	1,050
European Union	915	659	708	750
Russia	750	760	750	700
Paraguay	523	497	621	650
Turkey	289	403	469	465
Other	2,330	2,504	3,806	2,952
Total	11,742	11,812	15,258	14,817
Domestic Consumption				
China	17,900	18,900	20,500	20,900
United States	12,070	12,317	12,207	13,769
Brazil	8,300	10,200	10,410	10,950
India	5,400	5,175	6,645	7,090
European Union	2,405	2,630	3,005	2,905
Argentina	1,660	1,770	1,980	1,980
Mexico	1,305	1,270	1,310	1,400
Bangladesh	975	1,010	1,200	1,100
Egypt	560	510	730	910
Algeria	750	765	780	820
Canada	300	675	705	680
Pakistan	360	285	620	670
Korea, South	565	600	650	655
Morocco	510	505	600	630
Peru	540	550	585	595
Other	5,794	5,722	6,341	6,915
Total	59,394	62,884	68,268	71,969
Ending Stocks				
India	597	748	1,581	1,552
United States	729	703	792	833
China	981	1,168	746	796
European Union	601	659	629	574
Argentina	719	669	323	422
Other	2,242	1,766	2,365	2,329
Total	5,869	5,713	6,436	6,506

Source : Foreign Agricultural Service / USDA Global Market Analysis

Table 04: Soybeans and Products: World Trade

Thousand Metric Tons

	Marketing Year	Meal, Soybean		Oil, Soybean		Oilseed, Soybean	
		2024/25	2025/26	2025/26	2026/27	2024/25	2025/26
Exports							
North America		16,709	18,989	638	356	57,046	46,665
South America		57,382	58,458	9,465	9,553	121,070	134,602
South Asia		1,804	1,049	42	17	12	20
India	(Oct-Sep)	1,781	1,000	35	15	12	20
Other		6,993	7,388	4,672	4,826	6,202	5,938
World Total		82,888	85,884	14,817	14,752	184,330	187,225
Imports							
European Union	(Oct-Sep)	20,609	20,300	750	600	14,709	14,000
East Asia		3,425	3,515	807	812	115,144	120,085
China	(Oct-Sep)	45	150	200	200	108,000	113,000
Japan	(Oct-Sep)	1,621	1,600	2	2	3,243	3,200
Korea, South	(Oct-Sep)	1,725	1,725	460	460	1,128	1,080
Taiwan	(Oct-Sep)	34	40	0	0	2,768	2,800
Southeast Asia		19,910	21,760	272	272	10,128	11,000
Indonesia	(Oct-Sep)	6,179	6,500	37	40	2,439	2,900
Malaysia	(Oct-Sep)	1,426	1,400	95	92	727	670
Philippines	(Jan-Dec)	3,189	3,500	60	60	136	150
Thailand	(Sep-Aug)	2,939	3,250	0	0	4,190	4,200
Vietnam	(Jan-Dec)	5,703	6,550	65	65	2,609	3,050
North America		4,525	5,297	880	1,047	7,490	7,745
Canada	(Aug-Jul)	1,448	1,462	476	575	250	365
United States	(Oct-Sep)	732	885	204	272	806	680
Canada	(Aug-Jul)	1,448	1,462	476	575	250	365
Mexico	(Sep-Aug)	2,345	2,950	200	200	6,434	6,700
South America		8,632	9,615	1,738	1,798	8,017	9,270
Argentina	(Oct-Sep)	279	350	150	140	6,324	7,300
Brazil	(Oct-Sep)	5	10	100	100	731	900
Paraguay	(Jan-Dec)	0	0	1	1	4	20
Brazil	(Oct-Sep)	5	10	100	100	731	900
Colombia	(Oct-Sep)	2,030	2,350	350	400	561	530
Central America		2,056	2,275	230	230	320	330
Caribbean		801	1,064	311	336	17	40
Middle East		8,194	8,945	333	344	9,069	7,796
Iran	(Oct-Sep)	2,805	2,600	150	150	2,693	2,150
Israel	(Oct-Sep)	311	320	2	5	266	320
Syria	(Jan-Dec)	252	200	2	2	1	1
Turkey	(Oct-Sep)	1,350	2,500	0	0	4,183	4,250
North Africa		2,222	1,840	1,420	1,350	6,710	7,780
Egypt	(Oct-Sep)	395	400	275	200	4,543	4,900
Other Europe		3,151	3,125	211	211	1,757	1,645
United Kingdom	(Oct-Sep)	2,529	2,500	200	200	1,079	950
Other		4,356	5,262	6,548	6,427	5,784	8,084
World Total		77,881	82,998	13,500	13,427	179,145	187,775

Source : Foreign Agricultural Service / USDA Global Market Analysis

Table 05: Palm Oil: World Supply and Distribution

Thousand Metric Tons

	2022/23	2023/24	2024/25	2025/26
Production				
Indonesia	45,000	43,000	45,500	46,700
Malaysia	18,389	19,710	19,380	20,200
Thailand	3,321	3,274	3,740	3,900
Colombia	1,853	1,875	1,900	2,000
Nigeria	1,400	1,500	1,500	1,500
Other	6,818	6,845	6,924	7,142
Total	76,781	76,204	78,944	81,442
Imports				
India	10,045	8,886	7,786	8,100
China	6,190	4,377	3,203	3,900
Pakistan	3,094	2,980	3,325	3,500
European Union	4,576	4,013	3,140	3,200
Bangladesh	1,610	1,676	1,540	1,650
United States	1,887	1,864	1,542	1,425
Philippines	892	1,083	1,406	1,300
Egypt	1,052	1,171	1,301	1,400
Vietnam	1,112	1,071	1,076	1,050
Kenya	848	875	811	900
Other	15,344	14,368	16,251	15,537
Total	46,650	42,364	41,381	41,962
Exports				
Indonesia	28,077	22,273	23,471	23,800
Malaysia	15,355	16,530	15,617	16,400
Thailand	902	878	1,302	1,000
Papua New Guinea	813	669	740	830
Guatemala	883	620	566	725
Other	3,337	3,440	3,323	3,493
Total	49,367	44,410	45,019	46,248
Domestic Consumption				
Indonesia	19,125	21,075	22,375	23,225
India	8,900	8,990	8,800	8,350
Malaysia	3,975	3,667	4,165	4,245
China	5,400	5,000	3,300	3,925
Pakistan	2,995	3,070	3,250	3,450
European Union	4,500	3,890	3,200	3,100
Thailand	2,485	2,485	2,445	2,735
Nigeria	1,790	1,840	1,940	1,890
Bangladesh	1,600	1,575	1,540	1,675
United States	1,875	1,894	1,525	1,394
Colombia	1,500	1,555	1,500	1,450
Philippines	1,000	1,040	1,485	1,440
Egypt	1,060	1,160	1,250	1,365
Vietnam	1,037	1,007	1,040	1,002
Brazil	825	920	950	990
Other	15,814	16,016	17,487	16,990
Total	73,881	75,184	76,252	77,226
Ending Stocks				
Indonesia	5,108	4,761	4,416	4,091
Malaysia	2,312	2,014	2,360	2,475
India	2,419	2,615	1,898	1,888
Colombia	856	842	747	647
Thailand	499	412	409	576
Other	5,796	5,320	5,188	5,271
Total	16,990	15,964	15,018	14,948

Source : Foreign Agricultural Service / USDA Global Market Analysis

Table 06: Rapeseed and Products: World Supply and Distribution

Thousand Metric Tons

	Marketing Year	Meal, Rapeseed		Oil, Rapeseed		Oilseed, Rapeseed	
		2024/25	2025/26	2024/25	2025/26	2024/25	2025/26
Production							
China	(Oct-Sep)	11,861	11,448	7,839	7,566	15,800	16,000
India	(Oct-Sep)	6,189	6,399	3,956	4,090	11,520	12,000
Canada	(Aug-Jul)	6,710	7,512	4,821	5,480	19,239	22,227
Japan	(Oct-Sep)	1,231	1,242	884	913	3	3
European Union	(Jul-Jun)	13,509	14,706	9,954	10,836	17,073	20,657
Other		9,795	11,021	6,827	7,720	22,640	25,148
World Total		49,295	52,328	34,281	36,605	86,275	96,035
Imports							
China	(Oct-Sep)	2,810	3,200	2,171	2,000	4,600	3,600
India	(Oct-Sep)	21	5	26	40	0	0
Canada	(Aug-Jul)	1	5	16	18	131	109
Japan	(Oct-Sep)	4	4	23	9	2,138	2,200
European Union	(Jul-Jun)	420	860	295	615	8,023	6,955
Other		6,891	7,808	4,565	4,898	5,165	5,699
World Total		10,147	11,882	7,096	7,580	20,057	18,563
Exports							
China	(Oct-Sep)	32	600	19	120	0	0
India	(Oct-Sep)	1,870	1,500	13	15	0	0
Canada	(Aug-Jul)	5,855	6,274	3,327	3,346	9,387	8,959
Japan	(Oct-Sep)	8	0	5	4	0	0
European Union	(Jul-Jun)	880	939	576	650	382	642
Other		2,065	2,659	3,185	3,709	10,048	9,753
World Total		10,710	11,972	7,125	7,844	19,817	19,354
Domestic Consumption							
China	(Oct-Sep)	14,639	14,048	10,350	9,700	20,925	20,225
India	(Oct-Sep)	4,360	4,850	4,005	4,080	11,550	11,975
Canada	(Aug-Jul)	870	1,225	1,330	1,975	11,552	13,075
Japan	(Oct-Sep)	1,221	1,310	895	925	2,134	2,205
European Union	(Jul-Jun)	13,100	14,500	9,700	10,550	24,450	26,650
Other		14,611	16,091	8,119	8,775	17,842	19,928
World Total		48,801	52,024	34,399	36,005	88,453	94,058
Ending Stocks							
China	(Oct-Sep)	0	0	1,250	996	4,259	3,634
India	(Oct-Sep)	204	258	357	392	539	564
Canada	(Aug-Jul)	154	172	730	907	1,597	1,899
Japan	(Oct-Sep)	89	25	37	30	194	192
European Union	(Jul-Jun)	351	478	298	549	2,202	2,522
Other		628	707	653	787	1,136	2,302
World Total		1,426	1,640	3,325	3,661	9,927	11,113

Source : Foreign Agricultural Service / USDA Global Market Analysis

Table 07: Sunflowerseed and Products: World Supply and Distribution

Thousand Metric Tons

	Marketing Year	Oilseed, Sunflowerseed		Meal, Sunflowerseed		Oil, Sunflowerseed	
		2024/25	2025/26	2024/25	2025/26	2024/25	2025/26
Production							
Argentina	(Mar-Feb)	5,592	7,614	2,145	2,536	2,120	2,521
Russia	(Sep-Aug)	16,900	17,500	6,698	6,862	6,732	6,897
Turkey	(Sep-Aug)	1,350	1,250	995	1,388	795	1,109
Ukraine	(Sep-Aug)	13,000	10,700	5,080	4,337	5,290	4,515
European Union	(Oct-Sep)	8,645	8,629	4,108	4,174	3,212	3,256
Other		7,525	9,474	2,386	2,961	2,265	2,778
World Total		53,012	55,167	21,412	22,258	20,414	21,076
Imports							
Argentina	(Mar-Feb)	1	10	0	0	0	0
Russia	(Sep-Aug)	80	90	5	5	1	1
Turkey	(Sep-Aug)	789	1,700	1,042	900	1,236	1,300
Ukraine	(Sep-Aug)	22	33	1	0	1	0
European Union	(Oct-Sep)	582	1,350	2,567	2,400	2,411	2,400
Other		1,135	1,194	4,130	5,171	8,357	7,950
World Total		2,609	4,377	7,745	8,476	12,006	11,651
Exports							
Argentina	(Mar-Feb)	626	950	1,657	1,900	1,686	1,925
Russia	(Sep-Aug)	200	300	2,400	2,300	4,200	4,200
Turkey	(Sep-Aug)	174	125	53	75	1,001	1,000
Ukraine	(Sep-Aug)	68	40	3,418	2,861	4,744	4,036
European Union	(Oct-Sep)	824	1,150	479	550	691	700
Other		1,480	1,800	766	1,123	1,340	1,649
World Total		3,372	4,365	8,773	8,809	13,662	13,510
Domestic Consumption							
Argentina	(Mar-Feb)	5,230	6,425	500	600	562	562
Russia	(Sep-Aug)	16,800	17,220	4,300	4,500	2,575	2,575
Turkey	(Sep-Aug)	2,027	2,752	2,000	2,175	1,090	1,415
Ukraine	(Sep-Aug)	12,825	10,800	1,800	1,675	440	455
European Union	(Oct-Sep)	8,630	8,765	6,260	6,010	5,213	4,988
Other		7,396	8,794	5,729	7,029	9,222	9,364
World Total		52,908	54,756	20,589	21,989	19,102	19,359
Ending Stocks							
Argentina	(Mar-Feb)	558	807	194	230	116	150
Russia	(Sep-Aug)	697	767	410	477	195	318
Turkey	(Sep-Aug)	80	153	171	209	109	103
Ukraine	(Sep-Aug)	305	198	429	230	241	265
European Union	(Oct-Sep)	340	404	393	407	418	386
Other		560	634	328	308	1,468	1,183
World Total		2,540	2,963	1,925	1,861	2,547	2,405

Source : Foreign Agricultural Service / USDA Global Market Analysis

Table 08: Minor Vegetable Oils: World Supply and Distribution

Thousand Metric Tons

	Marketing Year	Oil, Peanut		Oil, Cottonseed		Oil, Olive	
		2024/25	2025/26	2024/25	2025/26	2024/25	2025/26
Production							
China	(Oct-Sep)	3,104	3,104	1,164	1,164	9	10
India	(Oct-Sep)	1,256	1,323	1,311	1,297	nr	nr
Turkey	(Nov-Oct)	7	7	235	185	410	210
United States	(Aug-Jul)	106	137	131	125	16	14
European Union	(Oct-Sep)	13	13	29	24	2,112	2,092
Other		1,822	1,728	1,844	1,918	786	952
World Total		6,308	6,312	4,714	4,713	3,333	3,278
Imports							
China	(Oct-Sep)	347	320	0	0	40	45
India	(Oct-Sep)	0	1	1	5	nr	nr
Turkey	(Nov-Oct)	0	0	3	3	30	30
United States	(Aug-Jul)	46	9	1	2	446	425
European Union	(Oct-Sep)	47	45	2	10	202	250
Other		33	39	58	69	518	519
World Total		473	414	65	89	1,236	1,269
Exports							
China	(Oct-Sep)	11	10	8	20	0	0
India	(Oct-Sep)	233	100	0	0	nr	nr
Turkey	(Nov-Oct)	0	0	2	2	79	60
United States	(Aug-Jul)	6	5	20	20	8	9
European Union	(Oct-Sep)	6	6	1	1	847	800
Other		330	314	27	37	420	529
World Total		586	435	58	80	1,354	1,398
Domestic Consumption							
China	(Oct-Sep)	3,440	3,414	1,156	1,144	49	55
India	(Oct-Sep)	1,010	1,180	1,330	1,305	nr	nr
Turkey	(Nov-Oct)	7	7	235	185	400	200
United States	(Aug-Jul)	143	138	116	105	454	430
European Union	(Oct-Sep)	54	52	30	33	1,395	1,470
Other		1,499	1,467	1,864	1,946	839	886
World Total		6,153	6,258	4,731	4,718	3,137	3,041
Ending Stocks							
China	(Oct-Sep)	0	0	0	0	0	0
India	(Oct-Sep)	200	244	28	25	nr	nr
Turkey	(Nov-Oct)	0	0	14	15	60	40
United States	(Aug-Jul)	11	14	16	18	0	0
European Union	(Oct-Sep)	4	4	0	0	254	326
Other		156	142	120	124	185	241
World Total		371	404	178	182	499	607

Source : Foreign Agricultural Service / USDA Global Market Analysis

Table 09: China Oilseeds and Products Supply and Distribution

Thousand Metric Tons

	2022/23	2023/24	2024/25	2025/26
Production				
Oilseed, Peanut	18,330	19,231	19,000	18,400
Oilseed, Rapeseed	16,317	15,800	15,800	16,000
Oilseed, Soybean	20,284	20,840	20,650	20,900
Oilseed, Sunflowerseed	1,741	1,983	1,750	2,200
Other	10,196	9,069	10,611	11,871
Total	66,868	66,923	67,811	69,371
Imports				
Oilseed, Peanut	940	774	448	650
Oilseed, Rapeseed	5,335	5,486	4,600	3,600
Oilseed, Soybean	104,500	112,000	108,000	113,000
Oilseed, Sunflowerseed	266	183	132	100
Other	665	690	332	300
Total	111,706	119,133	113,512	117,650
Domestic Consumption				
Meal, Peanut	4,005	3,973	3,885	3,883
Meal, Rapeseed	13,512	14,519	14,639	14,048
Meal, Soybean	75,050	77,150	80,850	84,550
Other	10,472	10,678	9,249	11,090
Total	103,039	106,320	108,623	113,571
SME				
Meal, Peanut	4,502	4,466	4,367	4,364
Meal, Rapeseed	9,276	9,992	10,074	9,654
Meal, Soybean	73,900	76,000	79,700	83,400
Other	8,435	8,936	8,147	9,253
Total	96,112	99,394	102,288	106,671
Food Use Dom. Cons.				
Oil, Palm	3,100	2,800	1,800	2,525
Oil, Peanut	3,418	3,373	3,440	3,414
Oil, Rapeseed	8,800	9,700	10,350	9,700
Oil, Soybean	17,900	18,900	20,500	20,900
Oil, Sunflowerseed	1,803	1,419	717	825
Other	1,387	1,369	1,367	1,399
Total	36,408	37,561	38,174	38,763
Domestic Consumption				
Oil, Palm	5,400	5,000	3,300	3,925
Oil, Peanut	3,418	3,373	3,440	3,414
Oil, Rapeseed	8,800	9,700	10,350	9,700
Oil, Soybean	17,900	18,900	20,500	20,900
Oil, Sunflowerseed	1,803	1,419	717	825
Other	2,134	2,051	2,121	2,149
Total	39,455	40,443	40,428	40,913
Imports				
Oil, Palm	6,190	4,377	3,203	3,900
Oil, Peanut	292	247	347	320
Oil, Rapeseed	1,978	2,039	2,171	2,000
Oil, Soybean	365	381	296	200
Oil, Sunflowerseed	1,555	1,207	532	600
Other	967	884	956	995
Total	11,347	9,135	7,505	8,015

Source : Foreign Agricultural Service / USDA Global Market Analysis

Table 10: India Oilseeds and Products Supply and Distribution

Thousand Metric Tons

	2022/23	2023/24	2024/25	2025/26
Production				
Oilseed, Cottonseed	11,166	10,783	10,189	10,104
Oilseed, Peanut	6,300	6,000	7,100	7,500
Oilseed, Rapeseed	11,200	11,600	11,520	12,000
Oilseed, Soybean	12,411	11,875	12,882	11,027
Oilseed, Sunflowerseed	215	112	113	113
Other	1,022	1,021	1,021	1,021
Total	42,314	41,391	42,825	41,765
Domestic Consumption				
Meal, Cottonseed	4,443	4,409	4,329	4,257
Meal, Rapeseed	4,350	4,600	4,360	4,850
Meal, Soybean	6,625	7,075	7,185	7,130
Other	2,176	2,069	2,146	2,264
Total	17,594	18,153	18,020	18,501
SME				
Meal, Cottonseed	3,600	3,573	3,508	3,449
Meal, Rapeseed	3,095	3,273	3,102	3,451
Meal, Soybean	6,225	6,625	6,710	6,700
Other	2,021	1,903	2,015	2,129
Total	14,941	15,373	15,335	15,730
Food Use Dom. Cons.				
Oil, Cottonseed	1,315	1,290	1,285	1,265
Oil, Palm	8,300	8,340	8,150	7,750
Oil, Peanut	1,050	995	1,000	1,170
Oil, Rapeseed	3,600	3,900	3,925	4,000
Oil, Soybean	5,400	5,175	6,645	7,090
Oil, Sunflowerseed	2,750	3,525	2,900	3,175
Other	400	410	395	405
Total	22,815	23,635	24,300	24,855
Domestic Consumption				
Oil, Cottonseed	1,361	1,345	1,330	1,305
Oil, Palm	8,900	8,990	8,800	8,350
Oil, Peanut	1,060	1,005	1,010	1,180
Oil, Rapeseed	3,680	3,980	4,005	4,080
Oil, Soybean	5,400	5,175	6,645	7,090
Oil, Sunflowerseed	2,750	3,525	2,900	3,175
Other	710	730	695	710
Total	23,861	24,750	25,385	25,890
Imports				
Oil, Cottonseed	1	0	1	5
Oil, Palm	10,045	8,886	7,786	8,100
Oil, Peanut	0	0	0	1
Oil, Rapeseed	6	6	26	40
Oil, Soybean	3,968	3,308	5,471	5,300
Oil, Sunflowerseed	2,988	3,516	2,905	3,100
Other	111	131	98	121
Total	17,119	15,847	16,287	16,667

Source : Foreign Agricultural Service / USDA Global Market Analysis

A REVIEW ON ALGAL OILS AS A SUSTAINABLE SOURCE OF ESSENTIAL OMEGA-3

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Highlights

1. Algal oil is a sustainable, vegan alternative to fish oil for omega-3 fatty acids.
2. Algal omega-3 reduces reliance on overfished sources, promoting marine sustainability.
3. Innovations in extraction methods improve oil quality while lowering environmental impact.
4. Algal omega-3 integrates into nutraceuticals, aquafeed, and functional food industries.

Introduction

Nutraceuticals can be defined as a product of food source having extra health benefits along with the basic nutritional value. Nutraceuticals can be broken down into two different words “nutrients” which means nourishing food components and “pharmaceuticals” which means medical drugs. Microalgae because of its higher nutritional value and higher rate of growth can be used as a production source for nutraceuticals (Udayan et al., 2022). The bioactive and functional pigments, natural colors, polysaccharides, antioxidants, and algal extracts that are produced by microalgae are ß-carotene, astaxanthin, DHA, and EPA (Cichonski and Chrzanowski, 2022). Utilizing CO2, sunlight, and water, microalgae may be grown in a photosynthetic state (Prasad et al., 2021). It may be grown in artificial tanks, raceway ponds, marginal ponds, or shallow lagoons. Comparing pond systems with open culture systems, the use of plastic tubes and reactors can increase production efficiency by up to seven times (Hemantkumar et al., 2019).

Omega-3 fatty acid is the dominating fatty acid in the neurological tissue of humans. Almost 20–25 % of the total fatty acid of human brain gray matter consists of omega-3 fatty acids. In the outer segment of the retina rod, almost 50–60 % of fatty acids consist of omega-3 fatty acids. Omega-3 fatty acid is also present in abundance in sperm cells and heart muscles (Priyadarsini et al., 2022). A deficiency of Omega-3 fatty acids can lead to phenylketonuria, adrenoleukodystrophy, depression, attention deficit hyperactivity disorder, Alzheimer's, and cognitive decline (Gil-Campos and Sanjurjo Crespo, 2012; Horrocks and Yeo, 1999; Lakra et al., 2019). Thus, to maintain an adequate supply of omega-3 fatty acids one needs an exogenous dietary source. The exogenous dietary source can be fish or fish oils as fishes are a rich source of omega-3 fatty acids but it may lead to many health and environmental problems such as high blood sugar, diarrhea, presence of contaminants, and varying consistency of the product (Samanta and Choudhary, 2019). In recent times with the advancement of nutraceuticals, it is possible to find alternatives for fish or fish oil for the production of omega-3 fatty acids. These alternatives mainly consist of the extraction of algal oil from the algae (Barta et al., 2021).

Algal oil is extracted from marine algae which is rich in omega-3 fatty acids such as DHA and EPA, algal oil also contains omega-9 fatty acids. DHA is an omega-3 long-chain polyunsaturated fatty acid with 22 carbon atoms and 6 methylene-interrupted cis double bonds (Chawla et al., 2020). EPA is a carboxylic acid with a 20-carbon chain and five cis double bonds (Mariamenatu and Abdu, 2021). Although DHA and EPA can be extracted from other

sources such as fish oil, krill oil, and cod liver oil, they are not the same. Algal oil can be extracted from a wide variety of species such as Crypthecodinium, Nannochloropsis, Schizochytrium, Prototheca, and Ulkenia (Barros de Medeiros et al., 2022; Chen et al., 2022).

Algal oils and fish oils are the main natural sources of omega-3 fatty acids. On comparing both the oils it is seen that algal oil has certain advantages over fish oil for the production of omega-3 fatty acids (Ryckebosch et al., 2014). Consistency of the composition, sensory properties such as aroma, taste, texture, and appearance, ease of production, lack of contaminants, and cholesterol marks are the key features of omega-3 fatty acid production using algal oil. Algal oils are odorless, scalable, vegan, and easier to cultivate (Koyande and Loke, 2022). Algal oil production may lead to both benefits and adverse effects, mainly the impact revolves around water quality, net greenhouse gas emissions, air quality, biodiversity, and waste generation (Walsh et al., 2016). The production of omega-3 fatty acids from algae offers environmental benefits, including reduced GHG emissions and improved air quality. Algae absorb CO2 during photosynthesis, acting as carbon sinks, while innovative methods like enzymatic extraction and hydrothermal liquefaction reduce energy consumption. Integrating algal cultivation with CO2 capture from industrial emissions enhances sustainability. Transitioning to renewable energy-powered systems can minimize emissions, making algal omega-3 production a climate-friendly alternative to traditional sources.

Water quality is a critical factor in scalable algal cultivation projects, especially at large scales. If untreated culture water from algal systems is released into natural water bodies, it can lead to eutrophication—a condition characterized by an excessive increase in nitrogen, phosphorus, and other nutrients, which disrupts aquatic ecosystems (Tekile et al., 2015). However, when managed properly, algal cultivation can mitigate eutrophication by absorbing excess nutrients from wastewater, such as those originating from municipal or agricultural runoff. This process reduces the release of pollutants and minimizes herbicide and insecticide runoff compared to conventional biofuel feedstocks like corn-grain ethanol or soybean biodiesel. The nitrogen content in the algal growth medium plays a pivotal role in determining the biomass quality and environmental impact (Suresh et al., 2023). Properly sealed or lined feedstock systems, combined with effective nutrient management, are essential to minimize nutrient leakage and mitigate water quality risks during extreme weather events.

This review will give information about the advancements in the technology, need, and application of nutraceuticals using different species of algae, and algal oil production using different methods, especially for the production of omega-3 fatty acids.

Methods of Algal oil Extraction

There are various methods for the extraction of algal oil such as enzymatic cell disruption (Das et al., 2022), solvent extraction (Li et al., 2021), osmotic pressure (Yucetepe, 2022), hydrothermal liquefaction (Cui et al., 2021), Soxhlet extraction (Aravind et al., 2021), electroporation (Zhang et al., 2021), ionic liquid extraction (Paliwal et al., 2022), ultrasonication assisted extraction method (Alpural et al., 2024).

Omega-3 fatty acids from algae and its benefits

Omega-3 fatty acids, particularly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are crucial long-chain polyunsaturated fatty acids (LC-PUFAs) essential for human health (Glencross et al., 2024; Mensah, 2024; K. Yan et al., 2024). However, due to low endogenous biosynthetic capacity and the lack of necessary enzymes such as elongases and desaturases, the human body cannot produce adequate amounts of these fatty acids, necessitating dietary intake (Karageorgou et al., 2023).

Omega-3 in various Algal Species

Omega-3 can be obtained from various microalgal and macroalgal sources. Macroalgal sources such as Gracilaria, Sargassum, and sea lettuces (Paul Abishek et al., 2014) are used for the production of algal oil whereas microalgal sources such as Neochloris aquatic, Phaeodactylum tricornutum, Spirulina sp. Microalgae is the potential source of omega-3 production due to its rapid rate of growth, higher yield with no characteristic smell, and allergic reactions as compared to other sources of omega-3.

Prospects and Innovations

The advancements in algae cultivation, such as photobioreactors and open pond systems, have significantly improved growth conditions, leading to higher oil yields. Synthetic biology is enabling the genetic modification of algal strains to boost lipid production, presenting a promising avenue for enhancing oil yields. Techniques like high-throughput phenomics are proving valuable for screening a large number of algal strains efficiently, allowing for the identification of those with optimal oil.

Conclusion

Omega-3 fatty acids are vital for human health, yet traditional sources such as fish oils face challenges including overfishing, environmental concerns, and contaminants. This review explores algal oils as a sustainable and efficient alternative for omega-3 production. Microalgae, cultivated under controlled conditions, offer a vegan, eco-friendly solution for producing high-quality DHA and EPA. Advances in biotechnological methods, such as genetic engineering and hydrothermal liquefaction, have optimized algal oil yields, enhancing its scalability and affordability. The review highlights innovative extraction techniques, including ultrasonication and enzymatic methods, which preserve oil quality while minimizing environmental impact. Furthermore, the integration of algal omega-3 s into nutraceuticals, aquaculture, and functional foods is transforming health and environmental sustainability. This work underscores the potential of algal omega-3 s in addressing global dietary needs while promoting sustainable practices. By bridging scientific innovation and environmental awareness, algal oils present a compelling path forward for human health and ecological preservation.

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Source : Bioresource Technology Reports, Volume 30, June 2025, 102154

You can now make fish-free omega-3s from whisky waste



Spent barley grains from nearby distilleries are used to feed omega-3-rich micro-algae in MiAlgae's fermentation tanks

Omega-3 fatty acids sourced from wild-caught fish stocks are valued for their studied health benefits such as healthy skin, joints, heart and brain function along with enhanced immunity, but this has resulted in a reduction in fish stocks globally. A Scottish firm is working on a solution, in the form of omega-3s made from whisky waste.

Fish don't produce omega-3 fatty acids themselves, but from ingesting marine algae in their diet. MiAlgae, a Scottish biotech company established in 2016, likewise uses the leftover barley grains used in whisky production (that would normally be discarded) to produce a plant-based, low-carbon alternative to fish-based omega-3 fatty acids.



MiAlgae claims to have already recycled 36.1 million liters of spent barley grains

The nutrient-rich barley grain leftovers are used to feed the algae in MiAlgae's specially designed fermentation tanks, generating omega-3-rich micro-algae that is dehydrated and processed into large quantities of fish-free omega-3 pet food and commercial fish feed products.

The company states that modular production hubs can be built quickly near distilleries and key customers, allowing it to collect the grain leftovers with ease and efficiency.



MiAlgae currently makes two products – MiAlgaeFish for aquaculture feeding (pictured) and MiAlgaePet for pet food supplementation

MiAlgae has recently received an investment of 3 million pounds from both the Scottish and UK governments. A new production facility located in Grangemouth, Scotland is set to open in early 2026 that will boost production by more than tenfold and reportedly save six billion fish annually by replacing

marine-sourced omega-3, recycling 36.1 million liters of whisky by-products.

MiAlgae claims that it has so far saved the equivalent of 2.1 million tonnes of CO2 emissions, used 639 million litters of whisky by-products, and replaced 1.6 million tonnes of wild fish.

Source: MiAlgae

Compact electron accelerator offers new approach for treating PFAS-contaminated water

At HZB, novel concepts for particle accelerators are being developed and tested that offer a wide range of possible applications. Here is a glimpse into the SEAlab (Sustainable Electron Accelerator Laboratory) at HZB. Credit: HZB

So-called forever chemicals or PFAS compounds are a growing environmental problem. An innovative approach to treating PFAS contaminated water and soil now comes from accelerator physics: high energy electrons can break down PFAS molecules into harmless components through a process called radiolysis.

A study published in PLOS One shows that an accelerator developed at HZB, based on a SRF photoinjector, can provide the necessary electron beam. PFAS compounds can now be detected in many places in our environment. These synthetic chemicals accumulate in water and soil, from where they enter the food chain.

Due to their extremely stable carbon fluorine bonds, they are hardly degraded by natural processes. Some PFAS are considered harmful to health. For instance, the area around the former Tegel Airport is heavily contaminated with PFAS, which entered the soil and groundwater as a result of previous firefighting exercises.

High energy electrons against PFAS

Accelerator physics now offers a new approach to tackling this problem. In a feasibility study, a team led by Prof. Dr. Thorsten Kamps has shown that an accelerator developed at HZB based on an SRF photoinjector can deliver the electron beam required for this purpose.

This electron beam must have a specific energy and high average power. An SRF photoinjector is a new accelerator concept using a superconducting radio frequency cavity with high frequency electromagnetic fields to accelerate electrons. Since the acceleration field can always be on, one can generate high average beam power, as required by electron beam water treatment.



"The SRF photoinjector concept is highly flexible and perfectly suited for the further development of accelerator based PFAS water treatment. This allows us to find out which beam parameters optimize the chemical yield for specific PFAS compounds," says Tasha Spohr, lead author of the study.

Competitive alternative for PFAS treatment

In the case study, the team compared the filter system currently used for PFAS removal at the former TXL airport with the proposed accelerator concept. "In terms of operating costs, we could be competitive with conventional technology within the next years," says Kamps. "We have demonstrated that accelerator physics is not only a tool for exciting basic research, but can also deliver new technologies to address urgent societal issues."

Compact accelerator in a box

The vision for this technology is a compact electron accelerator that fits into a container. This could be used at contamination hotspots—such as the former Berlin Tegel Airport—at potentially lower costs and with less effort than conventional remediation technology using filter systems.

Although development work is still needed before practical implementation, the study shows that the SRF photoinjector is a suitable platform for systematically optimizing the benefits, efficiency and costs of such systems.

Source: Helmholtz Association of German Research Centres

Green Assist: transforming agricultural waste into cosmetics and food

Plinius Labs, a Belgian research company in the bioeconomy sector, is transforming agricultural waste into bio-based premium ingredients for cosmetics and food. The company has developed AMPLE - a new process to extract natural compounds from flax shives - and sought Green Assist support to scale it up and overcome financial and industrialisation challenges.

Plinius Labs is built on the belief that plant waste is full of useful natural chemicals. Too often treated as simple waste, biomass contains molecules that serve essential roles in nature - from protection to healing. Plinius Labs works to extract and valorise this potential, combining 40+ years of green chemistry expertise with cutting-edge R&D to develop natural ingredients and help industries reduce their environmental footprint.

The company's mission is therefore to replace petroleum derived additives with greener alternatives and, to move forward, it needed to build a pilot plant and attract funding. The team faced challenges around investment planning, market positioning, and how to scale the AMPLE process efficiently and sustainably. That's when they turned to Green Assist for help.

Between July and October 2025, Green Assist provided expert advisory support tailored to the project's needs. This included guidance on developing a business model, refining the company's



value proposition, and identifying potential investors and clients. The expert also helped the team strengthen their financial strategy and assess how to grow in line with circular economy goals.

Thanks to Green Assist, Plinius Labs is now ready to implement its pilot project and bring its eco-innovation closer to the market. With clear business and financial plans in place, the company is better equipped to demonstrate the environmental and "Green Assist boosted the scaling-up of Plinius Labs. Potential investors were successfully identified as well as target customers for partnering contracts in the development of our proprietary process to produce bio-based cosmetic components. The assigned expert showed dedication and expertise, keeping our team focused and enhancing the market credibility of Plinius Labs' core competences in green chemistry," said Yves Boonen, CEO of the company.

Source: European Climate, Infrastructure and Environment Executive Agency

Fermentation has the potential to power 'high value nutrition'

Fermentation is key to unlocking significant nutraceutical opportunities, including advancing biotics from live cultures to postbiotic metabolites, says one strategist.



As the narrative around ultra-processed foods (UPFs) shifts to more nuanced, data-based classification, it is creating an opportunity for the industry to show that processing can be positive. In this context, fermentation has been tipped as a clean production technique that has the potential to restore trust whilst powering healthy innovation, according to Marit Veenstra, brand and innovation strategist at the Healthy Marketing Team (HMT).

Fermentation: Old technology, new opportunities

"Fermentation is one of the oldest technologies for preserving foods but it's also one of today's biggest opportunities. It connects with the consumer, industry and government response to the UPF crisis, which is to go back to real, simple, and authentic foods," she told this publication.

Veenstra dubs fermentation as the original "processing with purpose", resulting in food that "tastes real, digests naturally, and stays stable without the baddies".

"Fermentation has the power to unlock what's already there. It converts under-utilised compounds into bioactive ones, improving digestibility, bioavailability, flavour, and functionality, while reducing waste and anti-nutrients. In short it has the potential to create high-value nutrition," she said.

The evolution of fermentation

In recent history, fermentation-based new product development (NPD) has, broadly speaking, gone in two directions, according to Veenstra. In the 1990s, manufacturers such as Danone and Yakult drove a **"biotics boom"**, educating consumers about good and bad bacteria, gut flora, and the microbiome, through probiotic yoghurts and drinks. "This was where fermentation became a functional story, focused on benefits and claims, but not really on the culture or craft of the fermentation itself," said Veenstra.

The other direction was **"lifestyle fermentation"**, a hipster trend that saw consumers rediscovering fermented foods as living, authentic and real, through

products such as kombucha, kimchi, sourdough, and kefir. However, that trend was niche, premium, and too "craft" for the mass market, according to Veenstra.

The next step is using fermentation as a next-generation technology to help the industry create future-proof foods – and that is where we are today, she said.

Future fermentation opportunities

Healthy Marketing Team has identified three main opportunities for fermentation-based NPD:

Opportunity #1: Leveraging hidden nutritional assets

"Leverage the hidden nutritional assets of fermentation to create simple, real-food products with natural taste, texture, and easy-to-understand benefits, without the baddies," said Veenstra. "This is about promoting the intrinsic goodness."

Products that align with this approach include Siggi's Icelandic yoghurt, organic sourdough bread brand SlooOW, and fermented vegetable brand Symplicity, which is using lacto-fermentation to create meat-free burgers, sausages, and 'nduja, a spicy Italian meat paste.

Opportunity #2: Creating a new segment in biotics

This opportunity is about advancing biotics beyond probiotics to fermentates, to unlock new health benefits and a system-level approach to the microbiome, said Veenstra.

"The next wave is postbiotic- and metabolite-led: defined, stable, benefit-specific compounds produced through fermentation. It will be less about 'adding bacteria' and more about delivering outcomes, with better consistency and stability, clearer mechanisms, and fewer compliance issues," she explained.

It is early days for postbiotics, but one product example is ReFerm by Nordic Rebalance. This Swedish-Danish life science company uses a proprietary fermentation technology to transform Swedish oats into a concentrated postbiotic ingredient that is said to strengthen the gut barrier and reduce inflammation. Another is Gaia Herbs' Sauerkraut Postbiotic, which claims to support a healthy gut and immune system.

Opportunity #3: New low impact, high nutrition ingredients

The third opportunity identified by HMT is that of creating "future-proof foods" by substituting conventional ingredients with low-impact, high-nutrition, precision fermentation-derived alternatives.

Examples of this approach include Nukoko, which is using precision fermentation to transform fava beans into chocolate, and Remilk, whose precision fermentation derived milk proteins enable the production of dairy products without the cows. Here, however, Veenstra believes there is a consumer education job to be done. "This story is more difficult to tell. Even though the outcome is real food, it is high tech and most of it starts in the lab. It will take many years for consumers to understand and accept that."

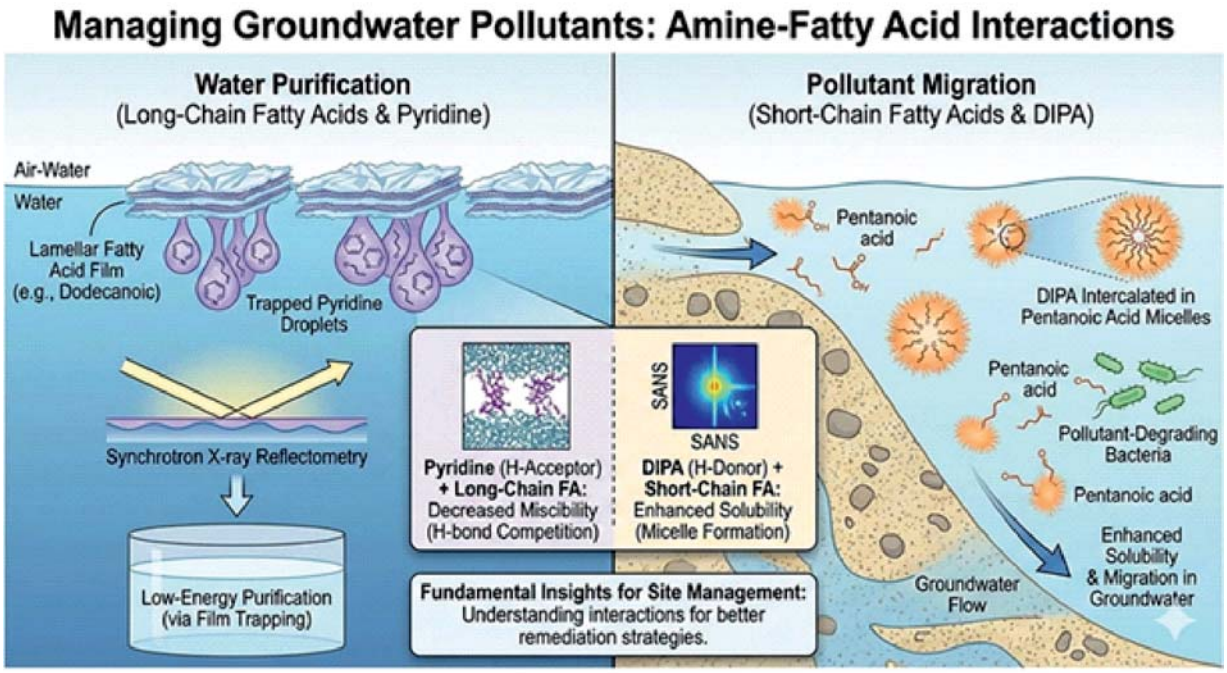
Source: Ingredient Network

Using fatty acids for efficient groundwater decontamination

Fatty acid tails determine how certain pollutants can be separated from groundwater.

Using fatty acids for efficient groundwater decontamination lead image

Compounds derived from ammonia, called amines, are used in industrial processes like carbon capture and desalination. However, these often end up as groundwater pollutants and can affect nearby ecology and plant growth. Pensini et al. sought an efficient way to remove these contaminants. Using a combination of experiments and simulations, the researchers uncovered how fatty acids can help separate and trap pollutants from the water — though



short-chain fatty acids can also make certain pollutants more soluble.

For pyridine, one of the toxic amines the group studied, fatty acids compete with the pollutant for hydrogen bond interactions with the water. "Hydrogen bonds are weak attractions that help water molecules 'stick' to each other and also let water interact with many dissolved chemicals," said author Erica Pensini. "In our mixtures, pyridine and fatty acids both try to interact with water this way, but fatty acids also have an oily tail that water does not like."

The length of this tail affects an acid's interaction with pyridine. Short tails prevent pyridine from gathering into large clusters, while long tails disrupt how it mixes with the water, potentially forming a thin film at the water's surface that can trap the pyridine.

The group was surprised by how much this small parameter affects groundwater pollutants' effectiveness. By tuning these molecular interactions, they were able to address one of the key challenges in groundwater treatment, the dissolved phase of the pollutants. "Just changing the fatty acid tail length moved the system away from 'everything stays mixed' to 'pyridine separates into droplets,' and then further to a self-assembled surface film that can physically trap those droplets — essentially turning a basic interfacial phase transition into a practical, low-energy separation mechanism," said Pensini.

The researchers are exploring additional factors that may affect groundwater decontamination, including the salinity of the water and the interactions between multiple contaminants.

Source: aip.org

CINNAMON (*CINNAMOMUM ZEYLANICUM*) ESSENTIAL OIL

Introduction:

Cinnamon oil is a concentrated, aromatic essential oil extracted from the bark or leaves of the Cinnamomum verum (and related Cinnamomum species) tree through steam distillation. It is prized for its warm, spicy aroma and its concentration of bioactive compounds, principally cinnamaldehyde together with eugenol, which impart notable antimicrobial, antioxidant, and anti-inflammatory characteristics. In wellness and aromatherapy applications the oil is commonly used to support circulation, ease discomfort, and reduce stress, while in food and beverage manufacturing it serves as a natural flavouring agent and in cosmetics and personal care it functions as a fragrance and functional ingredient.

Cinnamon oil is processed and sold principally in two forms, bark oil and leaf oil, depending on the plant part used and the extraction route adopted, with bark oil generally commanding a premium owing to its higher cinnamaldehyde concentration. Beyond its traditional culinary role, the oil is used extensively in pharmaceutical and nutraceutical formulations leveraging its antimicrobial and antioxidant profile, in cosmetic and personal care products for fragrance and functional benefit, and increasingly in natural food preservation and active packaging applications as manufacturers seek alternatives to synthetic preservatives. According to industry estimates, cinnamon oil accounts for approximately 12% of the broader cinnamon market by value.

Cinnamon oil is defined as an essential oil obtained from the Cinnamomum zeylanicum plant through steam distillation, with its chemical composition varying based on factors such as the plant's age, part used, and extraction methods. It possesses several pharmacological and medicinal applications, including antimicrobial properties against various bacterial pathogens.



Cinnamon oil is obtained from the dried inner bark of the shoots of the coppiced trees of Cinnamomum zeylanicum. It is indigenous to Sri Lanka and the Malabar Coast of India. It is also found in Jamaica and Brazil. Although the plant can be propagated by planting the cuttings and layers, commercially it is generally propagated by seed as it is the easiest method to adopt.

Botanical Name:

Cinnamomum verum (or C. zeylanicum) - known as true cinnamon, yielding oils high in cinnamaldehyde (bark) and eugenol (leaves).

Harvesting:

It is a crop of tropical countries. It needs sandy or siliconous soils with an admixture of humus. The favorable altitude is 800–1000 m and a sheltered situation with an annual rainfall of 200–250 cm is ideal for cultivation. The seeds are sown in well-prepared nursery beds located at suitable places in June and July. The seeds are sown at a distance of 10 cm and covered with a small layer of soil and watered properly. It takes approximately 20 days for germination of seeds. Seedlings are provided with the shades and are allowed to grow for about 10–12 months. Transplantation is done in October/ November or in the rainy season by keeping the distance of 2 m in between two plants. Shades are provided with the pedals of coconut leaves. The field is weeded 2–4 times in a year. For healthy growth, suitable fertilizers and manures are applied properly. The trees are coppiced to induce the formation of shoots. The trees are allowed to grow further unless they turn to uniform brown by formation of cork. Harvesting is done in the rainy season when it is easy to peel off the bark from shoots. The bark is dried in shade over the mats prior to oil extraction.

Manufacturing Process Overview:

The cinnamon oil processing operation transforms raw cinnamon bark or leaves into a purified essential oil through a sequence of cleaning, drying, size reduction, distillation, separation, and packaging operations. The key process stages are:

Raw Material Reception and Cleaning: Cinnamon bark or leaves received from growers or traders are inspected, sorted, and cleaned to remove soil, foreign matter, and damaged material prior to processing.

Drying: Raw material is dried, either through sun-drying or mechanical drying units, to reduce moisture content to levels suitable for storage stability and efficient downstream distillation.

Grinding or Chipping: Dried bark and leaves are chipped or ground to increase surface area, which improves steam penetration and oil recovery during distillation.

Steam Distillation: The prepared raw material is charged into distillation vessels where live steam or hydro-distillation volatilises the essential oil compounds, including cinnamaldehyde and eugenol, from the plant matrix.

Condensation: The vapour mixture of steam and volatile oil compounds passes through condensers, converting it back into a liquid distillate.

Oil-Water Separation: The condensed distillate is separated, typically using Florentine-type flasks or continuous separators, into crude essential oil and an aromatic water (hydrosol) by-product based on differences in density and miscibility.

Filtration: Crude cinnamon oil is filtered to remove residual moisture and fine particulate matter, yielding a clear, storage-stable product.

Quality Control: Finished oil is tested for cinnamaldehyde and eugenol content, specific gravity, refractive index, colour, and other parameters to verify compliance with applicable food, pharmaceutical, or cosmetic-grade quality standards before release for packaging.

Packaging and Dispatch: Cinnamon oil is packed in retail bottles, drums, or bulk containers suited to essential oil handling and dispatched to food, pharmaceutical, cosmetic, and aromatherapy customers. The hydrosol by-

product may be separately packed and sold into complementary wellness and fragrance applications.

Chemical Composition of Cinnamon Oil:

The compositions of the oil were analyzed by GC-MS, and the major constituents were found to be (E)-cinnamaldehyde (71.50%), linalool (7.00%), ß-caryophyllene (6.40%), eucalyptol (5.40%), and eugenol (4.60%). C. zeylanicum essential oil contained remarkable levels of phenolic and bioactive compounds with outstanding ability to scavenge free radicals and inhibit ß-carotene oxidation.

Benefits and Uses of Cinnamon Oil:

The cinnamon oil market serves several major end-use segments across food, pharmaceutical, cosmetic, and wellness sectors:

Food & Beverage Industry: Cinnamon oil is used as a flavouring agent in bakery products, confectionery, beverages, and spice blends, valued for its concentrated, consistent flavour profile relative to ground spice.

Pharmaceuticals: The oil's antimicrobial and digestive-supportive properties support its use in digestive formulations, antimicrobial preparations, and traditional medicinal products.

Cosmetics & Personal Care: Cinnamon oil is incorporated into soaps, creams, lotions, and perfumes for its fragrance and functional skin-care benefits.

Aromatherapy & Wellness: The oil is used in aromatherapy formulations to support relaxation, circulation, and general wellbeing, reflecting growing consumer interest in natural wellness products.

Household & Fragrance Products: Cinnamon oil is used in air fresheners, candles, cleaning products, and other fragrance formulations.

Nutraceuticals and Natural Preservation: Bioactive compounds in cinnamon oil support its emerging use in functional food formulations and as a natural preservative in food coatings and active packaging applications.

Global Cinnamon Oil Market Outlook:

The global cinnamon oil industry is expected to witness steady growth, supported by increasing consumer preference for natural, plant-based, and clean-label ingredients across food and beverages, personal care, cosmetics, aromatherapy, and pharmaceutical applications. Cinnamon oil contains bioactive compounds such as cinnamaldehyde and eugenol, which provide antimicrobial and antioxidant properties and strengthen its potential as a natural preservative and functional ingredient. Rising demand for essential oils in aromatherapy, wellness products, fragrances, skincare formulations, and natural household products is further supporting industry expansion, with the global skincare market alone estimated at USD 115.65 Billion in 2024. In the food sector, cinnamon oil is gaining attention for applications in preservation, edible coatings, and active packaging, driven by efforts to reduce reliance on synthetic preservatives.

Compiled by:
Dr. S. Adhikari

LAUGH AND LOUD



Q. Why is the pH of youtube so stable?

A. Because it constantly buffer;

****

Q. What did the scientist say to the chemist whose lab smelled like eggs?

A. “Sorry for your suffering”.

****

Q. After death, one scientist was sent to heaven. He tried to call the Lab but it was “very costly”. He saw one of his colleagues keep calling from hell. He inquired from the gate keeper why it is so?

A. Gate keeper replied “Hell to Lab calls are always considered “local”.

****

Q. Why did scientists love Nitrates so much ?

A: Because Nitrates are cheaper than day rates.

****

Q. Why don't we gossip in chemistry class ?

A. Too many Reactions.

****

Q. What did an Earthquake say to a Volcano ?

A. You are a hot mess.

****

Q. Why is the dieting advice to “eat light” so dangerous?

A. A burger is in its ground state

****

Q. A Chemistry professor silently fitted while showing the class how to conduct chemical reactions. When students started making faces and whispering with each other, the professor came to his own defence: “Class, the side product of this chemical reaction is hydrogen sulphide , smells awful isn’t it”.

****

Q. A new monk shows up at a monastery where the monks spend their time making copies of ancient books. The new monk goes to the basement of the monastery saying he wants to make copies of the originals rather than of others’ copies so as to avoid duplicating errors they might have made. Several hours later the monks, wondering where their new friend is.

****

Q. Why did the scientist take out their doorbell?

A. They wanted to win the no-bell prize.

****

MEMBERS' PAGE

PETAL STRONG

by R.C. ARORA (Ex. Manager Q.C. - S.F.F.I., New Delhi)

Not only are flowers beautiful, they are also that part of a plant rich in plant hormones. These hormones are often useful for our well- being, so all across the world, we find flowers used in popular and traditional medicines. Flower power can be used as an infusion (also known as flower and fruit tea), in poultices and as aromatherapy for several diseases. Here is some petal power.

Rose : Very popular in natural medicine. It is used as a beverage to heal irritable bowl disease, gall bladder and liver problems and bilious disorders. As aromatherapy, rose is used as a mood-elevator.

Marigold : Its petals are used to make an eyewash. Marigold is also used in both homeopathic and conventional medicine as an ointment for cuts and grazes. It has antiseptic, stimulant and anti- fungal properties.

Dandelion : Its infusion is used to treat anemia, jaundice and nervousness. It also purifies the blood.

Chamomile : It removes gases in the intestine, excessive stress and skin burns and irritations. It also helps improve immunity. Among other things, it provides relief from mouth ulcers, stomach aches and stressed muscles.

Begonia : Boil it in water with a dash of cinnamon to make an infusion that eliminates toxins from the blood and cleanses the liver. A paste made with the flower can be applied on burns, pains and toxic sores.

Calendula : Essence of calendula provides relief for menstrual pain, sore throats and tonsillitis. Apply it on cancer sores and wounds for quick healing.

Cornflower : Put a few drops of its essence on a wet cotton ball and keep over the eyes to relieve strain. Use in a facial if you have skin eruptions and acne.

Honeysuckle : Gargle with its essence to relieve a sore throat. It is also effective for all inflammatory conditions. The blossoms are rich in antiviral and antibacterial properties. The leaves and stems are useful for arthritis.

Sunflower : Its fusion provides relief for menstrual pain and ulcers. Gargle with the infusion to relieve a sore throat and tonsillitis. It is also a remedy for cancer sores.



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- On-Site Services



Calibration Services

FARE Labs provides NABL accredited (ISO/IEC 17025:2017) Calibration services in the following areas:

Temperature: 196 to 3000; Humidity: 10 % to 95 % RH Fixed Point Primary Standard: BPLN2, TP Hg, TPW, Ga, SN, Zn, Al.

Electro-Technical: AC/DC Voltage- 10 µV to 100 kV, DC Current- 1µA to 2000 A, AC Current- 10 µA to 6000A, Power & Energy

Primary Standard, Mechanical, Viscosity- 1cSt to 70000 cSt, Density- 0.6 g/ml to 1.95 g/ml Mass- 1 mg to 1000 kg, Volume- 1 µl to 6500 kl, Sound- 94 dB & 114 dB @1kHz,

Dimension: Vision Measuring Machine, Profile Projector, Test Sieve, Gauge Block Fluid Flow: 0.6 m/s to 20 m/s, 5 LPM to 60 LPM, 0.6m3/min. to 1.5 m3/min., 5 m3/hr. to 1080 m3/hr.

Calibration of Medical Devices: Discharge Equipment / Devices, Imaging / Plotters, Monitoring Units, Patient Conditioning / Maintenance

Proficiency Testing Provider (PTP)

- High Quality PT Items
- Comprehensive Report
- Frequency
- Cost Effective



Proficiency Testing Provider (PTP)

Accredited as per ISO/IEC 17043:2023 by NABL, for both Testing & Calibrations, FARE Labs is one of the top National PT Providers serving both National and International customers. We offer need-based and focussed PT Schemes for forthcoming regulations. We maintain International Quality at domestic prices.

R&D and Training

- Cutting Edge Research
- Tailored Solutions
- Experienced Faculty
- Globally Competitive



R&D and Training

Recognised by DSIR and crowned with Industrial Patents we offer cutting edge R & D facilities to the industries. The thrust areas are Product Development, Process Development and Technology Development. We carry out contract research for overseas organizations as well. We offer tailor-made hands-on training in various testing and calibration areas to Government/Non-Government Organizations and Corporates.

RMP

- Competency
- Quality Assurance
- Traceability
- Economical



Reference Material Producer (RMP)

Certified Reference Materials (CRM) are crucial and integral part of testing as these are used to confirm the identity of the products with appropriate metrological traceability. CRMs are also used to validate the analytical methods and calibration of equipment. The production of CRMs requires stringent conditions and need to be certified with traceability.

Inspection & Auditing

- **Inspection:** IAF Scope 03, IAF Scope 30
- **HRAA:** Food Establishments Sweet Shops Bakeries, and Meat Retail Stores
- **Third Party Audit:** Cereals & Products, Edible Oil, Oil Seeds & Fats, Tea, Coffee, Sugar Spices & Products Alcohol, Food Catering



Inspection & Auditing

FARE Labs Pvt. Ltd. is an accredited Inspection Body (IB) as per ISO/IEC 17020:2012 by NABCB, QCI, India for IAF Scope 03 and 30. We undertake inspections of food establishments as per the Regulatory Guidelines.

FSSAI/QCI have recognized FARE Labs as Hygiene Rating Audit Agency (HRAA) for Food Service Establishments. FSSAI has also recognized FARE Labs as Third Party Food Safety Audit Agency.

Choosing FARE Labs for Third Party Food Safety and Hygiene Rating Audits ensures adherence to industry standards, enhanced consumer trust and dependable certification, safeguarding both consumer health and regulatory compliance. We have a panel of most diversified and experienced team of Auditors that can deliver better & detailed Audit Reports to ensure the Regulatory Requirements

FARE LABS Private Limited

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