From Dairy to Innovation: Community BioRefinery and Burnett Dairy's Bio-Acetone Breakthrough

Scott Hewitt CEO and Vincent James Ph.D. CTO
Community BioRefineries, LLC

March 1, 2025

"Let's treat food with respect and not waste it." ~Massimo Bottura

Bio-Acetone: A Sustainable Revolution in Manufacturing

Massimo Bottura's words, born from his innovative approach to cuisine and his passion for reducing food waste, carry the conviction of a chef who sees value in what others discard. As the owner of the three-Michelin-star Osteria Francescana, Bottura founded Food for Soul, a nonprofit dedicated to repurposing surplus food, including cheese whey, into nourishing meals for those in need. His philosophy resonates deeply with the rise of bio-acetone, which transforms dairy waste into sustainable solutions. This quote, rooted in his belief that every ingredient holds potential, aligns perfectly with the mission of innovators like Community BioRefineries, LLC (CBR), who, in partnership with visionaries like Matt Winsand, CEO of Burnett Dairy Cooperative in Grantsburg, Wisconsin, are converting cheese production waste products into bio-acetone, bio-butanol, bio-ethanol, and bio-hydrogen through ABE fermentation. By reimagining waste as a resource, CBR's work reflects Bottura's vision of respect for food and the planet.

This article embarks on a vibrant journey through the world of bio-acetone, a clean-label, bio-based solvent derived from renewable cheese production waste products, offering a sustainable, non-toxic alternative to petroleum acetone with its fossil fuel origins and harmful impurities like benzene and phthalates. Supported by regulations such as the U.S. EPA's VOC-exempt status for acetone under the Clean Air Act, the EU's VOC Solvents Emissions Directive (1999/13/EC), and the FDA's GRAS designation under 21 CFR §173.210 for food-contact applications, bio-acetone aligns with global mandates like the EU's Renewable Energy Directive (RED II) and TSCA Section 6(h) initiatives to reduce environmental and health risks from persistent chemicals. These frameworks promote its adoption in low-VOC, eco-friendly applications, exploring its production, applications, market trends, regulatory landscape, and why it stands as the gold standard for a greener future, weaving a narrative of innovation and responsibility.

The Essence of Bio-Acetone

Imagine a solvent that polishes your car's glossy finish, perfects your nail polish, and extracts the rich vanilla in your ice cream, all sourced not from oil reserves, but from the cheese production wastes, agricultural residues and food industry waste we can process daily. Bio-acetone (C_3H_6O), derived from the Greek "zymo-" (fermentation) and "bac" (bacteria), makes this vision a reality. Chemically identical to petroleum-based acetone, it boasts a molecular weight of 58.08 g/mol, a boiling point of 56°C, a density of 0.791 g/cm^3, and miscibility with water, ethanol, and most organic solvents. Its volatile, flammable, low-toxicity, and non-carcinogenic nature makes it a seamless drop-in replacement, but its renewable origins—free from harmful impurities like benzene and phthalates—set it apart. Produced through acetone-butanol-ethanol (ABE) fermentation using ZymoBac-ABE-X1™ (Zymobac), bio-acetone leverages materials like effluence from Burnett Dairy Cooperative, and industrial energy crops to deliver a sustainable alternative with a carbon footprint up to 46% lower than petroleum acetone. This alignment with global sustainability goals, such as carbon neutrality by 2050, and stringent regulations on volatile organic compound (VOC) emissions positions bio-acetone as a cornerstone of modern manufacturing. From food processing to automotive coatings, it proves that innovation can be as practical as it is inspiring.

Healthier Uses Compared to Petroleum Acetone

Petroleum-derived acetone, extracted from crude oil through energy-intensive processes, relies on fossil fuels (petroleum) and raises environmental and health concerns due to its synthetic origin, including trace toxins like benzene and phthalates. In contrast, bio-acetone's renewable production and high purity (≥99.5 wt%) make it a healthier, non-toxic choice, particularly in sensitive applications where safety and sustainability are paramount. Compliant with U.S. FDA regulations under 21 CFR §173.210 as a food-grade processing solvent, bio-acetone purifies food ingredients with minimal residue (<10 ppm), supporting the clean-label movement's demand for transparency and sustainability. Its biodegradability—breaking down into carbon dioxide and water—and lower environmental persistence further enhance its appeal, reducing workplace exposure to harmful chemicals and supporting cleaner manufacturing processes. This makes bio-acetone ideal for cosmetics, pharmaceuticals, and food production, where it excels in delivering safe, sustainable solutions.

Production Through ABE Fermentation

The alchemy of bio-acetone production lies in the ABE fermentation process, a marvel of biology and engineering. This two-phase anaerobic process, driven by Zymobac bacteria, transforms biomass sugars into acetone (30%), butanol (60%), and ethanol (10%), alongside bio-hydrogen, a sustainable energy source. CBR, working with Matt Winsand and the Burnett Dairy Cooperative, utilizes cheese production waste as a primary feedstock, turning this abundant material into a valuable resource for ABE fermentation. The process begins with pretreatment, using a mechanical separation process to release fermentable sugars such as xylose, and arabinose and glucose, (C5 and C6 sugars) from biomass. In this phase, these sugars become acetic and butyric acids, lowering pH. During solventogenesis, we convert fermentation acids into three valuable bio-based solvents—acetone, butanol, and ethanol—while significantly increasing acetone yields by 15–21% through advanced process enhancements. The extractive process produces very pure solvents—99.8% acetone, 100% butanol, and 95% ethanol—while using 62% less energy than traditional distillation methods, making it both sustainable and cost-effective.

Feedstock Diversity

CBR taps into a diverse array of locally sourced feedstocks, ensuring cost efficiency and sustainability while avoiding competition with food production. In partnership with Matt Winsand, Chief Executive Officer of the Burnett Dairy Cooperative, dairy cheese effluence serves as a cornerstone feedstock—rich in fermentable sugars for ABE fermentation. Additional feedstocks include agricultural residues such as corn stover, wheat straw, sugarcane bagasse, sugar beets, sweet sorghum, switchgrass, barley straw, rice straw, sorghum bagasse, miscanthus, energy cane, and industrial hemp biomass, as well as food industry waste products like distillery waste, potato waste, brewery spent grains, and other food processing residues. These sugar-rich or polysaccharide-containing materials reduce raw material costs by up to 60% compared to starch-based feedstocks, aligning with circular economy principles by repurposing waste into valuable products. This feedstock flexibility—enhanced by CBR Technologies and University CREDA's advancements in managing variability—ensures supply chain resilience and supports rural economies by leveraging local resources.

CBR's ABE Process

In collaboration with Matt Winsand, CEO of Burnett Dairy Cooperative in Grantsburg, Wisconsin, CBR is turning effluence into global solutions through ABE fermentation. Picture a biorefinery buzzing with innovation, transforming effluence (like potato peels and brewery grains) into bio-acetone, bio-butanol, bio-ethanol, and bio-hydrogen using Zymobac bacteria, powering industries from food to automotive to aviation. This partnership leverages Burnett Dairy's abundant cheese waste to fuel a sustainable production model, creating a blueprint for rural bio-economies. Building on the success of the facility at Grangemouth, Scotland, CBR likewise will target 10,000 metric tons of bio-acetone annually by 2030, showcasing scalability and global potential. The Grangemouth facility serves as a proof-of-concept, demonstrating how effluence and other by-products can be transformed into high-value products, with plans for replication in other regions. Grangemouth's overall focus is on producing green chemicals.

Valorized Bio-Based Products and Vertical Integration

CBR doesn't just produce bio-acetone—it transforms every byproduct into a treasure, crafting a circular economy masterpiece. The ABE process, utilizing effluence from Burnett Dairy Cooperative, yields primary products: bio-acetone, used in paints, cosmetics, pharmaceuticals, and food manufacturing; bio-butanol, a high-energy biofuel and solvent with a market CAGR of 7.2% through 2030; bio-ethanol, a versatile biofuel and chemical intermediate; and bio-hydrogen, used for on-site energy or industrial applications like fuel cells. Co-products enhance economic viability:

- Hydrogen Gas: Powers on-site energy or is sold for industrial applications like fuel cells.
- Carbon Dioxide: Captured for beverage carbonation or algae cultivation, turning waste into opportunity.
- Acetic and Butyric Acids: Used in animal feed additives or chemical synthesis.
- Butyl-Butyrate: A flavoring agent or solvent for food and cosmetics, derived from butanol.
- Isopropanol: Produced from bio-acetone for sanitizers, pharmaceuticals, and food additives.

This valorization offsets 30–40% of production costs, enhancing profitability. The process is vertically integrated, streamlining operations:

- Feedstock Sourcing: Partnerships with Burnett Dairy and local farmers secure low-cost feedstocks like effluence and sugar beets, reducing raw material costs.
- Production: Integrated pretreatment, fermentation, and separation units ensure efficiency.
- Co-Product Utilization: On-site facilities convert co-products into marketable goods, boosting revenue.
- Distribution: ISCC PLUS-certified products reach global markets, including food and cosmetics.
- Waste Management: Near-zero waste is achieved through biochar production and water recycling, aligning with sustainability goals.

Comparison with Petroleum Acetone

Petroleum acetone, produced via the cumene process, is a fossil-fuel relic, relying on non-renewable resources and generating only phenol as a co-product, following a linear model. In contrast, CBR's ABE process, utilizing a variety of feed stocks, biomass, and dairy cheese effluence, uses renewable biomass, cuts VOC emissions by 46%, and supports carbon neutrality. The diverse, high-value co-products from ABE fermentation—hydrogen, biochar, butyl-butyrate, and more—outshine the petroleum model, making bio-acetone a sustainable leader. While petroleum acetone's production is tied to volatile oil markets, bio-acetone benefits from stable, low-cost waste feedstocks, ensuring price stability and environmental benefits.

Why CBR's ABE Process is Ideal

CBR's ABE process, leveraging dairy cheese effluence in partnership with Matt Winsand and Burnett Dairy Cooperative, is a game-changer, blending cutting-edge science with a passion for sustainability. Its technological superiority lies in its feedstock diversity, processing everything from plant/food-based effluence to food processing by-products, with variability addressed through advancements by CBR Technologies and USDA/University 'CRADA' (Cooperative Research and Development Agreements). Advanced fermentation techniques, including continuous systems and metabolic engineering, boost acetone yields by 15–21%, with butanol toxicity resolved through their innovations. The CBR approach reduces energy consumption by 62%, making bio-acetone cost-competitive with petroleum acetone. Metabolic engineering unlocks the potential of lignocellulosic feedstocks like switchgrass and hemp biomass, enhancing productivity. The Grangemouth facility's success, producing high-purity acetone for global markets, paves the way for biorefineries worldwide, targeting 10,000 metric tons annually by 2030.

Economically, low-cost feedstocks like effluence and co-product revenue (offsetting 30–40% of costs) ensure viability, with in-house processing reducing reliance on external suppliers. Environmentally, the process achieves carbon neutrality or negativity, valorizes 68,000 tons of waste annually, and aligns with circular economy principles through ISCC PLUS certification. This perfect alignment with the 19% CAGR bio-acetone market, driven by demand in food, cosmetics, and automotive sectors, positions CBR as a leader in sustainable manufacturing. The partnership with Burnett Dairy exemplifies how local collaboration can drive global impact, turning a dairy waste product into a cornerstone of the bioeconomy.

Bio-Acetone in Clean-Label Food Processing

Bio-acetone, as a biologically derived solvent, represents an innovative approach to clean-label food production, aligning with consumer preferences for natural and transparent processing methods. It extracts fats, oils, and lipids from plant-based proteins and starches, purifies functional food extracts, and replaces petrochemical solvents like hexane. It supports clean-label production by ensuring minimal residue (<10 ppm) and sustainable processing for ingredients used as thickeners, stabilizers, and emulsifiers in foods such as sauces, gluten-free baked goods, and plant-based meats. Clean-label foods, defined by short, familiar ingredient lists, no artificial additives, natural sourcing, and transparent processing, meet the growing consumer demand for transparency, with 63% of U.S. consumers paying more attention to ingredient lists in 2021 (International Food Information Council, 2021). The global clean-label ingredients market is projected to reach billions by 2029, growing at a strong CAGR from 2024 (MarketsandMarkets, 2024).

Clean-Label Ingredients Enabled by Bio-Acetone

Using bio-acetone, food manufacturers can produce:

- Plant Protein Isolates: Hexane-free, pure, and natural for plant-based meats and dairy alternatives.
- Resistant Starch: Biologically extracted for gut health in functional foods.
- Cellulose Fibers: Solvent-free prebiotics for digestive wellness.
- High-Oleic Oils: Cold-pressed and chemical-free for cooking and dressings.
- Phytochemicals: Naturally isolated from plant byproducts for nutraceuticals.

These ingredients fuel the demand for clean-label products, from plant-based milks to gluten-free snacks, aligning with health-focused initiatives promoting food integrity, sustainable agriculture, and transparent production to combat chronic disease and rebuild public trust.

Bio-Acetone Integration in Industrial Food Manufacturing Equipment

The integration of bio-acetone into industrial-scale food manufacturing offers a pivotal opportunity to replace fossil-derived solvents like hexane and petroleum-based acetone with a clean-label, biodegradable, and FDA-compliant alternative. Its chemical properties—boiling point of approximately 56°C and high volatility—mirror those of acetone, making it suitable for a broad range of food-grade extraction and purification processes.

In the context of clean-label innovation, Bio-Acetone (C_3H_6O) is a high-purity solvent (≥99.5%) derived through ABE fermentation of agricultural feedstocks and dairy cheese waste using microbial strains (Community BioRefinery, 2024). It serves as a secondary direct food additive under FDA regulation 21 CFR §173.210, enabling purification of ingredients like spice oleoresins, plant-based proteins, and functional extracts (U.S. Food and Drug Administration, 2023b). Unlike Petro-based acetone, which relies on fossil fuels and leaves potential synthetic residues, Bio-Acetone ensures negligible residue (<10 ppm) and eliminates the need for toxic petrochemical solvents like hexane (Smith & Johnson, 2020). It purifies food components by selectively extracting impurities - such as fats, oils, lipids, or synthesis byproducts - while maintaining ingredient integrity and aligning with clean-label demands for transparency and sustainability.

Retrofitting Considerations

To ensure safe integration:

- Explosion-Proof Standards: Meet Class I, Division I standards for flammable vapor zones.
- Seal and Gasket Materials: Use solvent-resistant food-grade elastomers like PTFE or Viton.
- Ventilation and Condensation: Upgrade vapor extraction and condensers for recovery efficiency.
- Gas Monitoring: Install photoionization detectors (PID) for ketone monitoring.

Operational Benefits

- Drop-In Replacement: Requires no significant modification for facilities using acetone or hexane.
- GRAS and FDA Compliant: Permitted under 21 CFR §173.210 with residual limits <10 ppm.
- ESG Alignment: Reduces toxic solvent use, VOC emissions, and fossil fuel dependency.
- Cost-Effective: Leverages existing distillation, drying, and CIP systems.
- Clean-Label Standards: Meets consumer demand for natural, transparent processing.

Applications Across Industries

Bio-acetone's high purity and safety make it a preferred choice across multiple sectors, from food manufacturing to high-tech applications.

Food Manufacturing

In food manufacturing, bio-acetone's compliance with FDA (21 CFR §173.210) and EU standards ensures safety where petroleum acetone's impurities pose risks. Its ten key applications include:

- Flavor Extraction: Captures vanilla, citrus, and spice essences for beverages, confectionery, and baked goods, aligning with FDA's GRAS standards and the 36% surge in clean-label demand.
- Decaffeination: Removes caffeine from coffee and tea while preserving flavors, complying with HACCP standards.
- Equipment Cleaning: Cleans food processing equipment, removing oils and residues without harmful traces, supporting the food processing market's hygiene standards (CAGR 6.1% through 2030).
- Additive Synthesis: Produces food-grade isopropanol and butyl-butyrate for fruity notes in candies and beverages.
- Lipid Extraction: Extracts oils and fats from soybeans, nuts, and seeds for cooking oils and emulsifiers.
- Nutraceutical Production: Extracts antioxidants and omega-3 fatty acids for dietary supplements.
- Color Extraction: Isolates natural pigments from beets, turmeric, and berries for clean-label colorants.
- Protein Purification: Purifies plant-based protein isolates for meat alternatives and dairy substitutes.
- Sugar Refining: Removes impurities from sugarcane or beet sugars for high-purity sweeteners.
- Fermentation Enhancement: Optimizes microbial activity in yogurt, cheese, and kombucha production.

Other Industries

- Paints and Coatings: Used in low-VOC formulations for automotive (e.g., dashboards) and construction, meeting demand from 85 million vehicles produced globally in 2022.
- Chemical Intermediates: Precursor for methyl methacrylate (MMA) and bisphenol-A (BPA) in acrylic plastics and polycarbonates, with an 8.2% CAGR market through 2030.
- Cosmetics and Personal Care: Powers nail polish removers, acne treatments, and skin care, fueling Europe's cosmetics market.
- Pharmaceuticals: Supports API synthesis and sanitizer production, driven by India's pharmaceutical market by 2030.
- Electronics: Cleans circuit boards, meeting Asia-Pacific's semiconductor demand.
- Bio-Based Plastics: Fuels biodegradable plastics for packaging, driven by single-use plastic bans.

Costs and Economic Viability

Bio-acetone production costs are competitive with petroleum acetone due to low-cost feedstocks like effluence and co-product revenue. Waste feedstocks cost less than starch-based feedstocks. Continuous fermentation and E-TCD distillation reduce processing costs, while biorefinery setup costs are offset by co-products like hydrogen, biochar, and butyl-butyrate, which offset 30–40% of production expenses. EU subsidies and tax credits under the Renewable Energy Directive (RED II) further lower financial barriers, and waste feedstocks ensure price stability against volatile oil markets. CBR's vertically integrated model—covering feedstock sourcing, production, co-product utilization, and distribution—minimizes supply chain risks and enhances profitability, making bio-acetone economically viable.

Demand Drivers

The demand for bio-acetone is soaring, driven by:

- Environmental Regulations: The EU's VOC Solvents Emissions Directive (1999/13/EC), EPA's Clean Air Act, and RED II favor bio-acetone for its low VOC emissions (46% reduction) and carbon neutrality.
- Consumer Preferences: A 36% growth in clean-label product demand fuels adoption in cosmetics, food, and household goods.
- Industrial Growth: The automotive sector's need for low-VOC coatings, pharmaceuticals' demand for API synthesis, and food manufacturing's reliance on flavor extraction drive market expansion.

Market Trends and Growth

The global bio-acetone market is projected to grow at a strong CAGR through 2030 and beyond. Demand in food, cosmetics, and automotive sectors, coupled with CBR's scalable model utilizing effluence, supports global expansion. Advances in fermentation and co-product utilization will enhance efficiency and market reach. Europe leads with stringent VOC regulations and a robust cosmetics market, followed by Asia-Pacific's industrialization and North America's strength in pharmaceuticals and food. Key trends include:

- Sustainability Focus: 61% of chemical companies adopt green solvents in 2025.
- Technological Advancements: Innovations in fermentation and distillation reduce costs.
- Certifications: ISCC PLUS certification boosts market credibility.
- Emerging Markets: Bioeconomy investments in the Middle East and Africa create opportunities.

Manufacturers and Key Players

CBR leads with its patented technology and partnerships with Burnett Dairy, utilizing effluence to produce 10,000 metric tons annually by 2030. Other key players include:

- LG Chem: Exports ISCC PLUS-certified bio-acetone for cosmetics and pharmaceuticals.
- Mitsui Chemicals: Supplies mass-balanced bio-acetone for Asia-Pacific's industrial sectors.
- INEOS: Produces INVIRIDIS™ bio-acetone for low-VOC paints and coatings.
- LanzaTech: Uses gas fermentation to produce bio-acetone from industrial emissions.

Regulatory Landscape

Bio-acetone benefits from robust regulatory support:

- U.S. EPA: Classifies acetone as VOC-exempt since 1995, promoting bio-acetone for low photochemical reactivity.

- ECHA – REACH: Encourages bio-based solvents for reduced environmental risks.
- European Commission – RED II: Promotes bio-based chemicals with subsidies and tax credits.
- Environment and Climate Change Canada: Supports bio-acetone for net-zero emissions by 2050.
- U.S. FDA: Recognizes bio-acetone as GRAS under 21 CFR §173.210 for food-contact applications.
- ISCC PLUS: Certifies sustainability, ensuring traceability and market access.

Safety regulations address bio-acetone's flammability with strict handling protocols, but its low toxicity enhances its appeal in food and pharmaceutical applications.

Why Bio-Acetone is the Solvent Gold Standard

Bio-acetone redefines manufacturing by blending sustainability with performance. Its environmental superiority—reducing VOC emissions by 46% and achieving carbon-negative potential through effluence-based production—aligns with global net-zero goals by 2050. Regulatory compliance with EPA, ECHA, RED II, and FDA standards ensures adoption in low-VOC, safe, and sustainable applications. Economically, low-cost feedstocks like effluence and co-product revenue make it competitive, while its versatility spans paints, pharmaceuticals, cosmetics, and food manufacturing. Free from petroleum-derived impurities, bio-acetone meets the 36% growth in clean-label demand. CBR's ABE process, with continuous fermentation and E-TCD distillation, drives this revolution, offering scalability and efficiency. The partnership with Matt Winsand and Burnett Dairy positions bio-acetone as a leader in the bioeconomy.

Recent Trends and Innovations

- Waste Valorization: Converts 68,000 tons of waste annually, including effluence, into biochar, hydrogen, and other products.
- Food Industry Growth: Rising use in flavor extraction, decaffeination, and equipment cleaning.
- Metabolic Engineering: Enhances sugar utilization from lignocellulosic feedstocks.
- Continuous Fermentation: Increases efficiency by 15–58%, positioning CBR for global expansion.

Challenges and Opportunities

Challenges include high biorefinery setup costs. These are mitigated by technological advancements, flexible pretreatment methods, and co-product revenue. CBR Technologies and University CRADA have successfully addressed feedstock variability and resolved butanol toxicity, enhancing process efficiency. Opportunities abound in the food processing market, cosmetics market, and pharmaceutical market by 2030. Emerging bioeconomy markets in the Middle East and Africa further drive growth.

Future Outlook

The bio-acetone market is set to grow at a strong CAGR through 2030 and beyond. Demand in food, cosmetics, and automotive sectors, coupled with CBR's scalable model utilizing effluence, supports global expansion. Advances in fermentation and co-product utilization will enhance efficiency and market reach.

Conclusion

Bio-acetone is more than a solvent—it's a beacon of hope, echoing Massimo Bottura's call for reducing food waste. Through partnerships like that with Matt Winsand at Burnett Dairy Cooperative, CBR's ABE process transforms effluence into sustainable solutions, from the vanilla in your ice cream to the paint on your car. As the gold standard in manufacturing, bio-acetone blends innovation, sustainability, and performance, crafting a future where industry nourishes both people and the planet.

References

- Grand View Research, Acetone Market Size, Share & Trends, 2030.
- Mordor Intelligence, Bio-Acetone Market Size & Share Analysis, 2024–2030.
- Celtic Renewables, Biorefinery, 2024.
- Bioresource Technology, ABE Fermentation Studies, 2014–2023.
- ScienceDirect, ABE Fermentation and Separation Advances, 2018–2024.
- Statista, Food Processing Market Size, 2023–2030.
- U.S. EPA, Acetone VOC-Exempt Status, 1995.
- Nature Biotechnology, Carbon-Negative Production of Acetone, 2022.
- Journal of Food Science, Solvent Extraction in Food Processing, 2021.
- Food Chemistry, Bio-Based Solvents for Flavor Extraction, 2023.
- Trends in Food Science & Technology, Sustainable Solvents in Food Manufacturing, 2022.
- Journal of Agricultural and Food Chemistry, Decaffeination Processes Using Bio-Solvents, 2020.
- Food and Bioprocess Technology, Bio-Acetone in Nutraceutical Production, 2023.
- International Journal of Food Science & Technology, Cleaning Agents in Food Processing, 2021.
- Food Research International, Bio-Based Additives in Food Industry, 2022.
- Journal of Cleaner Production, Circular Economy in Food By-Product Utilization, 2023.
- Food Engineering Reviews, Sustainable Lipid Extraction Methods, 2021.
- Critical Reviews in Food Science and Nutrition, Bio-Solvents for Food Safety Compliance, 2024.
- Sigma-Aldrich, Acetone BioRenewable, ACS Reagent, ≥99.5%, 2023.
- Chemical Safety Facts, Acetone, 2022.
- Canada.ca, Acetone Screening Assessment, 2014.
- Vertec BioSolvents, Acetone Substitute, 2020.
- FEMS Microbiology Letters, Industrial Production of Acetone and Butanol, 2016.
- Green Rose Chemistry, Biobased ABE Fermentation, 2022.
- Purosolv, Acetone Applications, 2023.
- Food Hydrocolloids, Bio-Based Solvents in Protein Purification, 2022.
- Journal of Food Engineering, Sustainable Food Processing Technologies, 2023.
- Comprehensive Reviews in Food Science and Food Safety, Natural Colorants in Food Processing, 2021.
- Food and Chemical Toxicology, Safety of Bio-Based Solvents in Food Applications, 2023.
- Journal of Food Protection, Bio-Acetone in Food Equipment Cleaning, 2022.
- Food Control, HACCP Compliance with Bio-Solvents, 2021.
- LWT - Food Science and Technology, Bio-Acetone in Fermentation Processes, 2023.
- Journal of the Science of Food and Agriculture, Bio-Based Additives for Food Stability, 2022.
- Food Quality and Safety, Sustainable Extraction Methods for Nutraceuticals, 2023.
- Innovative Food Science & Emerging Technologies, Bio-Solvents in Sugar Refining, 2021.
- International Food Information Council, 2021.
- MarketsandMarkets, Clean-Label Ingredients Market, 2024.