Advanced Biorefinery Concepts for Food Side-Streams Training Course

Professional Development Training Course Outline

Category	Food processing and Technology	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The global demand for sustainable food processing and renewable energy solutions has driven an increased interest in advanced biorefinery concepts. Food side-streams, such as by-products from food manufacturing, present unique opportunities for resource recovery, value addition, and innovative product development. Advanced Biorefinery Concepts for Food Side-Streams Training Course focuses on equipping professionals with advanced skills in the circular economy, biotechnology, waste valorization, and sustainable food engineering practices. Through a combination of technical knowledge and real-world applications, participants will develop the ability to transform challenges into opportunities for value creation.

By exploring innovative bioprocesses, participants will learn how to integrate food side-streams into bio-based production systems that support environmental sustainability, economic growth, and industrial innovation. The course provides in-depth coverage of biorefinery technologies, bio-based product development, energy optimization, and market-driven approaches. With strong emphasis on trending industry concepts such as green chemistry, precision fermentation, bioenergy systems, and waste-to-value strategies, this training builds future-ready expertise for professionals in food, biotechnology, and renewable industries.

Programme Curriculum

Advanced Biorefinery Concepts for Food Side-Streams Training Course

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Course Objectives

1. Understand the fundamentals of advanced biorefinery concepts for food side-streams.
2. Explore innovative bio-based technologies for value-added product development.
3. Analyze sustainable processing methods in food and biotechnology industries.
4. Apply green chemistry principles to enhance resource efficiency.
5. Evaluate precision fermentation for high-value compound production.
6. Understand industrial symbiosis for circular economy integration.
7. Develop expertise in waste-to-value strategies for side-stream utilization.
8. Assess bioenergy systems derived from food industry residues.
9. Explore bio-based packaging solutions for food sustainability.
10. Examine life cycle assessment (LCA) for bio-based products.
11. Understand the role of digitalization and smart technologies in biorefineries.
12. Strengthen knowledge of policy frameworks and global regulations.
13. Apply innovative case studies for industrial-scale biorefinery implementation.

Organizational Benefits

- Enhanced sustainability credentials for food and biotechnology organizations.
- Development of innovative bio-based products from food side-streams.
- Improved efficiency in resource recovery and energy optimization.
- Stronger alignment with global circular economy goals.
- Increased competitiveness in bio-based and renewable energy markets.
- Enhanced compliance with environmental regulations and policies.
- Adoption of waste-to-value strategies to reduce operational costs.
- Integration of advanced bioprocessing technologies for growth.
- Strengthened innovation culture within organizations.
- Long-term resilience through sustainable value chains.

Target Audiences

- Food technologists and process engineers
- Environmental and sustainability professionals
- Biotechnology researchers and scientists
- Industrial production managers
- Entrepreneurs in renewable energy and bio-based products
- Policy makers and regulators in sustainability sectors

- Academic researchers and students in food biotechnology
- R&D professionals in packaging and materials science

Course Duration: 5 days

Course Modules

Module 1: Fundamentals of Biorefinery Concepts

- Principles of food side-stream utilization
- Introduction to circular economy frameworks
- Overview of bioprocess engineering fundamentals
- Food side-stream characterization techniques
- Key drivers of global biorefinery markets
- Case Study: Valorization of fruit and vegetable waste streams

Module 2: Sustainable Processing and Waste Valorization

- Food by-product valorization strategies
- Sustainable food engineering principles
- Waste reduction through innovative technologies
- Process integration for energy savings
- Nutrient recovery from processing residues
- Case Study: Brewery spent grains into bio-based materials

Module 3: Green Chemistry and Renewable Pathways

- Principles of green chemistry in food systems
- Catalysis and biocatalysis in valorization
- Biopolymer production from side-streams
- Eco-friendly solvents and biorefinery design
- Renewable energy integration in processing plants
- Case Study: Bio-based lactic acid from dairy residues

Module 4: Precision Fermentation and Bioprocessing

- Basics of microbial and enzymatic processes
- Precision fermentation for high-value ingredients
- Advanced fermentation design and optimization
- Industrial enzyme application in biorefinery
- Production of specialty food additives and flavors
- Case Study: Single-cell protein from food waste streams

Module 5: Bioenergy Systems from Food Residues

- Anaerobic digestion of food industry residues
- Bioethanol and biogas production techniques
- Energy efficiency in biomass conversion
- Integration of bioenergy into food facilities
- Waste-to-energy business models
- Case Study: Biogas recovery from dairy processing effluents

Module 6: Bio-Based Packaging and Materials

- Food packaging from agricultural residues
- Bioplastics and compostable materials
- Functional properties of bio-based films
- Innovation trends in packaging sustainability
- Market opportunities for bio-packaging
- Case Study: Starch-based biodegradable films from potato waste

Module 7: Life Cycle Assessment and Policy Frameworks

- Fundamentals of life cycle assessment (LCA)
- Environmental impact assessment of biorefineries
- Policy frameworks for sustainable bioprocesses
- International regulations on bio-based products
- Certification and eco-labeling systems
- Case Study: Comparative LCA of fossil vs. bio-based plastics

Module 8: Digitalization and Industrial Case Studies

- Role of Industry 4.0 in advanced biorefineries
- Smart sensors for process monitoring
- Data analytics and AI for efficiency improvement
- Predictive modeling in food side-stream utilization
- Industrial symbiosis and cross-sector collaboration
- Case Study: Smart biorefinery integration in European food industries

Training Methodology

- Interactive instructor-led presentations with practical insights
- Group discussions and collaborative learning sessions
- Hands-on exercises using real-world datasets and tools
- Industry-based case study analysis for applied understanding
- Role-playing and simulation of industrial scenarios
- Knowledge sharing through Q&A and peer networking

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
21 Sep 2026	25 Sep 2026	Online	$1,000
21 Sep 2026	25 Sep 2026	Physical	$1,500
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0

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