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INTRODUCTION

We had the great honor of 2nd International Conference on Recent and Innovative Results in Engineering and Technology ICRIRET 2025. It was truly a great pleasure for us to greet a lot of participants from many different countries attending ICRIRET 2025! We firmly believe that the conference will become an important international event in the field of cross-industry discussion about innovations in Academic Studies.

Three cooperating organizations supported the two-day conference. There were 164 papers accepted for presentation at ICRIRET 2025, contributed from different countries. We had plenary speeches and several well-known scientists and experts, to give invited talks at different sessions.

The purpose of ICRIRET 2025 was to provide a forum for the participants to report and review innovative ideas, with up-to-date progress and developments, and discuss novel approaches to the application in the field of their own research areas and discuss challenges of doing science.

We sincerely hope that the exchange of ideas on doing research, science and improving education will help the participants, and international cooperation sharing the common interest will be enhanced.

On behalf the Organization Committee of ICRIRET 2025, we would like to heartily thank our cooperating organizations for all they have done for the conference. We would also like to thank the authors for their contribution to the proceedings; the participants and friends of ICRIRET 2025, for their interest and efforts in helping us to make the conference possible; and the Editorial boards for their effective work and valuable advice, especially the ICRIRET 2025 secretariat and the ICRIRET 2025 staff, for their tireless efforts and outstanding services in preparing the conference and publishing the Proceedings.

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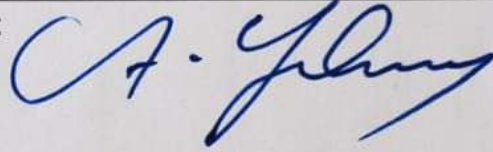
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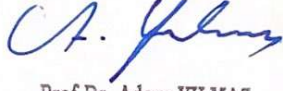
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Economic Sustainability Through Microalgae Innovation

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Abstract – In recent years, the need for innovative and practical solutions to ensure sustainability has become increasingly critical. Economic sustainability is essential in addressing global sustainability issues like environmental degradation, biodiversity loss, fossil fuel dependency, and climate change, as well as ensuring future generations' access to natural resources. Microalgae are a natural resource that offers solutions to both environmental and economic sustainability. These photosynthetic microorganisms' properties, such as rapid reproduction, high adaptability, and low resource and water consumption, make them valuable in terms of their potential to solve problems in various industries. Microalgae thrive in saline or wastewater environments and on non-arable land, overcoming traditional agricultural constraints and alleviating pressure on arable soils and freshwater resources. They produce high-value compounds such as proteins, lipids, and antioxidants, making them valuable for industries such as energy, food, medicine, animal feed and cosmetics. The use of microalgae helps to achieve economic sustainability by replacing expensive fossil fuels and raw materials that contribute to deforestation. Their commercial viability is increasing as biotechnology advances, improving the efficiency and scale at which microalgae can be grown. With the growing demand for sustainable solutions, new market opportunities for microalgae are emerging, and the circular economy is being promoted. As a result of economic recovery and technological advancements, microalgae's potential to significantly contribute to resource conservation, economic sustainability, and green industry growth is increasing. As technology evolves, the role of microalgae in the bioeconomy is expected to expand even further in the future.

Keywords – Sustainable management, microalgae, biotechnology, circular economy, low-carbon transition

I. INTRODUCTION

The world's growing population has raised the demand for basic resources such as food, water, and energy to critical levels. As a result, excessive use of limited natural resources has disrupted ecosystem balance and resulted in the depletion of non-renewable resources. The need for more sustainable and effective resource management has become evident as a result of this situation [1].

The agriculture sector is facing significant challenges as a result of the increase in greenhouse gas emissions that contribute to climate change. Climate anomalies that reduce crop yields and increase production costs, such as extreme heat waves, cold waves, droughts, and floods, ultimately lead to global food inflation and food insecurity [2]. In order to increase agricultural output, chemical pesticides and synthetic fertilisers are widely used, which pollute the soil and water and endanger human health [3].

The depletion of fossil fuel resources and its impact on the environment are making alternative energy sources increasingly important. Because of their potential to reduce greenhouse gas emissions and ensure energy security, biofuels have emerged as a viable solution. However, the burden that conventional biofuel production places on agricultural lands and water resources creates an unsustainable model [4]. In order to mitigate climate change, biomass sources with a low carbon footprint are crucial. Biomass offers a sustainable solution due to its carbon-neutral properties and waste management capabilities [5]. It also improves resource efficiency by implementing circular economy-compliant production methods. Microalgae are a significant source of biomass and biofuels. Microalgae, which can be grown in photobioreactors or open pond systems, require no agricultural land and can use limited resources such as saltwater [1], [6]. Photosynthesis absorbs carbon dioxide (CO₂) from the atmosphere, helping to combat climate change [7].

Industries such as food, medicine, cosmetics, and even energy understand the value of microalgae due to its cells storing bioactive compounds, proteins, carbohydrates, and fatty acids. This can substitute fossil fuels due to their high productivity rates in biodiesel refinement [6], [8]. This makes them more suitable as fossil fuel substitutes. Additionally, their application in bioremediation and wastewater treatment facilitates their adoption in a circular economy [7].

As seen in Figure 1, microalgae have made it possible to produce a whole range of products like pharmaceuticals, nutraceuticals, cosmetics, chemicals, food and feed, and even energy in the form of biofuels [9], [10]. They play a significant role in the economy's adaptability because their bioactive compounds facilitate the shift to a more sustainable and circular economy.

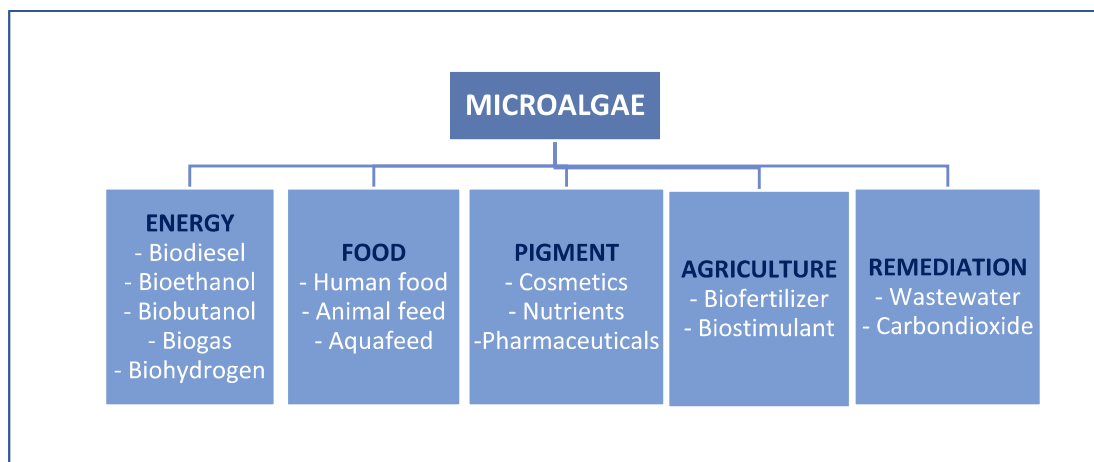


Figure 1. Microalgae Applications

Microalgae are used for various remediation processes, including soil and water remediation, flue gas treatment, and CO₂ reduction, in addition to biofuel production. These applications demonstrate their wide-ranging potential in preventing environmental pollution and mitigating the effects of climate change [11].

"Bioeconomy" is the word used to describe the long-term exploitation of biological resources to provide basic products and services. The primary objectives of the bioeconomy are to address resource use, reduce the impacts of climate change, and maintain a balance between supply and demand. By prioritising renewable biological raw materials over finite fossil resources during the production process, the bioeconomy creates a clear link between environmental sustainability and economic activity [12].

The 2030 Agenda for Sustainable Development, adopted by all of the United Nations which is scheduled to be completed by 2030, aims to address the food, energy, and natural resource crisis through sustainable resource management. This initiative emphasises the importance of fostering a circular bioeconomy, which prioritises sustainable practices and the efficient use of renewable biological resources to meet global demands while addressing climate change's pressing challenges. The implementation of these practices will contribute to a more balanced economic framework in which environmental and economic systems work together [13].

As a result, this study presents information on microalgae-derived products, as well as their economic sustainability. Microalgae have the potential to contribute not only to environmental applications but also to a circular bioeconomy, particularly given their low environmental footprint and versatility in producing a wide range of value-added products. Their role in ensuring a sustainable future that addresses both economic concerns is becoming increasingly important in global discussions about sustainability.

II. THE ROLE OF MICROALGAE IN THE BIOECONOMY OF ENERGY

Using biochemical, chemical, or thermochemical processes, microalgae have enormous potential as a sustainable feedstock for biofuels such as biodiesel, bioethanol, biobutanol, biogas, and biohydrogen. However, commercialisation is challenging due to the high production costs. Low-cost CO₂, nutrient, and water procurement, along with wastewater treatment integration, can help lower resource costs and increase economic sustainability. Because it combines the production of biofuel with high-value byproducts like zeaxanthin and phycocyanin, a biorefinery approach is essential. This multi-output model promotes a circular economy, offsets the costs of biofuel, and creates multiple revenue streams [7], [11].

Low-tech biogas systems, including closed anaerobic ponds, can achieve global carbon reduction targets by providing inexpensive energy access in low-income communities without the need for complex infrastructure. Policy frameworks, such as the European Union's (EU) goal of sourcing 20% of its energy from renewables by 2020, help to drive adoption. Continued research into cost-cutting methods and scalable technologies is critical to improving competitiveness, ensuring that microalgae biofuels can meet rising energy demands while advancing global sustainability and circular economy goals [7], [11], [14].

III. THE ROLE OF MICROALGAE IN THE BIOECONOMY OF FOOD AND FEED

Microalgae improve human nutrition by providing protein, omega-3 fatty acids (e.g., eicosapentaenoic acid-EPA/docosahexaenoic acid-DHA), and bioactive pigments, making them an affordable alternative to traditional supplements and animal proteins [15]. Their role in plant-based food markets is consistent with the growing demand for sustainable, health-conscious diets, which reduces reliance on resource-intensive livestock farming [16].

Microalgae enhance animal health and feed efficiency in livestock and aquaculture, reducing pharmaceutical costs while boosting output. Because ruminants are efficient at digesting unprocessed algal biomass, feed processing costs are reduced [17]. Animal diets containing 5–33% microalgae have better

immune systems and higher-quality products (such as meat and eggs free of cholesterol), which opens up premium market opportunities [18].

Microalgae diversify revenue streams in agriculture and aquaculture by replacing expensive ingredients such as fishmeal and soy. They also address sustainability trends. This positions them as a low-input, high-value resource that promotes circular economies and reduces environmental footprints [11], [14].

IV. THE ROLE OF MICROALGAE IN THE BIOECONOMY OF COSMETICS, NUTRIENTS, AND PHARMACEUTICALS

Carbohydrates, antioxidants, pigments, fatty acids, and other bioactive properties are some of the most coveted ingredients in the health and cosmetic industries, and they are abundantly found in microalgae and cyanobacteria. Microorganisms are known to contain essential molecules such as carotenoids like beta carotene, astaxanthin, and fucoxanthin that help in combating diabetes, obesity, and age-related macular degeneration. Furthermore, new research indicates that lutein and zeaxanthin can help avoid diabetic retinopathy [19], [20].

The use of natural and sustainable raw materials is becoming more important in the cosmetic, nutrition, and pharmaceutical industries. As companies look for eco-friendly alternatives to synthetic materials and petrochemicals, the economic potential of microalgae continues to rise. By utilising microalgae, the nutrition, cosmetics, and pharmaceutical sectors can capitalise on the increasing demand for sustainable products while contributing to global sustainability efforts [21].

Furthermore, microalgae-derived ingredients provide cost-effective solutions because they can be produced in controlled environments with minimal resource inputs. This makes it economically feasible to produce bioactive compounds from microalgae on a large scale. Additionally, the use of microalgae in these sectors encourages the creation of biorefinery models, which increase the overall economic value of microalgal cultivation by producing multiple products from a single biomass source [11], [13].

V. THE ROLE OF MICROALGAE IN THE BIOECONOMY OF AGRICULTURE

The potential of microalgae as biostimulants and biofertilisers makes them an intriguing alternative for improving agricultural sustainability [22]. The economic implications of using microalgae in agriculture are significant. Because microalgae-based products reduce farmers' reliance on chemical fertilisers, they result in more cost-effective and environmentally friendly farming practices. The ability to use fewer harmful chemicals reduces the risk of environmental degradation, resulting in long-term cost savings from soil health restoration and water quality improvement[23]. Furthermore, the use of microalgal waste in biogas production promotes energy recovery, fosters a circular economy, and aids in the larger transition to renewable energy sources [24].

Microalgae are not only environmentally friendly, but they also offer a practical and cost-effective alternative to traditional farming methods. Microalgae improve food security by increasing crop yields and using resources more sustainably. They also help to combat climate change, soil degradation, and resource scarcity. When incorporated into agricultural systems, they promote environmental sustainability while providing significant financial benefits to both large-scale and small-scale farmers [11], [13].

VI. THE ROLE OF MICROALGAE IN THE BIOECONOMY OF WASTEWATER

Microalgae have developed as a highly effective biological treatment for industrial, agricultural, and municipal wastewater. These microbes provide a promising technique for removing heavy metals, phosphate, and nitrogen from wastewater while also creating important biomass. Microalgal treatment systems not only aid in nutrient recovery from wastewater but also transform these nutrients into biomass that can be used as a renewable energy source or organic fertiliser.

This dual benefit reduces the overall costs of wastewater treatment, providing a more cost-effective alternative to conventional methods. Two critical global priorities are enhancing access to clean water and ensuring the sustainable management of water resources. Unlike traditional wastewater treatment methods, which often result in the production of toxic sludge, microalgae-based systems provide a highly efficient, economical, and environmentally sustainable solution. Furthermore, microalgal treatment systems can be integrated into a circular economy, providing economic and environmental benefits by reducing hazardous sludge production. Furthermore, by removing vital nutrients from wastewater and turning them into reusable biomass for energy generation, such as biogas, biobutanol, and biomethane, microalgal systems help to generate renewable energy [25], [26], [27].

VII. CONCLUSIONS

Microalgae, as photosynthetic microorganisms, are key to advancing the bioeconomy by offering sustainable solutions across a range of industries, including energy, food and feed production, cosmetics, pharmaceuticals, agriculture, and wastewater treatment. While their environmental benefits are well-known, microalgae-based products also bring significant economic value by lowering resource costs, promoting circular economies, and creating new market opportunities. Despite high production costs, microalgae promote economic sustainability by utilising low-cost resources like CO₂ and wastewater. Furthermore, by reducing reliance on fossil fuels and raw materials, they provide low-cost, environmentally friendly alternatives that drive growth in industries focused on sustainability.

The broad applications of microalgae across various industries are essential to achieving global sustainability objectives while also encouraging innovation and driving economic development. To fully unlock the potential of microalgae in the bioeconomy, it is critical to advance both technological innovations and policy initiatives. Increased support in these areas will allow microalgae to make significant contributions to environmental and economic sustainability in the years ahead.

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REFERENCES

- [1] D. Y. Y. Tang, K. S. Khoo, K. W. Chew, Y. Tao, S.-H. Ho, and P. L. Show, 'Potential utilization of bioproducts from microalgae for the quality enhancement of natural products', *Bioresource Technology*, vol. 304, p. 122997, May 2020, doi: 10.1016/j.biortech.2020.122997.
- [2] A. Pattnaik, 'How is the climate crisis affecting our food supplies?', *BMJ*, p. q2809, Dec. 2024, doi: 10.1136/bmj.q2809.
- [3] J. A. V. Costa, B. C. B. Freitas, C. G. Cruz, J. Silveira, and M. G. Morais, 'Potential of microalgae as biopesticides to contribute to sustainable agriculture and environmental development', *Journal of Environmental Science and Health, Part B*, vol. 54, no. 5, pp. 366–375, May 2019, doi: 10.1080/03601234.2019.1571366.
- [4] T. D. Moshood, G. Nawanir, and F. Mahmud, 'Microalgae biofuels production: A systematic review on socioeconomic prospects of microalgae biofuels and policy implications', *Environmental Challenges*, vol. 5, p. 100207, Dec. 2021, doi: 10.1016/j.envc.2021.100207.
- [5] I. Ahmed *et al.*, 'Socio-Economic and Environmental Impacts of Biomass Valorisation: A Strategic Drive for Sustainable Bioeconomy', *Sustainability*, vol. 13, no. 8, Art. no. 8, Jan. 2021, doi: 10.3390/su13084200.
- [6] M. Rizwan, J. H. Lee, and R. Gani, 'Optimal design of microalgae-based biorefinery: Economics, opportunities and challenges', *Applied Energy*, vol. 150, pp. 69–79, Jul. 2015, doi: 10.1016/j.apenergy.2015.04.018.
- [7] A. G. Olabi *et al.*, 'Role of microalgae in achieving sustainable development goals and circular economy', *Science of The Total Environment*, vol. 854, p. 158689, Jan. 2023, doi: 10.1016/j.scitotenv.2022.158689.
- [8] M. P. de Souza, M. Hoeltz, P. D. Gressler, L. B. Benitez, and R. C. S. Schneider, 'Potential of Microalgal Bioproducts: General Perspectives and Main Challenges', *Waste Biomass Valor*, vol. 10, no. 8, pp. 2139–2156, Aug. 2019, doi: 10.1007/s12649-018-0253-6.
- [9] S. Abu-Ghosh, Z. Dubinsky, V. Verdelho, and D. Iluz, 'Unconventional high-value products from microalgae: A review', *Bioresource Technology*, vol. 329, p. 124895, Jun. 2021, doi: 10.1016/j.biortech.2021.124895.

- [10] F. G. Acién *et al.*, ‘20 - Economics of microalgae production’, in *Microalgae-Based Biofuels and Bioproducts*, C. Gonzalez-Fernandez and R. Muñoz, Eds., in Woodhead Publishing Series in Energy. , Woodhead Publishing, 2017, pp. 485–503. doi: 10.1016/B978-0-08-101023-5.00020-0.
- [11] F. G. A. Fernández, A. Reis, R. H. Wijffels, M. Barbosa, V. Verdelho, and B. Llamas, ‘The role of microalgae in the bioeconomy’, *New Biotechnology*, vol. 61, pp. 99–107, Mar. 2021, doi: 10.1016/j.nbt.2020.11.011.
- [12] D. Özçimen, B. İnan, A. T. Koçer, and M. Vehapi, ‘Bioeconomic Assessment of Microalgal Production’, in *Microalgal Biotechnology*, E. Jacob-Lopes, L. Q. Zepka, and M. I. Queiroz, Eds., InTech, 2018. doi: 10.5772/intechopen.73702.
- [13] N. K. Sarker and P. Kaparaju, ‘Microalgal Bioeconomy: A Green Economy Approach Towards Achieving Sustainable Development Goals’, *Sustainability*, vol. 16, no. 24, Art. no. 24, Jan. 2024, doi: 10.3390/su162411218.
- [14] D. L. Sutherland *et al.*, ‘How microalgal biotechnology can assist with the UN Sustainable Development Goals for natural resource management’, *Current Research in Environmental Sustainability*, vol. 3, p. 100050, Jan. 2021, doi: 10.1016/j.crsust.2021.100050.
- [15] R. Katiyar and A. Arora, ‘Health promoting functional lipids from microalgae pool: A review’, *Algal Research*, vol. 46, p. 101800, Mar. 2020, doi: 10.1016/j.algal.2020.101800.
- [16] K. M. Rahman and L. Melville, ‘Chapter 45 - Global market opportunities for food and feed products from microalgae’, in *Handbook of Food and Feed from Microalgae*, E. Jacob-Lopes, M. I. Queiroz, M. M. Maroneze, and L. Q. Zepka, Eds., Academic Press, 2023, pp. 593–602. doi: 10.1016/B978-0-323-99196-4.00031-0.
- [17] M. Zhu, S. D. Singer, L. L. Guan, and G. Chen, ‘Emerging microalgal feed additives for ruminant production and sustainability’, *Adv. Biotechnol.*, vol. 2, no. 2, p. 17, May 2024, doi: 10.1007/s44307-024-00024-w.
- [18] I. Saadaoui *et al.*, ‘Microalgal-based feed: promising alternative feedstocks for livestock and poultry production’, *J Animal Sci Biotechnol*, vol. 12, no. 1, p. 76, Jun. 2021, doi: 10.1186/s40104-021-00593-z.
- [19] E. R. Bakac, E. Percin, A. Gunes-Bayir, and A. Dadak, ‘A Narrative Review: The Effect and Importance of Carotenoids on Aging and Aging-Related Diseases’, *International Journal of Molecular Sciences*, vol. 24, no. 20, Art. no. 20, Jan. 2023, doi: 10.3390/ijms242015199.
- [20] M. Silva *et al.*, ‘Microalgae as Potential Sources of Bioactive Compounds for Functional Foods and Pharmaceuticals’, *Applied Sciences*, vol. 12, no. 12, Art. no. 12, Jan. 2022, doi: 10.3390/app12125877.
- [21] M. A. Borowitzka, ‘High-value products from microalgae—their development and commercialisation’, *J Appl Phycol*, vol. 25, no. 3, pp. 743–756, Jun. 2013, doi: 10.1007/s10811-013-9983-9.
- [22] D. Ronga, E. Biazzi, K. Parati, D. Carminati, E. Carminati, and A. Tava, ‘Microalgal Biostimulants and Biofertilisers in Crop Productions’, *Agronomy*, vol. 9, no. 4, Art. no. 4, Apr. 2019, doi: 10.3390/agronomy9040192.
- [23] J. Gonçalves, J. Freitas, I. Fernandes, and P. Silva, ‘Microalgae as Biofertilizers: A Sustainable Way to Improve Soil Fertility and Plant Growth’, *Sustainability*, vol. 15, no. 16, Art. no. 16, Jan. 2023, doi: 10.3390/su151612413.
- [24] Y. Aryanfar *et al.*, ‘Transforming Food Industrial Sludge Into Sustainable Resources: Innovations in Waste Management and Renewable Energy Recovery’, *Business Strategy and the Environment*, vol. n/a, no. n/a, doi: 10.1002/bse.4170.
- [25] A. Ahmad and S. S. Ashraf, ‘Harnessing microalgae: Innovations for achieving UN Sustainable Development Goals and climate resilience’, *Journal of Water Process Engineering*, vol. 68, p. 106506, Dec. 2024, doi: 10.1016/j.jwpe.2024.106506.
- [26] C. Y. B. Oliveira *et al.*, ‘An overview on microalgae as renewable resources for meeting sustainable development goals’, *Journal of Environmental Management*, vol. 320, p. 115897, Oct. 2022, doi: 10.1016/j.jenvman.2022.115897.
- [27] O. Calicioglu and G. N. Demirer, ‘Chapter 1 - Role of microalgae in circular economy’, in *Integrated Wastewater Management and Valorization Using Algal Cultures*, G. N. Demirer and S. Uludag-Demirer, Eds., Elsevier, 2022, pp. 1–12. doi: 10.1016/B978-0-323-85859-5.00003-8.

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