

Unlocking the Potential of Microalgae SAF Production: An industry approach

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Abstract

The optimization of scalable solutions for the production of Sustainable Aviation Fuels (SAF) is of crucial importance, as it can support rural agricultural economies by generating jobs and income, and its cleaner burn can enhance engine performance. The SAF market is projected to reach \$6.26 billion by 2030, reflecting its potential in advancing aviation sustainability and reducing the sector's carbon footprint. While various renewable energy sources have gained prominence, SAF from lipid-rich microalgae strains is a promising solution for the decarbonization of the aviation sector. This work provides a comprehensive market analysis, highlighting current trends, challenges, and future prospects for SAF production, with a focus on hydrothermal liquefaction (HTL) as an emerging technology. The analysis identifies key drivers and challenges in the European SAF market, including feedstock availability, technological innovations, and certification procedures. The study gives light to the potential of microalgae as a promising feedstock due to its high oil yield, versatility in cultivation, and non-competition with food production. Preliminary findings from the design of Life Cycle Assessment (LCA) as well as from economic analysis provide useful insights into the environmental footprint and cost-efficiency of SAF production from microalgae.

The SWOT analysis reveals strengths such as reduced carbon emissions and compliance with EU regulations, while identifying weaknesses like high production costs and limited feedstock availability. Opportunities include energy security and EU funding, whereas threats encompass economic downturns and policy changes. By engaging large European industrial partners and leveraging existing technologies, the production of SAF from microalgae can lead the innovation and market uptake of advanced biofuels and renewable fuels of non-biological origin, representing a significant step towards achieving the EU's renewable energy targets and supporting the transition to sustainable energy systems.

Keywords : SAF; market analysis; LCA; HTL; EU policy

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Abstract review

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