

Waste to Fuels: Decarbonizing Aviation Sector by converting inedible oil to Sustainable Aviation Fuel

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The reduction of Greenhouse Gas emissions and achieving net zero to combat global warming are not just goals but necessities. Worldwide, the aviation sector contributes 15% of total emissions generated in the transportation sector. Therefore, achieving net zero is nearly impossible without the introduction of alternative aviation fuels with a lower carbon footprint.

In this regard, one promising alternative is to utilize used cooking oil (UCO) and Tree-Born Oils for the production of SAF. Repurposing these feedstocks will prevent their reuse, eliminating associated health hazards.

Engineers India Limited (EIL) along with CSIR-Indian Institute of Petroleum (CSIR-IIP) has developed a single-step HEFA process to convert lipids (Palm Stearin, Palm Fatty Acid Distillate, Jatropha Oil, UCO, etc.) into hydrocarbons. In this process, feed is de-oxygenated, selectively cracked, and isomerized over a single catalyst, in a single step, to produce SAF and green diesel with high yield. The process parameters can be tailored to maximize SAF or prioritize green diesel based on real-time requirements, with by-products including Green Naphtha, Fuel Gas etc.

The SAF produced by this technology has already been demonstrated for use in civilian aircraft and defense jets. This process of producing SAF is similar to other refinery process operations, making it easily implementable and economically viable as compared to other globally available technologies.

The present paper focuses on the production of SAF by CSIR-IIP and EIL exploring key aspects of the technology, processing diverse feedstocks, with varying yield patterns and overall impact on sustainability.