



India's First Biofuel Flight

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Budget carrier SpiceJet operated India's first "technology demonstrator" flight on biofuel.

- With the test flight, India has become one of the few countries like USA, Australia and Canada who have conducted the test to use biofuel for flying commercial planes.
- CSIR-Indian Institute of Petroleum (IIP) manufactured 330 kg of biofuel for 45 minutes Dehradun-Delhi flight.
- The flight burnt a mix of **75% traditional Aviation Turbine Fuel (ATF) and 25% oil extracted from the Jatropha plant**. International standards permit a blend rate of upto 50% biofuel with ATF.

Significance

- Currently, Aviation Sector contributes to 2% of global greenhouse gas emissions. Commercial biofuel flights will help Indian Airlines in achieving the International Air Transport Association (IATA) target for fuel efficiency and carbon emission:
 - average annual improvement of 1.5% in fuel efficiency from 2009 to 2020,
 - a cap on net aviation carbon emissions from 2020 (carbon-neutral growth)
 - reduction in net aviation carbon emissions of 50% by 2050, relative to 2005 levels.
 - target of 1 billion passengers flying on aircraft using a mix of clean energy and fossil fuels by 2025.
- Using Aviation Biofuel **reduces carbon emissions** and **enhances fuel efficiency**. An international research programme led by NASA reported that the use of biofuels can reduce particle emissions in the jet exhaust by as much as 50%-70%.
- Indian Aviation Sector is **suffering due to rising prices** of ATF. Therefore, blending ATF with biofuel will help airlines to tackle rising prices and bring down fares.
- Use of Aviation Biofuel will reduce India's dependence on oil imports, thus saving forex reserve.

Concern

- Commercial use of Aviation Biofuel is still far away. The infrastructure to mass-produce biofuel, and to deliver it at airports, is awaited.
- Production of the first generation of biofuels had shown that the displacement of other agricultural activity. Thus may lead to food security issues.

Future Prospects

- Given the scope of biofuel in aviation, a special policy on Aviation Biofuel is needed.
- There is a need for research in biofuel production to produce them at the commercial level and to meet the requirements of Aviation Sector.

Biofuels

- Biofuels are fuels manufactured from biomass.
- Biomass resources are the biodegradable fraction of products, wastes and residues from agriculture, forestry and related industries as well as the biodegradable fraction of industrial and municipal wastes.

BIOFUELS

GENERATION	CHARACTERISTICS	REMARKS
FIRST	Produced from food crops like maize, corn, sugar cane, rapeseed, palm, and soybean into ethanol and biodiesel, using a similar process to that used in beer and wine-making.	Impose significant costs on food security by demanding a share of staple crops, traditionally used solely for food and feed. Resulting in a conflict between fuel and food security. At the same time, lift the price of staple crops
SECOND	Produced from non-food crops and organic agricultural waste, which contain cellulose.	Grasses like switchgrass, non-edible oil seeds like Jatropha, castor seed can be transformed into biofuels.
THIRD	Derived from algae. Also known as green hydrocarbons	The list of fuels that can be derived from algae includes: Bio-diesel, Ethanol, and Jet-fuel.

FOURTH	Produce sustainable energy as well as capture and store CO ₂ by converting biomass materials, which have absorbed CO ₂ while growing, into fuel.	At all stages of production, the CO ₂ is captured using various processes. Rather than simply being carbon neutral, the fourth generation biofuel production is carbon negative, since it 'locks' away more carbon than it produces and also lowers CO ₂ emissions by substituting fossil fuels.
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Key Advantages of Biofuel

- Renewable Energy source.
- Non-toxic & Biodegradable.
- Contains no sulphur that causes acid rain.
- Environment friendly-less emissions.
- Has rural employment potential.

International Air Transport Association (IATA)

- The IATA is the trade association for the world's airlines, representing some 290 airlines or 82% of total air traffic.
- IATA support many areas of aviation activity and help formulate industry policy on critical aviation issues.
- Headquarter: Montreal, Canada.

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