

# Algal biofuels

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**In news-** Reliance Industries Ltd of India has recently released a short video on social media platform Instagram highlighting the cutting-edge algae-to-fuel technology it has developed.

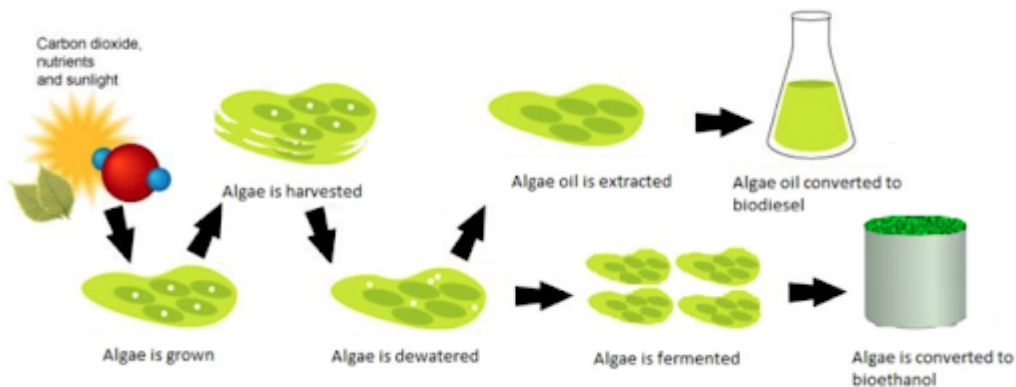
## Key updates-

- The company has been successfully running large algae raceway ponds the last five years at their **facility near Jamnagar, to convert sunshine, CO<sub>2</sub> and seawater into bio-oil.**
- It also displayed the **utilisation of catalytic hydrothermal liquefaction technology to convert algae biomass to oil.**
- Under this process, **water is used as solvent under high temperature and pressure** to extract oil from the biomass.
- The **benefits** of this technology include **direct utilisation of wet biomass** without any need for drying and conversion of every organic fragment of biomass into oil and without any wastage.
- At the global level, oil and gas giant ExxonMobil partnered with Viridos (formerly Synthetic Genomics) to commercialise algal biofuels.

## Algae biofuels-

- **Algae can synthesise large volumes of oil** (20 times more than that of mustard per acre), **grow fast** (10 times quicker than terrestrial plants) and **capture carbon dioxide** (CO<sub>2</sub>).
- **Microalgae are excellent at converting CO<sub>2</sub> and sunlight into oil-rich biomass**, especially when compared to land-based crop plants like oil palm and soy.
- By adapting microalgae to function as cell factories

producing energy-dense oils that can easily be refined into renewable diesel and jet fuel, we can reduce greenhouse gas emissions by 70 per cent.



- Algae are sometimes grown to make algae biofuels, which make up the third generation of biofuels. Many types of algae can be used and processed to become a biofuel.
- Biofuel is a fuel made from living things, or the waste of a living thing, also known as biomass.
- The algae oils can be converted to biodiesel and the remaining material can be used to create bioethanol.

### The challenges-

The major challenges associated with algae biofuel include-

- Large water requirements.
- High cost of growth nutrients.
- Expensive biomass harvesting, and
- Difficult oil extraction from algae cells.
- Producing a kilogram of biodiesel requires 3.73 tonnes of water, 0.33 kg of nitrogen and 0.71 kg of phosphate.
- Additionally, the energy cost of **extracting oil from algae biomass is 10 times higher than the energy cost of extracting soybean oil.**