



Biofuel from Microorganisms

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Why in News

Researchers at the **International Centre for Genetic Engineering and Biotechnology (ICGEB)** are developing a method to improve the growth rate and **sugar content** of a **marine cyanobacterium** called **Synechococcus sp. PCC 7002**.

Key Points

- **Biofuel** production is dependent on the availability of low-cost and sustainable supply of sugars and a nitrogen source. The **sugars typically come from plants**.
- However, **some bacteria**, such as the cyanobacteria (also known as blue-green algae), too can perform photosynthesis and **produce sugar** by fixing the carbon dioxide in the atmosphere.
- The yield of sugars from cyanobacteria could potentially be much higher than that of land-based crops unlike plant-based sugars.
- Cyanobacterial biomass provides a nitrogen source in the form of proteins.
- Use of marine cyanobacteria has been preferred as freshwater is increasingly getting scarce.

Cyanobacteria









- Cyanobacteria, also called blue-green algae, are **microscopic organisms found naturally in all types of water**.
- These **single-celled organisms** live in fresh, brackish (combined salt and freshwater), and marine water.
- These organisms use sunlight to **make their own food**.
- In **warm, nutrient-rich** (high in phosphorus and nitrogen) environments, cyanobacteria can multiply quickly.







Biofuels

- Biofuels are the **fuels that can be produced from organic matter**, or biomass, such as corn or sugar, vegetable oils or waste feedstocks. **Example:** Bioethanol, Biodiesel
- As biofuels emit less carbon dioxide (CO₂) than conventional fuels (eg:- Petrol) they can be blended with existing fuels as an effective way of reducing CO₂ emissions in the transport sector.
- The use of biofuels have grown over the past decade, driven largely by the introduction of new energy policies in Europe, the USA and Brazil that call for more renewable, lower-carbon fuels for transport. Today **biofuels represent around 3% of road transport fuels in use around the world.**
- In **India**, the National Policy on Biofuels, released by the Government of India in 2018, envisages production of biofuel from Used Cooking Oil (UCO). Also, the Policy has the objective of reaching 20% ethanol-blending and 5% biodiesel-blending by the year 2030.

National Policy on **Biofuels 2018**

Salient features

 <p>An indicative target of 20% blending of ethanol in petrol and 5% blending of biodiesel in diesel is proposed by 2030.</p>	 <p>With a thrust on Advanced Biofuels, the Policy indicates a viability gap funding scheme for 2G ethanol Bio refineries of Rs.5000 crore in 6 years in addition to additional tax incentives, higher purchase price as compared to 1G biofuels.</p>	 <p>Categorization of Biofuels into Basic Biofuels - First generation(1G) Bioethanol & biodiesel and “Advanced Biofuels”- Second Generation(2G) ethanol, drop-in fuels, algae based Third Generation(3G) Biofuels.</p>	 <p>Increase scope of raw material for ethanol procurement by encouraging Intermediate (B-Molasses), Sugarcane Juice, other Sugar containing materials and damaged as well as surplus food grains.</p>
 <p>Develop National Biomass repository by conducting appraisal of biomass across the Country.</p>	 <p>Bio diesel production to be encouraged from non edible oilseeds, used cooking oil, short gestation crops and development of supply chain mechanisms.</p>	 <p>Thrust on research, development and demonstration in the field of Biofuel feedstock production, advanced conversion technologies from identified feedstock.</p>	 <p>Setting up of National Biofuel coordination committee (NBCC) under Ministry of Petroleum & Natural Gas and Working Group on Biofuels.</p>

- It is a unique **intergovernmental organisation** initially established as a special project of the **United Nations Industrial Development Organization (UNIDO)**.

UNIDO is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability.

- Fully **autonomous since 1994**, it runs 46 state-of-the-art laboratories, in Trieste, Italy (also Headquarters of the Centre), New Delhi, India and Cape Town, South Africa and forms an interactive network with over 65 Member States.
- It plays a **key role in Biotechnology worldwide** for excellence in Research, Training and Technology Transfer to industry to contribute in concrete terms to the achievement of sustainable global development and operates within the United Nations System.

source : PIB