



India's First Dimethyl Ether Fuelled Tractor

Why in News?

Recently, India's **first 100% Dimethyl Ether (DME)** fuelled tractor/ vehicle for on- and off-road applications has been developed by IIT Kanpur that exhibited higher thermal efficiency and lower emissions than the baseline diesel engine.

- The research received support from the [Science and Engineering Research Board \(SERB\)](#), a part of the Department of Science and Technology (DST).
- The project aligned with the '[Methanol Economy](#)' program of [NITI Ayog](#), aiming to reduce India's oil import bill and greenhouse gas emissions.

What are the Key Points Related to DME Fuel?

▪ About:

- DME is a synthetically produced alternative fuel that can be directly used in specially designed compression ignition diesel engines for various purposes.
- DME is a **renewable alternative to crude oil**.
- Several countries, including **Japan, USA, China, Sweden, Denmark, and Korea, are already using DME** to power their vehicles.

▪ Properties:

- Under normal atmospheric conditions, DME is a **colourless gas**.
- DME exhibits **comparable calorific value** and similarity of its thermal efficiency to traditional fuels; It is a **clean-burning fuel with low emission** and low particulate matter.

▪ Uses:

- It is used extensively in the chemical industry and as solvent, fuel, and refrigerant.
- It has already been used as **an ozone-friendly aerosol propellant to replace ozone-destroying chlorofluorocarbons (CFCs)**.
- It is an essential intermediate for producing valuable chemicals such as lower olefins, dimethyl sulfate, and methyl acetate.

▪ Significance:

◦ Environmental Benefits:

- The DME-fuelled engine exhibited remarkably **low particulate and soot emissions, almost eliminating smoke generation**.
- This was achieved without the need for expensive exhaust gas after-treatment devices or advanced engine technologies.
- The DME technology offers a viable and **eco-friendly alternative** for conventional diesel engines in agriculture and transport sectors.

◦ DME as a Renewable Alternative:

- India heavily relies on crude oil imports to meet its energy demands across various sectors.
 - DME presents a renewable alternative fuel option that can be produced domestically.

◦ Reinforcing Methanol Economy Programme:

- Converting domestic **coal reserves, low-value agricultural biomass waste, and municipal solid waste into methanol** and DME can contribute to achieving

these goals.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. Which one of the following Union Ministries is implementing the Biodiesel Mission (as Nodal Ministry)? (2008)

- (a) Ministry of Agriculture
- (b) Ministry of Science and Technology
- (c) Ministry of New and Renewable Energy
- (d) Ministry of Rural Development

Ans: (d)

Exp:

- The Ministry of Rural Development (MoRD) was involved to act as a Nodal Ministry for launching the National Mission on Biodiesel with special focus on plantation of Jatropha.
- Jatropha is a plant of Latin American origin, which is now widespread throughout arid and semi-arid tropical regions of the world.
- The plant is well known among the Africans, Asians and Latin American countries as having many uses, particularly in providing renewable energy, controlling erosion, improving soil and reducing poverty.
- Biodiesel is an alternative fuel similar to conventional or 'fossil' diesel. Biodiesel can be produced from straight vegetable oil, animal oil/fats, tallow and waste cooking oil.
- The process of converting these oils into Biodiesel is called transesterification. Biodiesel is environmentally friendly as it is carbon neutral.
- Therefore, option (d) is the correct answer

Source: Dept of Sci and Tech.

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