

2G BIO-ETHANOL

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Context:

The Indian government is planning to set up dedicated enzyme manufacturing facilities to boost ethanol production.

Background:

The first plant is expected to be established in Manesar, Haryana. This facility will likely supply enzymes to proposed 2G bio-ethanol plants in Uttar Pradesh, Punjab, and an existing plant in Haryana. This initiative is part of the BioE3 policy, which aims to enhance biotechnology-driven manufacturing in India.

About 2G (second-generation) bio-ethanol:

1. 2G (second-generation) bio-ethanol is produced from non-food biomass, such as agricultural residues, wood chips, and other lignocellulosic materials.
2. Unlike first-generation bio-ethanol, which is made from food crops like corn and sugarcane, 2G bio-ethanol uses feedstocks that are not part of the human food chain. This makes it a more sustainable and environmentally friendly option.
3. The process involves breaking down the complex carbohydrates in the biomass into simple sugars, which are then fermented to produce ethanol. This typically requires specialized enzymes to convert the lignocellulosic materials into fermentable sugars.

Key benefits of 2G bio-ethanol:

1. Reduces waste: Utilizes agricultural residues that would otherwise be discarded or burned.
2. Lower greenhouse gas emissions: Produces fewer emissions compared to fossil fuels and first-generation bio-ethanol.
3. Energy security: Reduces dependence on imported fossil fuels by providing a renewable energy source.

Ethanol:

1. Ethanol, also known as ethyl alcohol, is a clear, colourless liquid that is flammable and has a characteristic odour.
2. It is produced through the fermentation of sugars by yeast or through chemical processes like the hydration of ethylene.
3. Ethanol can be derived from both biological and chemical sources, while bioethanol is exclusively produced from biological sources.

Uses of Ethanol:

1. Beverages: Ethanol is the type of alcohol found in alcoholic beverages such as beer, wine,

and spirits.

2. Fuel: It is used as a biofuel and is often blended with gasoline to produce ethanol-blended fuels. This helps reduce greenhouse gas emissions and reliance on fossil fuels.
3. Industrial Solvent: Due to its ability to dissolve a wide range of substances, ethanol is used as a solvent in the manufacturing of pharmaceuticals, perfumes, and other products.
4. Medical and Laboratory Uses: Ethanol is used as an antiseptic, disinfectant, and preservative in medical and laboratory settings.
5. Chemical Feedstock: It serves as a feedstock for the production of various chemicals.

Dr. Shivakumar's



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