KERONE
Kerone Engineering Solutions Limited

BIOETHANOL & PRODUCTION

In Association with SVCH-Technologii, Moscow (Russia)

ISO 9001:2015 | ISO 14001:2015 | ISO 45001:2018

ABOUT US

KERONE is now renowned for serving the specialized needs of customers with the best quality and economical process of Heating /cooling and drying products, manufactured in a high-quality environment by a trained and qualified workforce (special purpose machinery)

KERONE is a pioneer in application and implementation engineering with its vast experience and team of professionals.

KERONE is devoteded to serve the industry to optimize its operations both economically and environmentally with its specialized heating and drying solutions.

KERONE is having immense expertise in manufacturing and implementing various types of engineering solutions.

KERONE is possessing employee strength of more than 280+ experts continuously putting efforts for happy industrial engineering solutions.

WHY CHOOSE US

> Enhance the value of customer operation through our customer need centric engineering solution.

With decades of expertise, cutting-edge technology, and a customer-centric approach, Kerone Engineering offers tailor-made heating solutions that prioritize quality, flexibility, and cost-effectiveness. Benefit from our commitment to excellence, post-sales support, and innovative solutions for your unique heating needs. Choose Kerone Engineering for reliability, performance, and unmatched value.

MISSION

- To enhance the value of customer operation throughi our customer need centricengineefing solution
- We are cominitted to provide our customers, unique arid best in class products in Industrial heating drying and cooling segment with strategic tie-up for the technical know-how with renowned leader in the industry specific segment

VISION

- Turn into a world leader in providing specialized, top-notch quality and ecological industrial heating, cooling, and drying solutions across the globe.
- To attain global recognition as the best of quality and environment-friendly engineering solution company.

What is Bioethanol?

Bioethanol is an alcohol made by fermentation, mostly from carbohydrates produced in sugar or starch crops such as corn or sugarcane. Cellulosic biomass, derived from non-food sources such as trees and grasses, is also being developed as a feedstock for ethanol production.

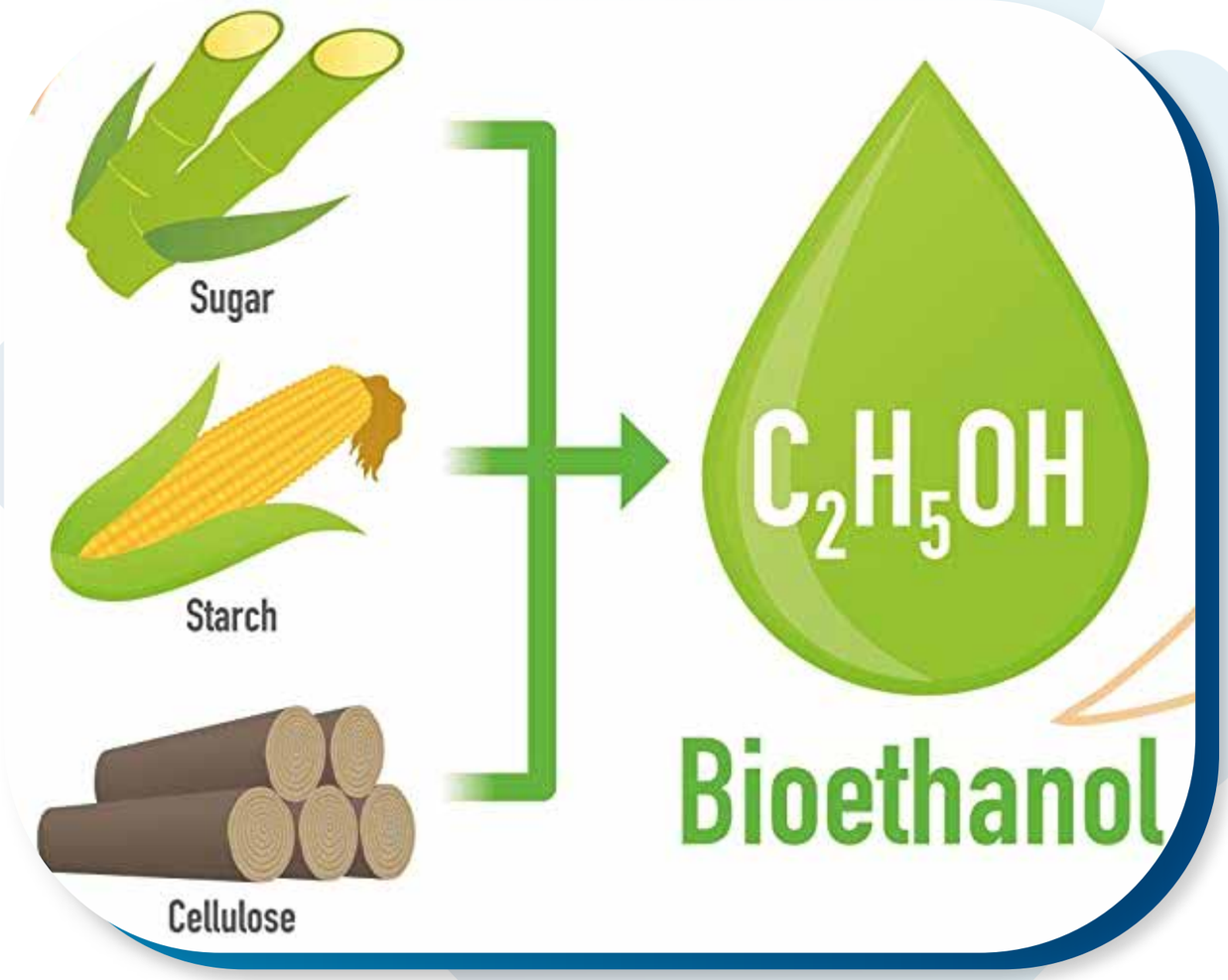
Bioethanol Production

- Wheat/Grains/Corn/Sugar-cane can be used to produce ethanol. (Basically, any plants that composed largely of sugars)
- Bioethanol is mainly produced in three ways.

Sugar → Ethanol

Strach → Sugar → Ethanol

Cellulose and Hemicellulose → Ethanol



Bioethanol Production

Concentrated Acid Hydrolysis

- ~77% of sulfuric acid is added to the dried biomass to a 10% moisture content.
- Acid to be added in the ratio of 1/25 acid :1 biomass under 50°C.
- Dilute the acid to ~30% with water and reheat the mixture at100°C for an hour.
- Gel will be produced and pressed to discharge the acid sugar mixture.
- Separate the acid & sugar mixture by using a chromatographic column.

Dilute Acid Hydrolysis

- Oldest, simplest yet efficient method.
- Hydrolyses the bio-mass to sucrose
- Hemi-cellulose undergo hydrolysis with the addition of 7% of sulfuric acid under the temperature 190°C
- To generate the more resistant cellulose portion, 4% of sulfuric acid is added at the temperature of 215°C

Wet Milling Process

- Corn kernel is soaked in warm water.
- Proteins broken down
- Starch present in the corn is released (thus, softening the kernel for the milling process)
- Microorganisms, fiber and starch products are produced.
- In the distillation process, ethanol is produced.

Dry Milling Process

- Clean and break down the corn kernel into fine particles.
- Yeast is added to ferment the cooled mixture into ethanol.
- Sugar solution is produced when the powder mixture (corn germ/starch and fibre) is broken down into sucrose by dilute acid or enzymes.

Sugar Fermentation

- Yeast is added and heated to the solution.
- Inverses acts as a catalyst and convert the sucrose sugars into glucose and fructose.
- Hydrolysis process breaks down the biomass cellulosic portion into sugar solutions which will then be fermented into ethanol.

Fractional Distillation Process

- In the distillation process, both the water and ethanol mixture are boiled.
- state first --------> condensed and separated from water.
- Ethanol has a lower boiling point than water, therefore ethanol will be converted into the vapor.
- After the sugar fermentation process, the ethanol still does contain a significant quantity of water which have to be removed.

Fermentation

- Cereal grains (corn, wheat, barley, sorghum, or rye); sugarcane (molasses); sugar beets; fruit product wastes; other starch crops (potatoes or rice); sulfate liquors (paper pulping); and such high cellulose-containing materials as wood, crop residues, and cultivated fiber crops.

Chemical synthesis

- Petroleum and natural gas; coal; oil shale's; and tar sands.
- Synthetic alcohol is not purer or better quality than fermentation alcohol for industrial use.

Bioethanol Properties

- Colourless and clear liquid
- Lower toxicity level
- Much more environmentally friendly
- Used to substitute petrol fuel for road transport vehicles
- One of the widely used alternative automotive fuel in the world (Brazil & U.S.A are the largest ethanol producers)

Benefits of Bioethanol

- Less dependence on crude oil.
- It is a renewable fuel.
- Helping emerge a new market.
- Expanded market opportunity in the agricultural field.
- Increase octane number (a standard measure of the performance of motor fuel)
- Reduces air pollution, cleaner environment due to cleaner combustion lower net carbon dioxide emissions.

Application

- Transport fuel to replace gasoline
- Fuel in Cogeneration systems
- Fuel for fuel cells by thermochemical reaction
- Fuel for Power generation by thermal combustion
- Feedstock in the chemicals industry
- Blending of ethanol with a small proportion of a volatile fuel such as gasoline -> more cost effective
- Various mixture of bioethanol with gasoline or diesel fuels
  - E5G to E26G (5-26% ethanol, 95-74% gasoline)
  - E85G (85% ethanol, 15% gasoline)
  - E15D (15% ethanol, 85% diesel)
  - E95D (95% ethanol, 5% water, with ignition improver)

Advantages

- Exhaust gases of ethanol are much cleaner ethanol- blended fuels such as E85 (85% ethanol and 15% gasoline) reduce up to 37.1% of GHGS
- Output of energy during the production is more than the input the CO2 released in the bioethanol production process is the same amount as the one the crops previously absorbed during photosynthesis.
- Exhaust gases of ethanol are much cleaner
- It burns more cleanly as a result of more complete combustion
- Greenhouse gases reduce
- Ethanol-blended fuels such as E85 (85% ethanol and 15% gasoline) reduce up to 37.1% of GHGS
- Positive energy balance, depending on the type of raw stock
- Output of energy during the production is more than the input
- Any plant can be use for production of bioethanol, it only has to contain sugar and starch
- Carbon neutral the CO2 released in the bioethanol production process is the same amount as the one the crops previously absorbed during photosynthesis

Advantages

Decrease in ozone formation

- The emissions produced by burning ethanol are less reactive with sunlight than those produced by burning gasoline, which results in a lower potential for forming ozone

Renewable energy resource

- Result of conversion of the sun's energy into usable energy
- Photosynthesis -> feedstocks grow-> processed into ethanol

Energy security

- Countries that do not have access to crude oil resources grow crops for energy use and gain some economic freedom

Reduces the amount of high-octane additives

Fuel spills are more easily biodegraded or diluted to non toxic concentrations

BambooEthanol Recovery Plant from

An ethanol recovery plant from bamboo is a facility that utilizes bamboo as a feedstock to produce ethanol through a process known as fermentation. The process involves breaking down the bamboo fibers into simple sugars, which are then converted to ethanol through fermentation by yeast or bacteria.

Ethanol Recovery Plant from Biomass

An ethanol recovery plant from biomass is a facility that converts various types of biomass into ethanol through a process known as bio-refinery. Biomass feedstock can include wood chips, agricultural residues, energy crops, and other organic materials.

Ethanol Recovery Plant from Corn Cob

An ethanol recovery plant from corn cob is a facility that produces ethanol from the corn cobs left over after the harvest of corn kernels. Corn cobs are an abundant and renewable source of biomass that can be used as a feed-stock for ethanol production.

Ethanol Recovery Plant from Food Grains

An ethanol recovery plant from food grains has several benefits. It provides a sustainable source of biofuel, reduces dependence on fossil fuels, and promotes the use of renewable resources. Additionally, it can help to reduce greenhouse gas emissions, as food grains are considered a car-bon-neutral feedstock.

Conclusion

- For bioethanol to become more sustainable to replace petrol, production process has to be more efficient.
  - Reducing cost of conversion
  - Increasing yields
  - Increase the diversity of crop used
- As microbes are use to convert glucose into sugar which is ferment in bioethanol
- Microbiology and biotechnology will be helpful in the genetic engineering

TRUSTED PARTNERS

AFCONS

Technip

TÜV ISO 14001:2004

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TATA CONSULTING ENGINEERS LIMITED

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THANK YOU

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