



ALCOTimes™



AUGUST 2024



BALAJI ENZYME & CHEMICAL PVT LTD

Akshay Mittal Industrial Estate
A-113, 1st Floor, Building No 5, Sir M V Road, Andheri (East),
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E-mail : info@becpl.in | Web. : www.becpl.in

Introducing AlcoTimes :

We **Balaji Enzymes & Chemical Pvt Ltd** are sharing our monthly newsletter **ALCOTIMES** for Alcohol Industry. Now we are happy to launch our new monthly news letter "ALCOTIMES" for Alcohol Industry.

About Our Company :

We **M/s Balaji Enzyme & Chemical Pvt Ltd** are a leading supplier of Enzymes, Filter aid, Yeast, Hops, Processing aids, Clarifiers and food fortification products to breweries, distilleries, malt extract industry, starch industry, juice and beverage industry, and other food industry.





BALAJI ENZYME AND CHEMICAL PVT LTD

GRAIN AND MOLASSES DISTILLERY ENZYMES AND ANTIBACTERIAL SOLUTIONS



OUR PRODUCTS

Through innovations and advanced technologies, we want to provide excellent services and build long-term relationships with our esteemed customers

THE BEST SERVICE

We intend to provide our customers the best quality services that exceed the expectations. To be the best in the industry by providing enhanced services, relationship, innovative measures and profitability.

GRAIN DISTILLERY

1

SUPER AMYLASE DX

Thermostable Alpha Amylase

2

SUPER GLUCOAMYLASE

Glucoamylase

3

VITAHOP C

Hop Based Natural Antibacterials

4

SUPER ALCOBOOST G

Antibacterials Solutions

MOLASSES DISTILLERY

1

SUPER ALCOBOOST M

Antibacterials Solutions

Contact Us



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**Akshay Mittal Industrial Estate
A-113, 1st Floor, Sanjay Building No 5,
Sir M V Road, Andheri (East),
Mumbai - 400059,
Maharashtra, India**



SUPERAMYLASE DX

Thermostable Alpha Amylase

Description

SuperAmylase DX is a kind of thermostable α -amylase with high activity. It is derived from *Bacillus licheniformis* and produced through submerged fermentation and refining process. It can hydrolyse α - 1,4 glycosidic bond of starch randomly and reduces mash viscosity rapidly. SuperAmylase DX Alpha-amylase is designed for starch-based feedstock ethanol production

Characteristics

Component name : Alpha amylase

Activity : ≥ 150000 U/g

Color :Amber

Physical form : Liquid

Approx. density g/ml : 1.10-1.25

Enzyme	DS	Brix	Reducing sugar	Iodine test	Viscosity/cp
Benchmark	1:2.8	23.0	3.06	Brown to red	283
SuperAmylase DX	1:2.8	23.4	3.08	Brown to Red	224

pH:4.85, Dosage: 12u/g, Temp/Time: 90°C/120 min

Advantages

For ethanol producer, smooth running and high starch conversion rate are extremely important to achieve high ethanol yields. Super Amylase DX may become an ideal solution to meet your targets. The advantages are as follows:

- Outstanding viscosity reduction performance
- Easier liquefaction handling with wide pH and temperature range
- Complete starch conversion to enhance ethanol yields

Recommendation

Material/water ratio : 1:1.8-1:3 (Optimum ratio 1:2-1:2.7)

pH range : 4.8-6.5 (Optimum : 5.0 to 6.0)

Temperature range : 65-100 °C (Optimum : 75 to 95 °C)

Cooking time : 90 to 120 mins

Dosage (kg/t Starch) : 0.10-0.15 kg/T

The actual dose required will depend upon the conditions of your fermentation: time, initial pH and the level of solids.

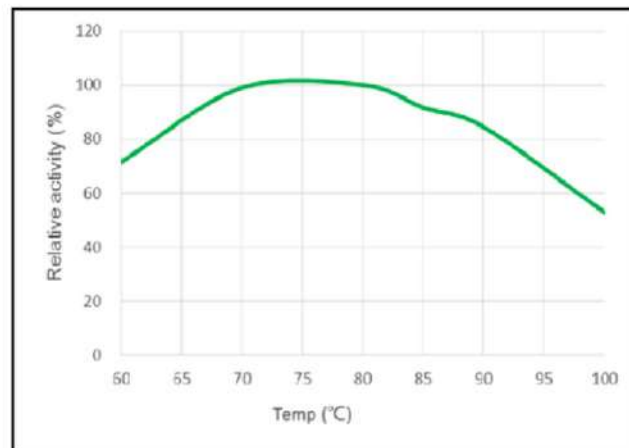


Fig. 1 : The influence of temperature on the activity of Super Amylase DX

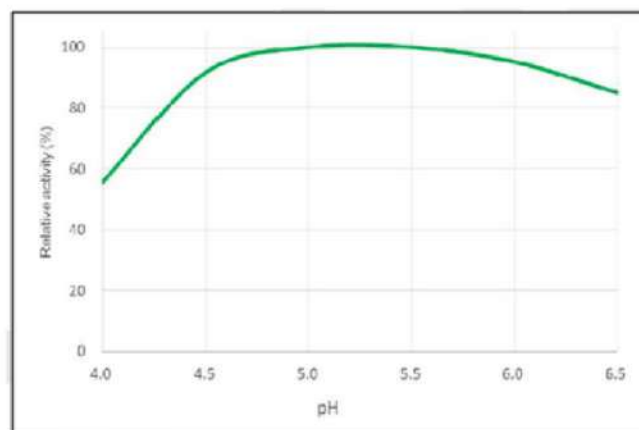


Fig. 2 : The influence of pH on the activity of Super Amylase DX

Composition

Preservatives : Potassium sorbate

Stabilizers : Sorbitol

Sodium chloride

Balaji Enzyme & Chemical Pvt Ltd

Rahul Mittal Industrial ,Premises Co. Op.
Society Ltd No 230, 2nd Floor, Building NO. 3,
Sir M.V Road, Andheri (E), Mumbai- 400 059



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+91-7666049638



info@becc.com



SUPERAMYLASE DX

Thermostable Alpha Amylase

Packaging

Available in various package sizes. Please consult Our representative for detailed information.

Safety and Handling precaution

Enzymes are proteins. Inhalation of dust or aerosols may induce sensitization and may cause allergic reactions in sensitized individuals. Some enzymes may irritate the skin, eyes, and mucous membranes upon prolonged contact. See the MSDS or Safety Manual for further information regarding safe handling of the product and spills.

Storage and Shelf life

Recommended storage: 0-25 °C Packaging must be kept intact, dry, and away from sunlight. Please follow the recommendations and use the product before the best before date to avoid the need for a higher dosage. To ensure maximum retention of activity, please keep the enzyme under refrigerated conditions below 5 °C with the container closed.

Best before: You will find the best before date in the certificate of analysis or on the product label. The product can be transported at ambient temperature. Following delivery, the product should be stored as recommended



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SUPER GLUCOAMYLASE

Glucoamylase

Description

Super Glucoamylase is the exo-glucoamylase derived from a *Aspergillus niger* with extremely high enzyme activity and sugar conversion rate, which can efficiently hydrolyze α -1,4-glucosidic bonds from the nonreducing end of liquefied starch to produce glucose quickly. Super Glucoamylase Alpha-amylase is designed for starch-based feedstock ethanol production

Characteristics

Component name : Glucoamylase

Activity : 400,000 U/g

Color : Amber

Physical form : Liquid

Approximate density g/ml : ≤ 1.20

Advantages

For ethanol producer, smooth running and high starch conversion rate are extremely important to achieve high ethanol yields. The advantages are as follows:

- Release glucose quickly and smoothly, the successive glucose providing favorable conditions for alcohol production.
- Optimize fermentation time and improve the utilization rate of equipment.
- Stable production performance with wide pH and Temperature range.
- Utilized in saccharification and can achieve high DX value.
- Wide pH stability, flexibility in process control.
- Saccharification can be processed in higher temperature and drier substance concentrations.

Composition

Enzyme : Glucoamylase

Stabilizers : Glucose

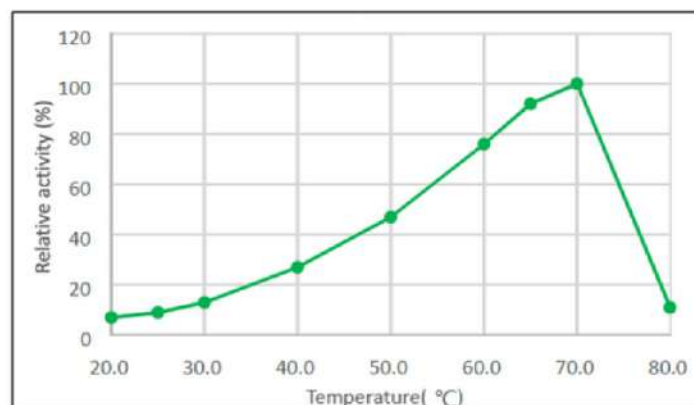


Fig. 1 The influence of temperature on the relative activity of Super Glucoamylase

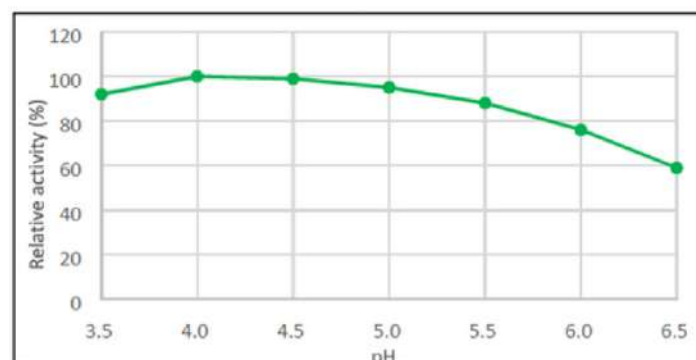


Fig. 2 The influence of pH on the relative activity of Super Glucoamylase

Recommendation

Material/water ratio: 1:1.4-1:3.0

(Optimum ratio 1:1.6 to 1:2.4)

pH range : 4.0-5.0 (Optimum : 4.1 to 4.5)

Temperature range : 30-70 °C (Optimum : 55 to 65 °C)

Dosage (kg/t Starch): 0.4-0.6 kg/T

The actual dose required will depend upon the conditions of your fermentation: time, initial pH and the level of solids.



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Glucoamylase

Packaging

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Best before: You will find the best before date in the certificate of analysis or on the product label.

The product can be transported at ambient temperature.

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Vitahop®

**Increase profits in
BIOETHANOL...naturally**

Vitahop® is a range of natural hop extracts, ideal for production of bioethanol from a range of raw material feedstocks, as they protect yeast from bacterial growth, and their acid by-products, during fermentation processes. When used as part of a planned process regime with regular additions, bacterial infections do not develop and spoil yeast fermentations.

When infections do develop, they can quickly get out of control and disrupt production, potentially causing substantial losses and lost revenue. By controlling bacteria and preventing bacterial growth, catastrophic infections can be a thing of the past.

Vitahop® is used in both continuous and batch fermentations. It helps ensure healthy, vitalised yeast growth and during fermentation suppress gram positive bacteria. If bacteria are allowed to prosper, they will compete with and eventually inhibit the yeast, slowing fermentation sometimes to a complete stop, resulting in a “stuck” fermentation. Bacteria will also use up valuable feedstock producing organic acids such as lactic acid, further reducing ethanol yields. Prevent this happening with **Vitahop®**.

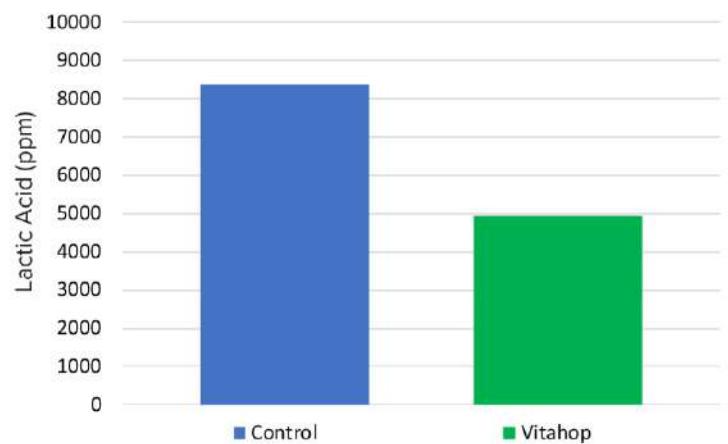


Key Benefits of Vitahop®

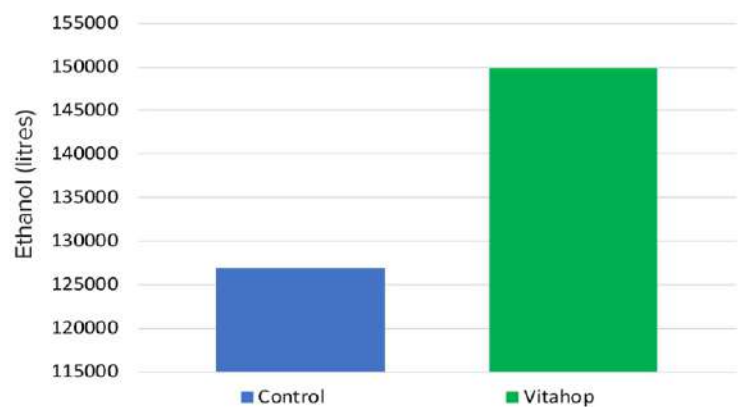
- Maintains optimum ethanol yields
- Ensures reliable fermentations
- Keeps yeast healthy
- Controls bacteria
- Demonstrated benefits in ethanol production plants worldwide
- Safe and natural, easy to use
- Safe DDGS for animal feed
- A natural alternative to antibiotics



Effect of Vitahop® on Average Lactic Acid Production at Fermenter Drop



Effect of Vitahop® on Ethanol Production



Unpublished data BetaTec 2015



BetaTec is the first company worldwide specialising in the application of hops and hop-derived compounds for use in “beyond brewing” industries. Our product portfolio includes natural fermentation aids, antibacterials, flavours and functional ingredients. Our key business areas are alcohol, yeast and sugar production.

All BetaTec products are accompanied by on-site support, process optimisation and consulting.

Please contact our technical experts to learn how Vitahop® can help you sustain improved ethanol yields.

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+44(0) 1684 217340

BetaTec® 
hop products

“Transforming your world with our natural hop solutions”



SUPER ALCOBOOST G

Grain ethanol biocide

Description

Super Alcoboost G is a powerful solid biocide in powder form that protects yeast, sugar, and alcohol by removing bacteria from wort/wash. It improves alcohol quality by reducing acid formation caused by harmful lactic acid bacteria during grain ethanol production. It also benefits microorganisms during the biomethanation process.



Advantages

Super Alcoboost G provides the following benefits:

- Reduction of yeast stress & Increased alcohol yields
- Reduces sucrose losses due to contamination
- Reduces bacterial contamination very rapidly
- Prevention of bacterial competition for glucose



Dosages

5-10 PPM in the wort prior to pitching the yeast culture, and the same dose after filling the fermenter.

We recommend 6 PPM or 600 gram per 1.00 lac litre of wort / wash for grain.

Before mixing to bulk volume in the pre fermenter and fermenter, Super Alcoboost G should be dissolved in wort / wash in a bucket. (It is readily dissolved in water, wort & wash)

Balaji Enzyme & Chemical Pvt Ltd

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SUPER ALCOBOOST G

Grain ethanol biocide

Product application

PRE FERMENTER

Dosing/application begins in the pre fermenter. Super Alcoboost G should be added as soon as 10% of the wort is transferred to the pre fermenter.

Example-

If the pre fermenter capacity is 2 lacs litres, then Super Alcoboost G should be added for full capacity as soon as 20,000 litres of wort are transferred to PF @ 600 gm per 01 lac litre, i.e. 1.2 kg Super Alcoboost G should be dissolved by hand in the same wort in a bucket & put it to PF now PF should be filled normally. (The operator must wear gloves and goggles).

FERMENTER

Super Alcoboost G should be added to the fermenter as soon as 10% of the wort is transferred/reaches the fermenter.

Example-

We presume only one fermenter of 12 lac litre in capacity.

In this case, the total amount of Super Alcoboost G should be added as soon as 10% (1,20,000 ltr) of wort/wash is transferred to the fermentation tank, i.e. @ 600 gm/one lac litre x 12 = 7.2 kg, and then the fermenter should be filled normally.

Packaging

12 Kg carton (12 sealed plastic jars - 1 Kg each)

Safety ,Handling and storage precaution

Store in a cool, dry place. Nobody should try to smell or taste anything. Hand gloves are advised to be worn when handling.

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SUPER ALCOBOOST M

Molasses ethanol biocide

Description

Super Alcoboost M is a powerful solid biocide in powder form that protects yeast, sugar, and alcohol by removing bacteria from wort/wash. It improves alcohol quality by reducing acid formation caused by harmful lactic acid bacteria during grain ethanol production. It also benefits microorganisms during the biomethanation process.



Advantages

Super Alcoboost M provides the following benefits:

- Reduction of yeast stress & Increased alcohol yields
- Reduces sucrose losses due to contamination
- Reduces bacterial contamination very rapidly
- Prevention of bacterial competition for glucose



Dosages

5-10 PPM in the wort prior to pitching the yeast culture, and the same dose after filling the fermenter.

We recommend 6 PPM or 600 gram per 1.00 lac litre of wort / wash for grain.

Before mixing to bulk volume in the pre fermenter and fermenter, Super Alcoboost M should be dissolved in wort / wash in a bucket. (It is readily dissolved in water, wort & wash)



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SUPER ALCOBOOST M

Molasses ethanol biocide

Product application

PRE FERMENTER

Dosing/application begins in the pre fermenter. Super Alcoboost M should be added as soon as 10% of the wort is transferred to the pre fermenter.

Example-

If the pre fermenter capacity is 2 lacs litres, then Super Alcoboost M should be added for full capacity as soon as 20,000 litres of wort are transferred to PF @ 600 gm per 01 lac litre, i.e. 1.2 kg Super Alcoboost M should be dissolved by hand in the same wort in a bucket & put it to PF now PF should be filled normally. (The operator must wear gloves and goggles).

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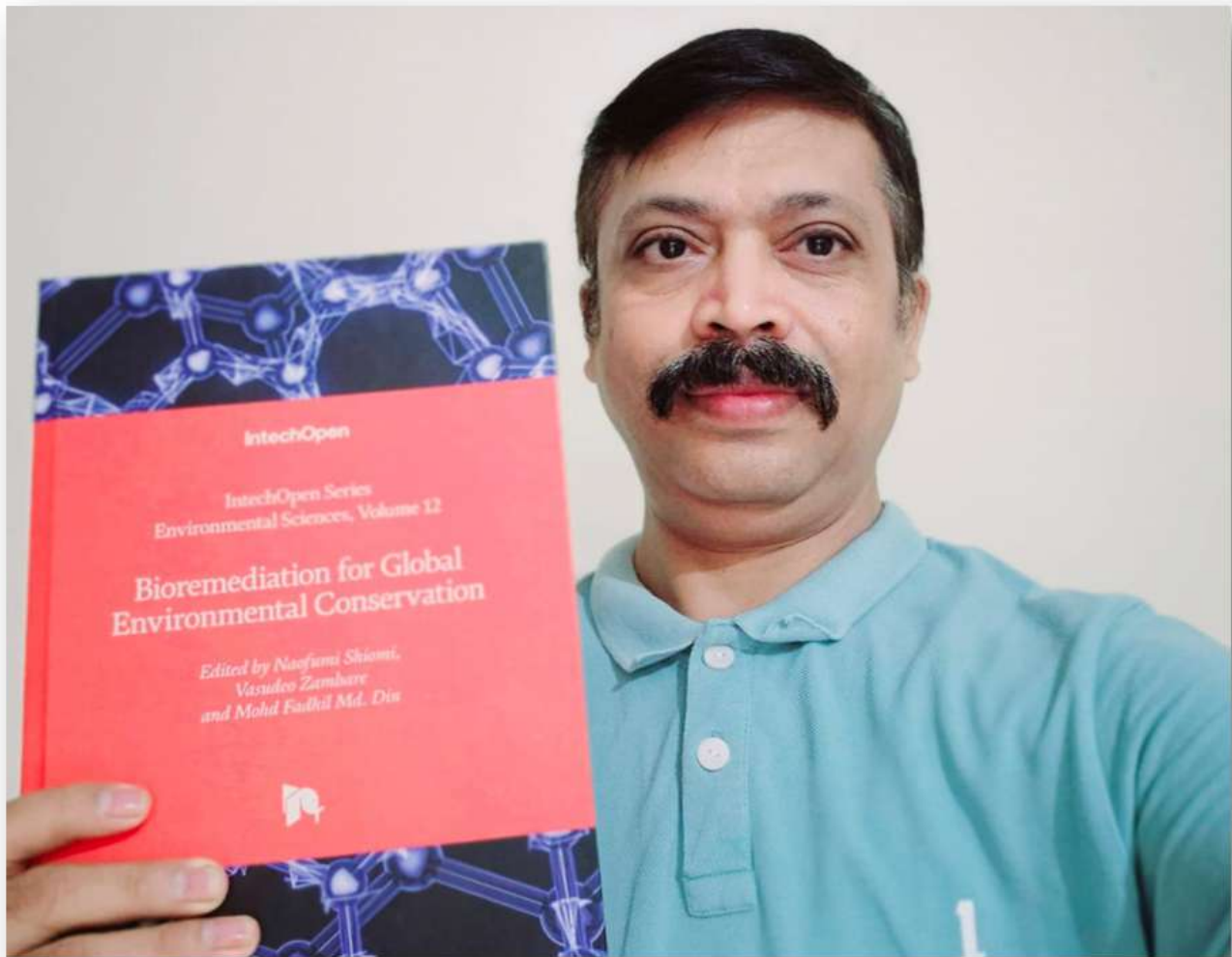
we wish you all

HAPPY
INDEPENDENCE
DAY 15TH *August*

Freedom in our mind, Faith in our words, Pride in our hearts,
Memories in our soul



BECPL'S R&D HEAD DR. VASUDEO ZAMBARE PUBLISHED BOOK WITH UK'S PUBLISHER



Dr. Vasudeo Zambare, Head- R&D and Technical of Balaji Enzyme & Chemical Pvt Ltd has published his book on “**Bioremediation for Global Environmental Conservation**” with IntechOpen Publisher, London, UK (<https://www.intechopen.com/books/12675>). The book is co-authored with Dr. Naofumi Shiomi, Japan and Prof. Mohd. Fadhil Md. Din, Malaysia. This book is mainly focuses on the remediation of widespread pollution, which is one f the most important issues for maintaining sustainable society. The views of many experts on new strategies for efficient remediation and material in this book provide important information for the rapid cleanup of contaminated soil and groundwater.

Dr. Zambare was specially congratulated by BECPL group including the Board of Directors, Mr Abhay Kainya, Mr. Arun Kainya & Mr. Ashish Sharma and wishing a big success for future assignments and many more milestones.

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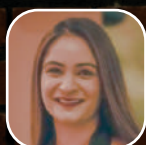
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Second-Generation Ethanol Plants in India: Challenges and Benefits



Rohit Chauhan

India is making significant strides in the realm of biofuels, with a keen focus on second-generation (2G) ethanol plants. These plants, which use lignocellulosic biomass instead of food crops as feedstock, represent a promising avenue for sustainable energy production. As the country endeavors to meet its ambitious ethanol blending targets, 2G ethanol plants offer a viable solution to reduce reliance on fossil fuels and improve environmental sustainability. However, the transition to 2G ethanol comes with its set of challenges, particularly related to feedstock management, alongside notable benefits.

Understanding Second-Generation Ethanol

Second-generation ethanol is produced from non-food biomass, including agricultural residues (such as wheat straw, rice straw, and corn stover), forestry residues, and dedicated energy crops (like switchgrass and miscanthus). Unlike first-generation ethanol, which is derived from food crops like sugarcane and corn, 2G ethanol does not compete with food resources, making it a more sustainable alternative.

Challenges Related to Feedstock

1. Feedstock Collection and Logistics:

- **Scalability** : Collecting large volumes of agricultural residues is a daunting task. These residues are scattered across vast areas, making the logistics of collection, transportation, and storage complex and costly.
- **Seasonality** : Agricultural residues are available only after specific crop harvest seasons, leading to challenges in maintaining a consistent year-round supply of feedstock.

2. Feedstock Quality:

- **Variability** : The quality of agricultural residues can vary significantly based on factors such as crop type, geographical location, and farming practices. This variability can affect the efficiency and yield of ethanol production.



- **Pre-treatment Requirements :** Lignocellulosic biomass requires extensive pre-treatment to break down the complex cellulose and hemicellulose structures into fermentable sugars, adding to the cost and complexity of the process.

3. Environmental Impact:

- **Soil Health :** Removing crop residues from fields can have adverse effects on soil health, as these residues play a crucial role in maintaining soil organic matter and preventing erosion. Sustainable residue management practices are essential to mitigate these impacts.

Benefits of Second-Generation Ethanol

1. Environmental Sustainability:

- **Lower Carbon Emissions :** 2G ethanol has a significantly lower carbon footprint compared to fossil fuels and even first-generation biofuels. It contributes to a reduction in greenhouse gas emissions, aligning with India's climate goals under the Paris Agreement.
- **Waste Utilization :** Utilizing agricultural and forestry residues helps in waste management, reducing the environmental issues associated with residue burning, which is a common practice in many parts of India.

2. Energy Security:

- **Reduced Dependence on Imports :** By producing ethanol domestically, India can reduce its reliance on imported crude oil, enhancing energy security and reducing vulnerability to global oil price fluctuations.
- **Diversification of Feedstocks :** The use of diverse biomass sources for ethanol production ensures a more resilient and stable supply chain, less affected by the volatility in agricultural commodity markets.

3. Economic and Social Benefits:

- **Rural Development :** The establishment of 2G ethanol plants can drive economic growth in rural areas by creating jobs in feedstock collection, transportation, and plant operations. This can lead to improved livelihoods for farmers and rural communities.
- **Technology Advancement :** Investing in 2G ethanol plants spurs technological innovation and development, positioning India as a leader in advanced biofuels and creating opportunities for exports and international collaborations.

Moving Forward

To fully realize the potential of second-generation ethanol, India must address the challenges related to feedstock logistics and quality. This can be achieved through:

- **Policy Support** : Continued government support through policies, subsidies, and incentives to promote the establishment and operation of 2G ethanol plants.
- **Research and Development** : Investment in R&D to improve pre-treatment technologies, enhance feedstock conversion efficiency, and develop sustainable residue management practices.
- **Public-Private Partnerships** : Encouraging collaborations between government agencies, private companies, and research institutions to drive innovation and scale up 2G ethanol production.

In conclusion, second-generation ethanol plants hold the promise of transforming India's energy landscape by providing a sustainable, low-carbon alternative to fossil fuels. Despite the challenges associated with feedstock management, the environmental, economic, and social benefits of 2G ethanol make it a vital component of India's renewable energy strategy.

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BECPL TEAM AT NATIONAL CONFERENCE ON BIO ENERGY INDIA ON 2ND AUGUST 2024





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FERMENTATION AND DISTILLATION ARE TWO KEY PROCESSES USED IN THE PRODUCTION OF ALCOHOLIC BEVERAGES FROM GRAINS. HERE'S A BRIEF OVERVIEW OF EACH PROCESS



AMIT UPADHYAY

Fermentation

Fermentation is the metabolic process by which yeast converts sugars into alcohol, carbon dioxide, and other byproducts. Here's how it typically works with grains:

- 1. Mashing:** Grains (such as barley, corn, rye, or wheat) are ground and mixed with water to create a mash. The mash is heated to activate enzymes that convert the starches in the grains into fermentable sugars.
- 2. Cooling and Adding Yeast:** Once the mashing process is complete, the mash is cooled and transferred to a fermentation vessel. Yeast is then added to the mash.
- 3. Fermentation:** The yeast consumes the sugars and produces alcohol and carbon dioxide. This process can take several days to a few weeks, depending on various factors such as temperature and yeast strain.
- 4. Completion:** When fermentation is complete, the result is a liquid called "beer" (in brewing) or "wash" (in distilling), which contains alcohol, water, and other compounds.

Distillation

Distillation is the process of separating components of a liquid mixture based on differences in boiling points. Here's how it works in the context of grain-based alcohol production:

- 1. Heating the Fermented Liquid:** The wash is heated in a still. Alcohol has a lower boiling point than water, so it evaporates first.
- 2. Condensation:** The alcohol vapors are collected and condensed back into liquid form, typically in a series of stages to increase purity.

3. Fractional Distillation: In some cases, the distillation process is repeated (fractional distillation) to achieve a higher concentration of alcohol and remove more impurities.

4. Collection: The distilled liquid, now called “distillate,” is collected. This distillate is often clear and has a much higher alcohol content than the original fermented liquid.

5. Aging (Optional): For certain spirits (like whiskey), the distillate may be aged in barrels to develop flavors and achieve the desired characteristics.

6. Bottling: Once the desired alcohol content and flavor profile are achieved, the spirit is filtered (if necessary), diluted to the appropriate proof, and bottled.

Common Products

- **Beer:** Fermented grains without distillation.
- **Whiskey:** Distilled grain spirits, often aged in barrels.
- **Vodka:** Distilled grain spirits, typically not aged and often distilled multiple times for purity.
- **Gin:** Similar to vodka but infused with botanicals during or after distillation.

These processes can vary significantly depending on the specific type of beverage being produced and the traditions and regulations of the region.



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A collection of Bara Mati Purple Premium wine-based cosmetics is displayed on a white circular pedestal. The products include a bottle of Purple Premium Wine Base Shower Gel, a round bar of Purple Redwine Soap, a bottle of Purple Premium Wine Base Conditioner, a bottle of Purple Premium Wine Base Perfume, a jar of Purple Premium Wine Base Scrub, and a bottle of Purple Premium Wine Base Shampoo. The background features lush green grapevines with clusters of green grapes, suggesting a vineyard setting. The brand name 'Bara Mati Purple Cosmetics' is prominently displayed in a stylized font at the top center.

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ABHAY VISHWAKARMA

Ethanol can be produced from various feedstocks, including grains and molasses. Here are some key parameters for ethanol production from each:

Ethanol Production from Grains

- 1. Feedstock:** Corn, wheat, barley, sorghum, etc.
- 2. Starch Content:** High starch content (60-70%) is preferred.
- 3. Processing Steps:**
 - **Milling:** Breaking down grains into smaller particles.
 - **Liquefaction:** Mixing with water and heating to break down starch into dextrins.
 - **Saccharification:** Converting dextrins to simple sugars using enzymes (e.g., amylase).
 - **Fermentation:** Yeast (*Saccharomyces cerevisiae*) converts sugars into ethanol and CO_2 .
 - **Distillation:** Separating ethanol from the fermentation mixture.
 - **Dehydration:** Removing remaining water to obtain fuel-grade ethanol.
- 4. Yield:** Approximately 2.8 gallons of ethanol per bushel of corn.

Ethanol Production from Molasses

- 1. Feedstock:** Byproduct of sugarcane or sugar beet processing.
- 2. Sugar Content:** Typically contains 40-50% fermentable sugars.

3. Processing Steps:

- **Dilution:** Molasses is diluted with water to a suitable concentration for fermentation.
- **Fermentation:** Yeast (*Saccharomyces cerevisiae*) converts sugars into ethanol and CO_2 .
- **Distillation:** Separating ethanol from the fermentation mixture.
- **Dehydration:** Removing remaining water to obtain fuel-grade ethanol.

4. Yield: Approximately 6.5 gallons of ethanol per ton of molasses.

Common Parameters

1. Fermentation Time: Typically 48-72 hours.

2. Fermentation Temperature: Optimal range is 30-35°C (86-95°F).

3. pH: Optimal range is 4.5-5.0.

4. Yeast Strain: *Saccharomyces cerevisiae* is commonly used.

5. Distillation: Ethanol is distilled to around 95% purity, then dehydrated to achieve 99% purity for fuel.

These parameters can vary depending on specific processes and technologies used in ethanol production facilities.

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