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VARUNA
BIO TECHNOLOGY

Transforming industries through enzymatic innovation

For Biofuel & Bioethanol Industry

- Liquimax
- Saccharimax
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Liquimax

Thermostable, acid tolerant bacterial α-amylase for starch liquefaction

Liquimax is a high temperature Alpha Amylase which converts Starch into dextrin i.e., used in liquification of grain.

Liquimax is an Alpha-Amylase that hydrolyses (1,4)-alpha-D-glucosidic linkages in starch substrates. It is heat stable and efficient in viscosity reduction over wide range of pH. Liquimax is produced from a specially selected strain of Bacillus Sp. It is tested by specialized laboratories for quality and purity.

Application

- Liquimax is used during the slurry preparation and liquefaction process. As per the plant condition we can decide to split the dosages in slurry and liquefaction tanks. Liquimax is effective in viscosity reduction and during high DS liquefaction.
- The recommended parameters are to maintain the liquefaction temp 83-85°C with overall retention time of 150-180 minutes to achieve optimum results.

Product Specifications

- Appearance : Light brown liquid
- Odour : Slight fermentation
- Solubility : Miscible in water
- pH Range : 5.0 – 6.5
- Specific gravity : 1.0 – 1.2

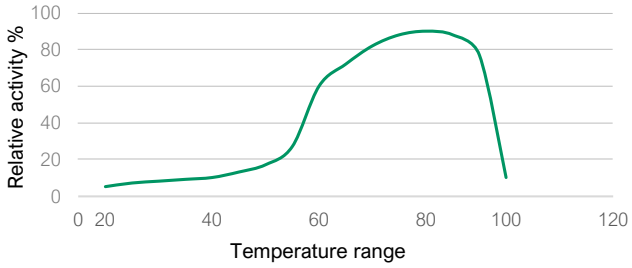
Operating Parameters

- Dosage : 0.40 – 0.50 KG/Per ton of starch
- Optimum pH : 5.5 – 6.0
- Optimum Temperature: 83 - 85°C
- Retention time : 150-180 minutes

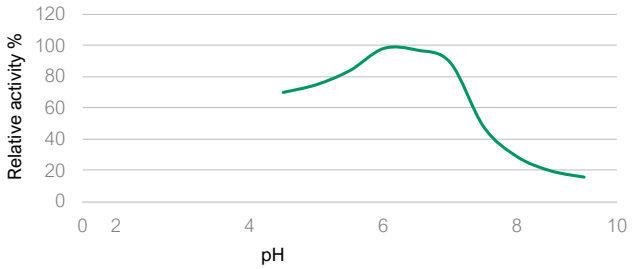
Shelf Life

Liquimax maintains the declared activity for 12 months (e.g., shelf life – 12 months) if stored below 25°C. At higher temperature the shelf life will decrease and may lead to high doses requirements.

Liquimax Temperature Profile



Liquimax pH Profile



Storage

This enzyme has been formulated for optimal stability. The recommended storage condition is 0-25°C. Container should be dry, sealed and kept away from sunlight.

Safety and Handling procedure

Enzymes may cause allergic reactions; Inhalation of dust and aerosol should be avoided. Spilled enzyme should be cleaned with plenty of water immediately. Please read our safety manual for complete details.

Saccharimax

High Conversion Glucoamylase

In the production of alcohol and spirits from grain, the saccharification enzymes degrade gelatinized starch and dextrins into fermentable sugars. These sugars are then converted or fermented by the yeast cells into alcohol.

Saccharimax is high conversion glucoamylase derived from a selected strain of Aspergillus niger, consists exo-1, 4-alpha-D-glucosidases (glucoamylases) and is refined through a proprietary downstream processing technique. Widely used in alcohol, brewing, MSG, glucose and antibiotic industries.

Properties

Appearance	:	Liquid with low subsidence
Colour	:	Brown
Odour	:	Normal fermentation odour
pH Range	:	4 to 5
Temperature Range:		30-75°C
Dosage Range	:	0.50 to 0.60 Kg per ton of starch
Recommended dose:		0.8-1 kg per ton of substrate

Application

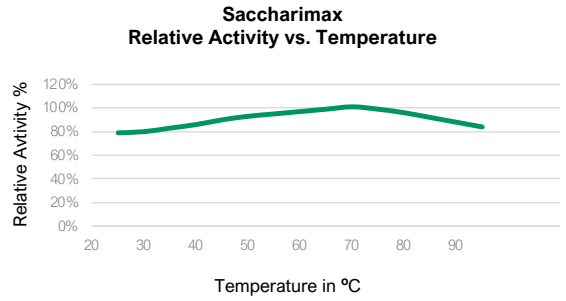
Saccharimax can be used in pre-saccharification or in the simultaneous saccharification and fermentation process (SSF) at a dosage of 0.40 - 0.60 kg / MT of starch based on the substrate used.

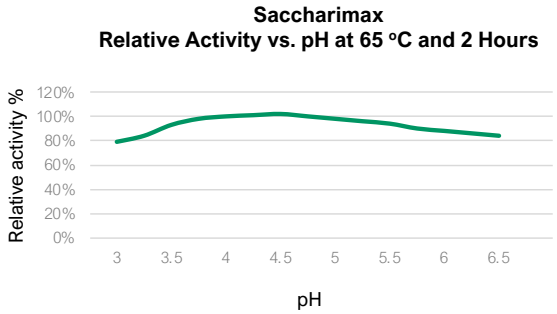
Uses

For optimum results, add Saccharimax just after liquefaction to the pre-tank or saccharification tank when the temperature has cooled to 65 °C.

Performance

The temperature and heat-stability performance of saccharimax is shown in the following:





Packing

Saccharimax is available in HDPE drums of 25 Kgs.

Storage

Ideal storage conditions are 0-25°C (32-77 °F) in sealed packaging in a dry environment protected from the sun. The products have been manufactured for optimum stability.

Benefits

Works over broader pH and temperature range

Efficient degradation of dextrins

Reduced risk of infection because of working at lower temperatures

Lower treatment costs and dosages

High concentration delivers savings in logistics

Faster fermentation time

Lower by product formation

Enhanced alcohol recovery

Lower solids in thin stillage

Gralco Plus

Grain alcohol enhancer

Gralco+ has been developed by research team of Varuna Biocell Pvt Ltd, a DSIR recognized R&D laboratory for improvement of alcohol yield using grain fermentation process. Gralco+ has been designed using blend of selected enzymes and suitable supporting ingredients to improve alcohol yield in the conventional process of grain fermentation.

Gralco+ is a thoroughly researched specialized enzyme-based product which improves the overall sugar profile of liquefied and saccharified grains which in turn brings better alcohol yield.

Gralco+ has been developed using various grain samples normally being used like Rice, Maize, Millet etc. Gralco+ .

Operational Parameters

Gralco+ is recommended to be used along with saccharification enzyme in PSF and directly in fermenter or SSF as per recommended dosing pattern for efficient outcomes.

Doses

Gralco+ dosage can be adjusted between 10-12 grams per ton of starch, depending on the type of grain used. We recommend taking dose precautions so that enzyme is mixed properly. It is always recommended to do a trial at laboratory scale on the grain to be used before using Gralco+ at commercial scale.

Product description

Gralco+ has been specially developed in a stable buffered off white powder form. It provides ease in storage and handling.

Storage

Gralco+ should be stored in a cool and dry place in well-sealed condition. The packs should be kept closed when not in use. Exposure to high humidity and temperature will cause faster decay of activity. If properly stored Gralco+ maintains its activity for a minimum of 12 months.

Handling

Gralco+ is formulated in a way that gives the highest degree of safety during handling. The product is non-flammable, completely dispersible in water and safe when used according to direction. Use normal handling precautions against direct contact. In case of accidental spillage or contact with skin or eyes, rinse with plenty of water.

Safety

Contact or Inhalation of enzymes in any form may cause allergic reactions and should be avoided. In case of contact with the skin or eyes, promptly rinse with water for at least 15 minutes. Please refer to the Material Safety Data Sheet (available on request) for all safety instructions.

Benefits

Helps improve conversion of grain to sugar where α-amylase and gluco-amylase are used for liquefaction and saccharification of grains

Controls contamination through lysing activity which eats the microbes responsible for contamination

Controls undesirable contamination, which results in inhibition of the growth and propagation of bacterial cells to arrest VFA level

Improved convertible sugar gets converted to higher alcohol recoveries from the same grain.

Helps to increase healthy viable cell (yeast)count

Improves Alcohol recovery from grain used

Helps to liberate FAAN content, which improves nutritional value to yeast leading to faster yeast growth

Fermol NTG

Yeast nutrients for grain

Fermol NTG is a proprietary blend of yeast nutrients complex that promote and sustain yeast cell propagation and viability in fermentation process thus promoting an active and efficient ethanol fermentation.

The addition of Fermol NTG results in reduction of retention time of fermentation and hence increases the process efficiency.

Properties

- Fermol NTG is active at a wide range of temperature and pH normally prevalent in the fermentation process.
- Works well at pH range 3.5 to 6 and temperature 30-40°C. However, a pH of 3.5-4.5 is optimal for fermentation.

Application

- Fermol NTG is a light brown coloured free flowing powder having a characteristic smell.
- Fermol NTG is intended for use in ethanol production.
- In a batch process it is recommended to use in the propagation tank. Dose during the beginning of the tank fill to ensure distribution throughout the wash.
- In a continuous process, it is recommended to dose in the first fermenting train vessel that the yeast propagation is intended.

Doses

10-15 PPM

Packing

Available in 25 kg HDPE drums.

Storage

Below 30°C Minimum shelf life is 12 months. Store in a cool dry place.

Handling

Fermol NTG is formulated in a way that gives the highest degree of safety during handling. The product is non-flammable, and safe when used according to direction. Use normal handling precautions against direct contact. In case of accidental spillage or contact to skin or eyes, rinse with plenty of water.

Safety

Contact or Inhalation of biological products in any form may cause allergic reactions and should be avoided. In case of contact with the skin or eyes, promptly rinse with water for at least 15 minutes. Please refer Material Safety Data Sheet (available on request) for all safety instructions.

Benefits

Increases cell count

Promotes yeast cell propagation and viability

Aids in the increasing cell mass during propagation

Promotes consistent fermentation and yields

Reduces overall process cost

Replaces Urea and DAP

Xylacid 2G

Value added Xylanase Enzyme for Xylan hydrolysis and mash viscosity reduction

Xylacid 2G is a Xylan hydrolysing enzyme produced from a selected strain of Aspergillusl species and falls in the category of endo 1,4-Beta Xylanase, which are the most important enzyme for the hydrolysis of Xylan polymers in Cereal Grains and Lignocellulosic Biomass. Xylans are polysaccharides composed of β-1, 4- linked Xylopyranose units. They are one of the major constituents of plant cell walls and account for more than 30 % of the dry weight of terrestrial plants. The enzyme breaks Xylan to short chain xylo-oligosaccharides of varying lengths.

Properties

Appearance	:	Liquid
Colour	:	Brown to light brown
Operative pH range	:	4.5 - 8
Operative Temperature range:		40°C - 70°C
Solubility	:	Soluble in water

Application

Xylacid 2G increases the accessibility of cellulose to cellulases by removing hemicellulose barriers. It eenhances cellulose degradation, leading to better glucose yields for fermentation Many microbes (e.g., engineered yeast, bacteria) can ferment both pentose (C5) and hexose (C6) sugars, improving ethanol yield.

Xylacid 2G helps release more xylose, enabling better fermentation strategies. Hemicellulose breakdown reduces the viscosity of biomass slurries, improving mixing and downstream processing. It eenhances filtration efficiency and reduces energy consumption.

Xylacid 2G application enables the use of agro-industrial residues (corn stover, wheat straw, sugarcane bagasse) as feedstocks. Its application ccontributes to second-generation (2G) bioethanol, reducing reliance on food-based ethanol sources.

Doses

The optimal usage level of the enzyme in viscosity reduction depends on processing parameters such as type of Raw material, Processing time, pH, Temperature and the quality composition.

A typical dosage rate for viscosity reduction during liquefaction of starch is 0.5 - 0.1 % w/w of the material and degrading Xylan in lignocellulosic biomass is 0.5 – 1.0 % w/w of the material.

Packing

It is available in 50 KG HDPE Drums.

Storage

Cool & dry conditions are recommended. Extended storage or adverse conditions may lead to higher dosage requirement.

Handling

It can be stored in closed container up to is12 months at 25°C.

Safety

Enzyme preparation belongs to protein, which may induce sensitization and or cause allergic reactions in sensitive individuals. Prolonged contact may cause minor irritation for skin, eyes or mucous membrane of nose, so any direct contact with the human body should be avoided. If irritation or allergic response for skin or eyes develops, consult a doctor. MSDS is available on request.

Benefits

Concentrated
Xylanase complex

Helps
in viscosity reduction

Reduces
the need for harsh chemical pre-treatments (acid/alkali), lowering cost and environmental impact

Helps
in better water retention at lower doses

Eco-friendly
& Biodegradable

VCell 2G

Cellulase complex for biodegradation of lignocellulosic waste

VCell 2G is a Cellulase complex enzyme derived from a selected strain of Trichoderma spp. It has been developed to breakdown the Cellulose, Xylan, Arabinan and other Hemicellulolytic components in Lignocellulosic materials. VCell 2G is a robust cellulase complex for efficient biomass hydrolysis:

- Endocellulases (EG) – Randomly cleave internal β-1,4-glycosidic bonds in cellulose.
- ExoCellulases (CBH, Cellobiohydrolases) – Release cellobiose from cellulose ends.
- β-glucosidase (BGL) – Converts cellobiose into glucose, reducing product inhibition.
- Xylanases & Accessory Enzymes (e.g., arabinofuranosidase, β-xylosidase) – Help break down hemicellulose, improving overall hydrolysis efficiency.

There are two main types of exo-cellulases (or cellobiohydrolases-CBH), one type working from the reducing end, and other type working from the non-reducing end of cellulose chain. Cellobiase or beta-glucosidase hydrolyses the ExoCellulases product into monosaccharides, suitable for fermentation. The Xylanase side activity enables the degradation of Xylan which one of the major constituents of plant cell walls in the Lignin structure, thus enhancing the Cellulase performance.

Properties

Appearance	:	Liquid
Colour	:	Brown
Operative pH range	:	4.5 - 6.5
Operative Temperature range:		40°C - 70°C
Solubility	:	Soluble in water

Application

VCell 2G enzymes have been evaluated for their efficiency in hydrolysing various pretreated biomass substrates. Studies have demonstrated that these enzymes can effectively convert lignocellulosic materials into fermentable sugars, which are essential for bioethanol production.

Doses

The optimal usage level of the enzyme in Cellulose bioconversion process depends on processing parameters such as type of Raw material, Processing time, pH, Temperature and the quality composition. A typical VCell 2G dosage rate starts at 0.5 % w/w.

Packing

It is available in 50 KG HDPE Drums.

Storage

Cool & dry conditions are recommended. Extended storage or adverse conditions may lead to higher dosage requirement.

Handling

It can be stored in closed container up to 12 months at 25°C.

Safety

Enzyme preparation belongs to protein, which may induce sensitization and or cause allergic reactions in sensitive individuals. Prolonged contact may cause minor irritation for skin, eyes or mucous membrane of nose, so any direct contact with the human body should be avoided. If irritation or allergic response for skin or eyes develops, consult a doctor. MSDS is available on request.

Benefits

Flexible
range of feedstock compatibility

Eco-friendly
& Biodegradable

Designed
to degrade complex plant materials, making them suitable for second-generation (2G) bioethanol production

Process
flexibility and robust performance

Lipsol 90L (Fungal Lipase)

Fungal Lipase for Biodiesel applications

Lipase is an enzyme of considerable commercial and industrial importance. The major applications of lipase are in the fat and oleo-chemical, food and dairy, textile, detergent, cosmetics, tea processing, pulp and paper, and leather industries.

Lipsol 90L (fungal lipase) is a food grade lipase produced from Non-GMO fungal specie Candida cylindracea which finds application in hydrolysis of oils, food processing and feed supplementation.

Properties

Lipsol 90L	:	Brownish clear liquid
Optimum pH	:	7.0 Optimal
Temperature	:	37°C
Activity	:	900 FIP u/gm

Storage

Lipsol 90L should be stored in a cool and dry place. The packs should be kept closed when not in use. If stored below 25°C claimed activity shall be maintained for 12 months from the date of manufacture.

Handling

Lipsol 90L is formulated in a way that gives the highest degree of safety during handling. The product is non-flammable, and safe when used according to direction. Use normal handling precautions against direct contact. In case of accidental spillage or contact to skin or eyes, rinse with plenty of water.

Safety

MSDS sheet is available on request.

β-Glucanase Enzyme

Industrial grade. Efficient Hydrolysis of β-Glucans for enhanced industrial bioethanol production

β-Glucanases are a class of enzymes that hydrolyze β-1,3 and β-1,4 linkages in β-glucans—polysaccharides found in cereals, fungi, and cell walls of yeast and plants. These enzymes are essential in various industries for improving viscosity control, nutrient availability, and processing efficiency.

Applications

- Degradation of cereal β-glucans in pretreated biomass
- Improvement of saccharification and fermentation processes

Properties

Form	:	Liquid / Powder
Activity	:	≥8,000 BgU/g (customizable based on application)
Source	:	Aspergillus spp.
Optimal pH Range	:	4.5 – 6.5
Optimal Temperature	:	45°C – 60°C
Stability	:	Stable in feed, brewing, and pulp process conditions
Compatibility	:	Compatible with cellulase, xylanase, amylase

Packing

Available in 50 Kg drums.

Storage

- Store in a cool, dry place below 25°C
- Shelf Life: 12 months (in sealed condition)

Benefits

Increased fermentable sugar yield

Reduced mash viscosity for easier handling

Enhanced ethanol yield and process efficiency

Compatibility with cellulase and hemicellulase cocktails

Lipase Enzyme

Industrial grade. Targeted Lipid Hydrolysis for biodiesel applications

Lipases are hydrolytic enzymes that catalyze the breakdown of triglycerides into glycerol and free fatty acids. These enzymes exhibit broad substrate specificity and operate effectively at oil–water interfaces, making them valuable in industries that deal with fats and oils. Lipases also support esterification and transesterification reactions, expanding their utility into biosynthesis and green chemistry.

Applications

- Enzymatic transesterification of vegetable oils and animal fats
- Glycerol separation and biodiesel purification

Properties

Form	:	Liquid / Powder
Activity	:	≥900000 FIT /g (customizable based on application)
Source	:	Candida.sp.
Optimal pH Range	:	6.0 – 8.5
Optimal Temperature	:	35°C – 55°C
Stability	:	Stable under detergent, biodiesel & food processing conditions
Compatibility	:	Compatible with protease, amylase, cellulase

Packing

Available in 50 Kg drums / 25 Kg bags.

Storage

- Store in a cool, dry place below 25°C
- Shelf Life: 12 months (in sealed condition)

Benefits

Mild, eco-friendly process without chemical catalysts

High purity biodiesel and reduced wastewater generation

Lower energy consumption and minimal by-product formation

Reusable catalyst in immobilized lipase systems

Mannanase

Industrial grade. Eco-efficient Mannan breakdown for industrial excellence.

Mannanase is a hydrolytic enzyme that specifically breaks down mannans, a group of complex polysaccharides found abundantly in plant cell walls, especially in legumes, palm kernel, guar gum, and copra meal. Classified primarily as endo-β-1,4-mannanase, it cleaves the internal β-1,4-mannosidic linkages in the backbone of mannans, glucomannans, and galactomannans.

This enzyme plays a vital role in various industries by improving process efficiency, enhancing nutrient availability, and reducing anti-nutritional factors in feed and food matrices. Its use contributes to clean-label, sustainable processing solutions.

Application

Aids in the enzymatic hydrolysis of lignocellulosic biomass by breaking down mannans.

Properties

Appearance	:	Light brown liquid / off-white powder
Enzyme Activity	:	25000 U/g (customizable)
pH Range	:	4.5 – 7.5 (optimum ~6.0)
Temperature Range	:	30°C – 60°C (optimum ~50°C)
Solubility	:	Completely soluble in water (liquid)
Shelf Life	:	12 months at 25°C (sealed, dry state)

Packing

50 kg HDPE drum

Storage

- Store in a cool, dry place away from direct sunlight.
- Keep container tightly closed when not in use.
- Use personal protective equipment (PPE) during handling.

Regulatory & Quality

- Non-GMO production strain
- Compliant with ISO 9001, FSSAI, and GMP standards
- Halal and Kosher certification available (on request)
- Safety Data Sheet (SDS) available upon request

Benefits

Increases
sugar yield for fermentation

Supports
pre-treatment and saccharification of agricultural residues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