

Transforming industries through enzymatic innovation



For Molasses Ethanol Industry

Fermol BD plus

Fermol NT

Molplus Prime & Additive

Sweetenol

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Fermol BD Plus

Fermentation Optimizer for Contaminated Molasses

An important concern with conventional fermentation systems is the difficulty in preventing microbial contamination, especially bacterial infection. Unfortunately, the optimum atmosphere for fermentation is also extremely conducive to bacterial growth. Bacteria can convert sugar (glucose) to organic acids, such as acetic acid and lactic acid, rather than ethanol. Furthermore, bacteria grow rapidly in the nutrient rich environment of a fermentation system, and may consume sugar (glucose) faster than does yeast.

Furthermore, organic acids produced by the bacteria inhibit performance and growth of yeast. Thus, bacterial infection results in decreased yield of ethanol, and the fermentation process becomes less economical.

R&D Team of Varuna has developed a special enzyme blend Fermol BD Plus for efficient management of bacterial contamination. It is a protease based formulation which inhibits growth of filamentous bacteria by opening a sheath that surrounds the filamentous bacteria. Fermol BD Plus has been fortified with two selected broad spectrum anti-bacterial to control contamination during fermentation process.

Properties

pH (1% Solution) :	5.0 to 7.0
Bulk Density :	0.45 to 0.65 gm/ml
Appearance :	Off White Powder

Doses

3-6 ppm of the total fermentable wort (diluted molasses). Divided dosing is to be done at pre fermenter as well as fermenter stage for getting best results.

Packaging

Available in 1 Kg foil pack, further packed in 25 Kg HDPE drums.

Storage

Fermol BD Plus should be kept in cool & dry location. Fermol BD Plus maintains its activity up to 12 months if stored below 25°C in dry location.

Handling

Fermol BD Plus 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 precaution to prevent direct contact with skin or eyes. In case of accidental spillage or contact to skin or eyes, rinse with plenty of water.

Safety

MSDS sheet is available on request.

Benefits

Reduced

dosing of antibacterial thus lowering the antibacterial load in wash

Does not

affect yeast cells

Non-toxic

and is environment friendly

Works

at wide range of pH and temperature

Stable

throughout the fermentation cycle

No toxicity

to workers or environment

Fermol NT

Yeast Nutrients for Molasses

Fermol NT 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 NT results in reduction of retention time of fermentation and hence increases the process efficiency.

Application

- Fermol NT is a light brown coloured free flowing powder having a characteristic smell.
- Fermol NT 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.

Operational Parameters

- Fermol NT 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.

Doses

10-15 ppm

Packaging

Available in 25 kg HDPE drums.

Storage

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

Handling

Fermol NT 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 with 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

Promotes
consistent
fermentation and
yields

Increases
cell count

Promotes
yeast cell
propagation and
viability

Reduces
overall process cost

Aids
in the increasing
cell mass during
propagation

Molplus Prime & Additive

Molasses Optimizer

Molplus Prime is a research product developed after years of research on molasses and changes during storage. Molplus has been formulated with a complex of enzymes of high specificity and functional proteins which improves total reducible sugar and provides better storage stability.

Molplus Prime is a thoroughly researched enzyme based formulation which improves overall sugar profile required to improve fermentation efficiencies and it also has supporting ingredients to control the formulation of undesirable acids. Molplus Prime has been developed based on aggregate samples of typical Indian molasses.

Properties

Molplus Prime remains active at temperature and pH normally prevalent during molasses storage and early stage of fermentation.

pH Range	:	5.00-6.00 (works best at pH 5)
Temperature	:	30°C-50°C (works best at 45°C)

Application

Molplus Prime is applied in Molasses storage tank till storage period. MOP is supplied in 2 parts i.e. MOP and MOP additive

MOP	:	Every 30 days
MOP additive	:	Every 15 days

Molplus Prime dosage can be adjusted between 5-8 gms/ mts of the molasses depending on kind of molasses, storage condition and parameters like temperature, pH and time which play a vital role in dose adjustment. MOP additive is used @20ppm in storage tank and circulate to mix properly using circulation pump. It is always recommended to do a trial at laboratory scale before

using Molplus Prime at commercial scale.

Molplus Prime is recommended to be dosed after dispersing with sufficient water along with Molasses in storage tanks. Intermittent circulation or stirring is required for its performance.

Packing

Molplus Prime is available in a properly formulated powder form and is packed in 1 Kg Alu. Sachets in HDPE drums. MOP additive is available in liquid form in 50 HDPE kg drums.

Storage

Molplus Prime should be stored in a cool and dry place in a 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 Molplus maintains its activity for a minimum of 12 months.

Handling

Molplus Prime 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 to 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 Material Safety Data Sheet (available on request) for all safety instructions.

Benefits

Reduces
viscosity

Conversion
of unfermentable sugars into fermentable sugars by breaking the various bonds binding the molecules and creating complex structures.

Reduces
scaling

Hydrolysing
various polysaccharides present to simpler molecules which are subsequently converted into sugars for fermentation.

Increases
Molasses self-life

Improves
TRS of stored Molasses significantly during storage period. It starts showing results within 48 hours of storage.

Sweetenol

Distillery performance Optimizer

Sweetenol is a blend of various specialty enzymes designed for its application in the continuous fermentation process of cane juice to increase fermentation efficiency by controlling the microbial load and ensuring additions fermentable sugars.

The specialty formulation provides more out of raw materials, cut costs, and boost competitive edge. This formulation helps in optimizing each step of fermentation process for increased operation efficiency.

Sweetenol delivers improved alcohol yields, production capacity and output and improves the quality of product.

The enzyme blend for process enhancement provides more yeast assimilable nitrogen (YAN). It also increases fermentable sugars, that leads to improved yeast nutrition, higher yields and faster fermentation. With Sweetenol, fermentation and distilling processes are smoother and more energy efficient.

Properties

Sweetenol has been specially developed in a stable buffered powder form. It provides ease in storage and handling.

Doses

- 5-7 PPM depending on kind of cane juice quality and fermentation conditions for optimizing the best alcohol yield.

- Parameters like temperature, pH and time also play a role in dose adjustment. It is recommended to do a trial at laboratory scale before using at commercial scale.

Storage

- Sweetenol should be stored in a cool dry and location.
- The packs should be used upon opening. Exposure to high humidity and temperature will cause faster decay of activity. If properly stored Sweetenol maintains its activity for minimum 12 months.

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.

Direction for uses

Open the pouch and add in to 5-6 times clean water. Mix to get uniform suspension, dose the content into fermenter.

Benefits

Conversion

of unfermentable sugars into fermentable sugars by breaking the various bonds binding the molecules and creating complex structures

Controlling

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

Hydrolyzing

various polysaccharides present to simpler molecules

Reduces

viscosity of the mash

Improves

alcohol recoveries

Improves

yeast growth

Improves

plant efficiencies by reducing fouling

Amino Nitrogen

sufficient to support accelerated rates of ethanol fermentation

Syptreat Plus

An efficient technology for Reduce, Recycle and Reuse (3R's) for Syrup

Syptreat Plus is a specially formulated cocktail of enzyme and enzymatic salts used for recycling of condensate water in fermentation of syrup/juice to alcohol.

The scarcity of freshwater resources, concerns about the increasing regulatory controls make a necessity for recycling & reuse of wastewater in distilleries. Further, to be economical, reduce environmental impact & most importantly to meet legislation for effluent; Zero Liquid Discharge (ZLD) is the remedy.

Properties

Syptreat Plus remains active at wide range of temperature and pH normally prevalent in the fermentation process.

pH	:	4.0 - 7.0
Temperature	:	30 - 55°C

Application

Syptreat Plus is a product for maximizing the benefit of ZLD & waste water stream recycle. It can be applied directly into the tank which stores the waste streams or in the fermenter immediately during filling.

Doses

10 ppm in the fermenter during waste stream filling (Divided Dose

50% at the beginning and 50% after 6-7 Hrs)

Packaging

Available in 25x1 kg packing in 50 kg HDPE FOT drum.

Storage

Below 30°C Minimum shelf life is 12 months. Store in cool place away from sun light.

Handling

Syptreat Plus is formulated in a way that gives the highest degree of safety during handling. The product is non-flammable, completely soluble in water 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 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 Material Safety Data Sheet (available on request) for all safety instructions.

Benefits

Non-toxic
and is environment friendly

Protects
valuable ferment-able sugar content, thus prevent losses in yield/MT of feed stock.

Used
as a source of renewable energy

Introduces
proven technology for reduce, recycle and reuse (3R'S) in different streams which is most critical in distillery.

Supports
fermentation process while recycling process condensate and hence reduces fresh water consumption.

Helps
in Zero liquid discharge

Controls
contaminants, thus controls VA concentration and increases alcohol yield.

Prevents
formation of undesirable by-products in fermentation, resulting in better yield.

Fermtreat Plus

An efficient technology for Reduce, Recycle and Reuse (3R's) for Molasses & Grain distillery

Fermtreat Plus is a specially formulated cocktail of enzyme and enzymatic salts used for recycling of condensate water in molasses and grain-based distillery.

The scarcity of freshwater resources, concerns about the increasing regulatory controls make a necessity for recycling & reuse of wastewater in distilleries. Further, to be economical, reduce environmental impact & most importantly to meet legislation for effluent; Zero Liquid Discharge (ZLD) is the remedy.

Application

Fermtreat Plus is a product for maximizing the benefit of ZLD & waste water stream recycle. It can be applied directly into the tank which stores the waste streams or in the fermenter immediately during filling.

Properties

Fermtreat Plus remains active at wide range of temperature and pH normally prevalent in the fermentation process.

pH	:	4.0 - 7.0
Temperature	:	30 - 55°C

Doses

Either add 15-25 ppm directly into water storage tank or 5-10

ppm in the fermenter during waste stream filling.

Packing

Available in 25x1 kg packing in 50 kg HDPE FOT drum.

Storage

Below 30°C Minimum shelf life is 12 months. Store in cool place away from sunlight.

Handling

Fermtreat Plus is formulated in a way that gives the highest degree of safety during handling. The product is non-flammable, completely soluble 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 Material Safety Data Sheet (available on request) for all safety instructions.

Benefits

Non-toxic
and is environment friendly

Protects
valuable ferment-able sugar content, thus prevent losses in yield/MT of feed stock.

Used
as a source of renewable energy

Introduces
proven technology for reduce, recycle and reuse (3R'S) in different streams which is most critical in distillery.

Supports
fermentation process while recycling process condensate and hence reduces fresh water consumption.

Helps
in Zero liquid discharge

Controls
contaminants, thus controls VA concentration and increases alcohol yield.

Prevents
formation of undesirable by-products in fermentation, resulting in better yield.

Fermol Nutrazyme

Blend for Urea, DAP & Other Nutrients Replacement

Fermol Nutrazyme is a cocktail of distillery enzyme which provides micro and macro nutrients to the yeast by autolysis and break down of the old biomass and existing complex sources in the raw material.

Fermol Nutrazyme promotes and sustains yeast cell propagation and viability, thus promoting an active and efficient ethanol fermentation.

On a dry weight basis, about 10% of yeast weight consists of nitrogen. All the nitrogen used in building cellular material during fermentation is taken up from the mash. The growing yeasts produce ethanol 33 times faster than stationary phase yeasts. Nutrition is important during growth for maintaining a good start during the log phase and later.

Properties

Fermol Nutrazyme is a light brown coloured free flowing powder having characteristic smell. Fermol Nutrazyme remains active at wide range of temperature and pH normally prevalent in the fermentation process. It is best active at:

pH	:	4.0 - 7.0
Temperature	:	30 - 55°C

Doses

10 to 15 ppm

Packaging

Available in 50 kg HDPE drums.

Storage

Minimum shelf life is 12 months if stored below 30°C in dry condition.

Handling

Fermol Nutrazyme is formulated in a way that gives the highest degree of safety during handling. The product is non-flammable, completely soluble 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 Material Safety Data Sheet (available on request) for all safety instructions.

Benefits

Promotes

yeast cell propagation and viability

Low

treatment cost and dosages

Total

replacement of Urea, DAP and Magnesium sulphate

Aids

in the increasing cell mass during propagation

Promotes

consistent fermentation and yields

Complete

environmental package with supplementation of macro and micronutrients

Easily

degrade complex materials

Aids

yeast competitively excluding contaminating bacteria

Protidex

Enzymatic Biocide for Distillery

An important concern with conventional fermentation systems is the difficulty in preventing microbial contamination, especially bacterial infection. Unfortunately, the optimum atmosphere for fermentation is also extremely conducive to bacterial growth.

Bacteria can convert sugar (glucose) to organic acids, such as acetic acid and lactic acid, rather than ethanol. Furthermore, bacteria grow rapidly in the nutrient rich environment of a fermentation system and may consume sugar (glucose) faster than does yeast. Furthermore, organic acids produced by the bacteria inhibit performance and growth of yeast. Thus, bacterial infection results in decreased yield of ethanol and the fermentation process becomes less economical.

Any feed to a fermentation system, such as water, mash, enzymes and yeast as well as the fermenting vessel itself (if not disinfected between batches) can be a source of bacteria. High levels of contamination not only impact the yeast growth, but also have an impact on the recovery of the ethanol from molasses.

R&D Team of Varuna has developed a special enzyme blend Protidex for efficient management of bacterial contamination. It is a protease-based formulation which inhibits growth of filamentous bacteria by opening a sheath that surrounds the filamentous bacteria.

Properties

- Form Buffered Liquid
- Colour Off white to light brown colour
- Odour Characteristic
- Solubility Highly soluble in water

Doses

5-7 PPM is required to be added directly into the pre-fermenter stage or at the fermentor (depending upon the condition).

Storage

Protidex should be stored in a cool dry location. The container should be kept closed when not in use. It maintains the declared activity for 12 months if stored below 25°C. At higher temperature the shelf life will decrease and may lead to high dose requirement.

Availability

Protidex is available in 50 Lits HDPE containers.

Safety

MSDS sheet is available on request.

Benefits

Reduced
dosing of antibacterial
thus lowering the
antibacterial load in wash

Does not
effects yeast cells

Non-toxic
and is environment
friendly

Works
at wide range of pH
and temperature

Stable
throughout the
fermentation cycle

No toxicity
to workers or environment





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