

Transforming industries through enzymatic innovation



For Detergent Industry

Ozolite 4E

Ozolite-P

Ozolite-L

Ozolite-A

Oxigent

Acticlean

Cellulase Enzyme

Lipase Enzyme

Ozolite 4E

Enzyme composite for detergents

Enzymes used in detergents are protein catalysts that consist of long chains of amino acids. As catalysts; enzymes speed up specific chemical reactions, in mild conditions of temperature and pH, without being altered or consumed in the process. Consequently, small quantities of enzyme can repeatedly catalyze the break down of millions of molecules in minutes.

Use of enzymes in household laundry detergents is environment friendly since enzymes are non-toxic, 100% biodegradable and helps reduce clothes washing energy consumption.

Enzymes provide the superior cleaning performance needed to attack stains. Generally, the earliest enzymes to be added to laundry detergents were proteases. However, in today's dynamic marketplace, the most successful detergent brands combine proteases with amylases, lipases and cellulases to deliver outstanding cleaning performance.

Each of these enzymes is able to attack a specific type of stain or soil. Accordingly, the inclusion of multiple enzymes in a detergent allows the product to tackle a much broader profile of soil types. What's more, multiple enzymes can work in concert to remove tough stains or soils made up of a variety of substances. For example, a food stain might typically contain protein, lipid (fat) and starch, necessitating the combined actions of protease, lipase and amylase for its complete elimination.

More types of enzymes simply mean a cleaner wash and whiter whites, both long-standing key consumer demands.

Ozolite4E

R&D team of Team Varuna has developed a blend of enzymes stable at alkaline pH with the objective based on aforesaid background information.

Ozolite4E is a special blend of 4 enzymes suitably designed for detergent application in Indian subcontinent.

It contains alkaline protease, α -amylase, alkaline lipase and cellulase. This combination of enzymes help Ozolite4E to provide superior performance to detergent blend in tackling wider range of common stains like food-protein, carbohydrate, fat, milk, egg, soya, blood, grass and body fluids, starch containing stains such as baby food, mashed potatoes, gravy, chocolate, tomato sauce and other starch thickened foods, fatty food stains, cosmetics and sebum lipstick, salad oil, animal fat and butter.

Cellulase in the blend effectively removes cotton cellulose micro fibrils on wear and wash-damaged cotton garments. Repeated washing with Ozolite4E containing detergent formulation improves soil removal, brightens fabric color, softens and restores original garment appearance.

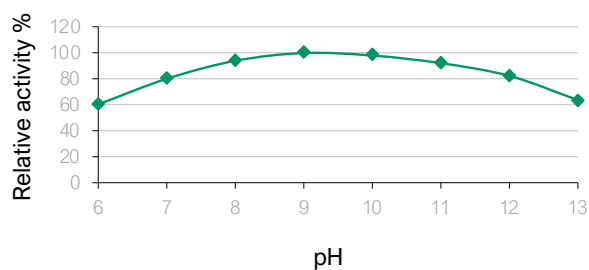
Appearance

Free flowing, dispersible, low dust granules. The enzymes maintain their respective activities at wide range of temperature and pH normally encountered during washing.

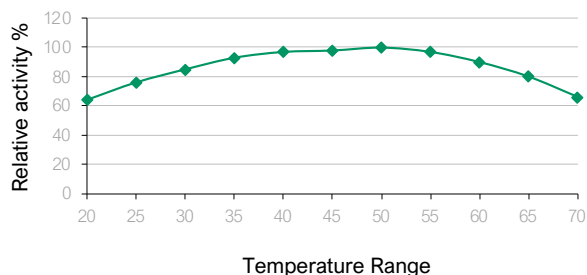
Operating conditions

Ozolite-4E can be used at different temperatures and pH. Its activity profile at wide range of temperature and pH range is given at the right:

Ozolite 4E pH Profile on Typical Mixed Substrate



Ozolite 4E Temperature Profile on Typical Mixed Substrate



Ozolite 4E

Enzyme composite for detergents

Application

Ozolite4E has been designed for use in cleaning applications and compatible with all commonly used detergent components such as nonionic and most an ionic surfactants, builders, anti-redeposition agents, optical brighteners and oxygen-releasing bleaching agents.

Ozolite4E is suitable for detergent formulation in powder or granular form.

Doses

Ozolite4E is recommended for use in detergent formulation @ 0.5 to 1% for best results. Dosage can be adjusted depending on overall detergent formulation.

Specifications

Ozolite4E has been made using non-GMO and GRASS certified microorganisms.

Storage

Ozolite4E should be stored in sealed containers under cool, dry conditions. It should be used within 12 months of the date of manufacture beyond which loss of activity starts which may accelerate in the case of improper storage.

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.



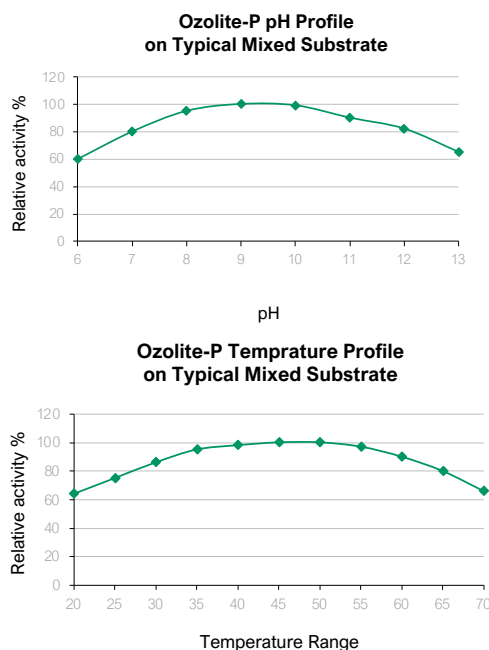
Ozolite-P

Alkaline protease

Ozolite-P is an Alkaline Protease used in detergent formulations to remove protein-based stains e.g.; grass, blood, mucous, faecal material and various foods such as egg & gravy. The enzyme hydrolyses insoluble protein stains into soluble peptides and amino acids, which then can be removed easily from fabric.

Properties

Figure 1 & 2 illustrate the activity of Ozolite-P at various temperatures and pH values respectively. Enzyme is active throughout the pH range of interest for most detergent application. Ozolite-P is available in the form of non-dusting dispersible granules for quick release of active enzymes in the wash solution.



Doses

The recommended dose of Ozolite-P varies from 0.5% to 1% w/w of the detergent formulation depending on the economy and performance requirements of the customer.

Packing

The product is available in 50 Kg HDPE drums. Customized packing can also be done on request.

Storage

The enzyme granules provide excellent storage stability. The granular composition protects the protease from other chemicals in the detergent formulations and from external denaturing conditions. To retain maximum activity the product should be stored at < 25°C in the original containers with the lid closed.

Handling

Inhalation of enzyme containing dust or aerosols from granulated enzyme should be avoided. In case of accidental spillage or contact with skin or eyes, rinse thoroughly with plenty of water.

Safety

Enzyme is produced by non-toxicogenic and non-pathogenic eco-friendly strain of microorganism to ensure environmental safety. All our detergent-industry enzymes are technical-grade and produced using GRAS certified non-GMO microorganisms.

Benefits

Enhanced Stain Removal

Proteases break down protein-based stains like blood, sweat, food residues, and grass into smaller peptides and amino acids, making them easier to wash away.

Eco-Friendly

Reduced need for chemical surfactants and harsh cleaning agents. Their biodegradability minimizes the environmental impact.

Reduced Detergent Dosage

The high efficiency of proteases allows for reduced amounts of detergent needed for effective cleaning.

Improves

cleaning performance of detergents at lower temperatures and in a variety of water conditions (e.g., hard or soft water).

Fabric Care

Proteases are gentle on fabrics compared to harsh chemicals, helping to maintain the quality and longevity of garments.

Energy and Cost Savings

Detergents with proteases perform effectively at lower temperatures, reducing the energy required for heating water and lowering utility costs.

Synergistic Effects

Proteases work synergistically with other enzymes (e.g., amylases, lipases, cellulases) to target a wider range of stains, enhancing overall detergent efficacy.

Consumer Satisfaction

Better stain removal at low temperatures and eco-friendliness lead to improved user satisfaction.

Ozolute-L

Alkaline Lipase

Ozolute-L is an Alkaline Lipolytic enzyme produced by a modified variety of fungal strains. Ozolute-L hydrolyses triglycerides to mono- & Di glycerides, glycerols and free fatty acids which are easily removable from fabric.

Enzyme Properties

Figure 1 & 2 illustrate the activity of Ozolute-L at various temperatures and pH values respectively. Enzyme is active throughout the pH range of interest for most detergent

Ozolute-L is available in the form of non-dusting dispersible granules for quick release of active enzymes in the wash solution.

Safety

Ozolute-L is produced by non-toxicogenic and nonpathogenic eco- friendly strain of micro-organism to ensure environmental safety. Ozolute-L is technical-grade and produced using GRAS certified non-GMO microorganisms.

Storage

The enzyme granules provide excellent storage stability. The granular composition protects the lipase from other chemicals in the detergent formulations and from external denaturing conditions. To retain maximum activity the product should be stored at <25°C in the original containers with the lid closed.

Packing

The product is available in 50 Kg HDPE drums. Customized packing can also be done on request.

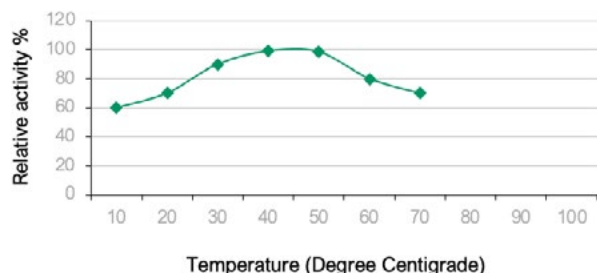
Doses

The recommended dose of Ozolute-L varies from 0.15% to 0.7% w/w of the detergent formulation depending on the economy and performance requirements of the customer.

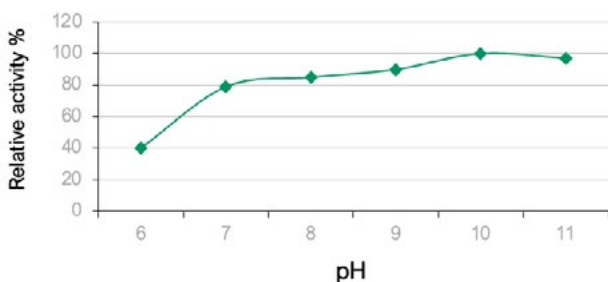
Handling

Inhalation of enzyme containing dust or aerosols from granulated enzyme should be avoided. In case of accidental spillage or contact with skin or eyes, rinse thoroughly with plenty of water.

Activity of Ozolute-L at different Temperatures



Activity of Ozolute-L at different pH



Benefits

Enhanced Stain Removal

Lipases break down lipid-based stains such as grease, oil, butter, and cosmetics. They target insoluble fats and convert them into smaller, water-soluble molecules, making them easier to remove during washing

Compatibility with Formulations

Lipases are compatible with various detergent formulations, including liquid, powder, and concentrated forms. They can be used in both laundry and dishwashing detergents

Eco-friendly

Lipases are biodegradable and reduce the need for harsh chemical surfactants, making detergents more environmentally friendly. Lower chemical usage helps reduce water pollution

Enhanced Cleaning

Lipases complement other detergent enzymes (like proteases and amylases), offering a broader spectrum of stain removal. They work effectively even on stubborn or aged stains

Gentle on fabrics

By targeting fats specifically, lipases minimize the degradation of non-lipid-based materials like fibers, enhancing the longevity of fabrics

Energy efficiency

Lipases are biodegradable and reduce the need for harsh chemical surfactants, making detergents more environmentally friendly. Lower chemical usage helps reduce water pollution

Cost effectiveness

Lipases allow for lower dosages of detergents due to their efficiency, reducing overall costs for manufacturers and consumers. They reduce the need for additional cleaning cycles, saving water and detergent

Improved consumer experience

Clothes washed with lipase-containing detergents are less likely to retain greasy residues, ensuring better cleaning results and fresher laundry

Ozolite-A

Alkaline amylase

Starch, a main component of our daily diet, is frequently found not only in food residues on dishes but also in food stains on clothes. Enzymatic hydrolysis of starch is catalyzed by α -amylase (1,4- α -D-glucan glucanohydrolase; EC 3.2.1.1), Ozolite-A is a liquefying alkaline α -amylase having the following enzymatic properties: Hydrolyses 1,4- α -glucosidic linkages in starches, amylose, amylopectin and partial degradation products thereof.

Applications in Specialized Products:

- Dishwashing Detergents: Helps in removing starchy residues from utensils.
- Laundry Detergents: Targets starch-heavy food stains.
- Industrial Cleaning: Useful in cleaning applications where starch-based residues are common, such as in food processing industries.

Properties

Ozolite A has an optimum pH for activity from 8.0 to 10.0 and a wide temperature range from 25°C to 75°C. Ozolite-A is substantially free from activity inhibition by surfactants selected from the group consisting of sodium linear alkyl benzene suffocates, sodium alkyl sulfate esters, sodium polyoxyethylene alkyl sulfate esters, sodium alkylsulfonates, soaps, and polyoxyethylene alkyl ethers.

Ozolite-A is available in the form of non-dusting dispersible granules for quick release of active enzymes in the wash solution.

Doses

The recommended dose of Ozolite-A varies from 0.15% to 1% w/w of the detergent formulation depending on the economy and performance requirements of the customer.

Packing

The product is available in 50 Kg HDPE drums. Customized packing can also be done on request.

Storage

The enzyme granules provide excellent storage stability. The granular composition protects the protease from other chemicals in the detergent formulations and from external denaturing conditions. To retain maximum activity the product should be stored at < 25°C in the original containers with the lid closed.

Enzyme Handling

Inhalation of enzyme containing dust or aerosols from granulated enzyme should be avoided. In case of accidental spillage or contact with skin or eyes, rinse thoroughly with plenty of water.

Safety

Enzyme is produced by non-toxicogenic and non-pathogenic eco-friendly strain of microorganism to ensure environmental safety. All our detergent-industry enzymes are technical-grade and produced using GRAS certified non-GMO microorganisms.

Benefits

Enhanced Removal

Alkaline amylase breaks down starch molecules into smaller, water-soluble sugars that can be easily removed during the washing process. This is particularly effective for stains from food items like rice, pasta, potatoes, and sauces

Fabric care

By efficiently removing starch-based residues, alkaline amylase reduces the likelihood of residue buildup, which can lead to fabric discoloration and stiffness over time

Reduced need for harsh chemicals

By efficiently targeting specific stains, alkaline amylase reduces the reliance on harsh chemicals like oxidizing agents or bleaches, making the detergent gentler on fabrics and skin

Improved cleaning

When combined with other enzymes like proteases and lipases, alkaline amylase contributes to a synergistic effect, enhancing the overall stain-removal efficiency of the detergent

Works at low temperatures

Alkaline amylases are stable and active in a wide pH range and can function effectively in cold or moderately warm water. This helps save energy by reducing the need for high-temperature washes

Environment friendly

Alkaline amylases are biodegradable, making detergents with enzymatic formulations more eco-friendly compared to those relying solely on synthetic chemicals

Cost effective

Alkaline amylase can reduce the quantity of detergent required by enhancing stain removal efficiency, which can lead to cost savings for both manufacturers and consumers

Oxigent

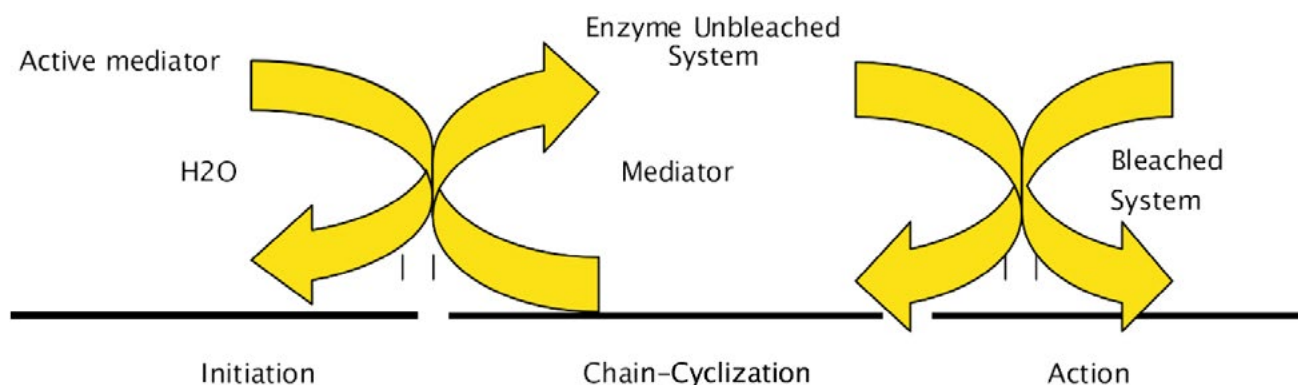
Bio-oxy bleach system for detergent

Oxigent is a bio-bleaching system which enzymatically catalyses the oxidation of a wide range of substrates such as aromatic alcohols, polycyclic aromatic hydrocarbons, anthracene, nonphenolic aromatic compounds and aromatic amines. These substrates cover almost all types of stains normally encountered in daily life.

Oxigent consists of a mediator and an array of enzymes produced by a modulated strain of Fungus. These enzymes belong to a group of Aryl Alcohol Oxidases & Peroxidases. AAO provides the H_2O_2 is necessary for peroxidase activity, through

a system based on aromatic aldehyde redox cycling. (Ref. 1 & 2)

Oxigent catalyses one electron oxidation, their by creating phenoxy radicals (for phenolic compounds) and cations (for non-phenolic compounds). (Ref. 3) These active moieties than undergo spontaneous rearrangements and degradation. Most of the resulting products are uncleaned ketones whose presence enhances bleaching because they are susceptible to cleavage by alkali (Detergent). (Ref. 4)



Properties

It is free flowing, white granules soluble in water. The pH of 1% solution is 7.5.

Activity

The activity of Oxigent is determined relative to an analytical standard under the following conditions:

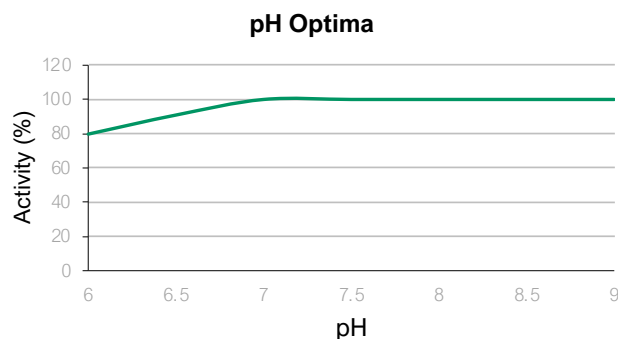
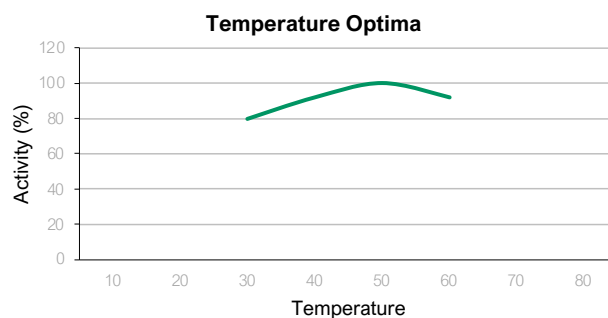
Substrate : ABTS [2,2' azinobis (3-ethylbenzathiazoline-6-sulphonic acid)]

pH : - 7.5

Temperature : - 50 C

A detailed description of this method is available on request.

Figure 1 & 2 illustrate the activity of Oxigent at various temperatures and pH values commonly found in laundry detergents.



Oxigent

Bio-oxy bleach system for detergent

Stability in Detergent Formulation

The granular composition of Oxigent protects it from other chemicals in the detergent formulation and from external denaturing conditions.

Oxigent at 3% concentration was incorporated in detergent formulation and was kept at 50°C & 60°C for 1hr, 2hrs and 3hrs respectively. One sample was kept as control at room temperature. To test the stability of Oxigent against temperature, its action was measured through decolorization of ink by it. Ink was diluted to give the standard O.D. of 0.450 at 550 nm. 10 ml of this solution was taken in different test tubes and 1 gram of the samples, drawn from all above were added in it. Then the solutions were filtered after 10 minutes and decrease in O.D. was recorded. The results are shown below:

Temperature	O.D after 1Hr	O.D after 1Hr	O.D after 3Hrs
50°C	0.028	0.020	0.013
60°C	0.020	0.013	0.010
Room Temp.	0.028	0.020	0.010

Oxigent at 30 mg was incorporated in 1 gm detergent formulation in final packed condition and was kept at 50°C & 60% RH for one month in a humidity chamber. The decrease in O.D. of the same was compared with control. The results are shown in the following table:

Conditions	O.D after 1Hr
50°C & 60% RH	0.026 (Control)
Room Temp. & Humidity	0.028 (Test)

Toxicology

Oxigent is produced by a non-toxicogenic and non-pathogenic eco-friendly strain of microorganism to ensure environmental safety. Non-toxic to animals, plant and human.

Doses

The recommended use of Oxigent is 0.3 to 1% of the detergent. Determination of the exact amount of enzyme required for laundry application should be based on wash condition, detergent formula, amount of detergent used per wash and the level of cleaning performance desired.

Packing

Oxigent is available in a packing of 10 X 1 Kg packed in canvas bag. Handling Precautions Oxigent is neither toxic by acute oral exposure nor by repeat exposure. It may cause slight irritation of the skin but not sensitization of the skin. Unnecessary contact with the product and inhalation of the dust should be avoided. In case of spillage or contact with the skin or eyes rinse thoroughly with water.

Storage

To retain maximum activity, the product should be stored in moderate temperature in dry and air-tight condition in original containers

Benefits

Better

long-term shelf stability than other available oxygen bleaches

Brightens

fabrics

Fabric friendly

Being a bio-bleach it is gentle in action

Oxigent

can be mixed or used with another household cleaner

Acts as a

disinfectant on both bacteria and viruses likely to be encountered in daily life

Environment friendly

as it is 100% biodegradable

Acticlean

Fortified Bio-surfactant

Choice of a surfactant system for many applications, from fabric detergency to tertiary oil recovery, is a critical step. In practice, mixtures of surfactants are used because a single surfactant rarely satisfies all requirements. Mixed- surfactant systems are also known to exhibit synergism, leading to enhanced performance properties.

Acticlean has been developed from diverse groups of surface-active molecules secreted extra-cellularly by microbial cells during their growth. These molecules are amphiphilic compounds produced by micro-organism and contain hydrophobic and hydrophilic moieties that reduce surface tension and interfacial tensions between individual molecules at the surface and interface respectively. Structurally it is a cyclolipopeptide which is non-ionic in nature.

Properties

Acticlean comes in stabilized brownish liquid with distinct smell.

Specific gravity	:	~1
pH	:	5-7
Solubility	:	100% in water

Application

Acticlean has applications as non-ionic emulsifier or surface-active agent in detergent, formulations. In detergents it is recommended to be used in the dose of 1% to 5% of the formulation in combination with an anionic surfactant or as per the requirement of overall formulation and application. It has shown improvement in performance by providing synergies with anionic or cationic surfactants in formulations and in application.

Dosing in detergents

Acticlean can be dosed after complete neutralization of LABSA

Packing

Acticlean is available in 50 Kg / 200 kg HDPE drums.

Safety

Acticlean is produced by a non-toxicogenic, non-pathogenic, eco- friendly Non GMO strain of microorganism. It is non-toxic to animals, plant and human. Acticlean is safe in industrial and washing application. Its MSDS sheet is available on request.

Benefits

Good
emulsification
capacity

Non-toxic
and is environment
friendly

100%
biodegradable

Sustained
performance at wide
range of temperature
and pH

Better
wash performance
and moderate foam

Soft
to skin and fabrics

Cellulase Enzyme

Industrial grade cellulase. Eco-efficient Biomass conversion for detergent industry.

Cellulases are enzymes that hydrolyze β -1,4-glycosidic bonds in cellulose to release glucose and cello oligosaccharide. Cellulases are a group of hydrolytic enzymes that break down cellulose, the major structural component of plant cell walls, into simpler sugars like glucose.

Applications

Inclusion in enzyme-based laundry detergents for breaking down microfibrils in fabrics

Properties

Form	:	Liquid/Powder (as per need)
Enzyme Activity	:	$\geq 30,000$ U/g (customizable)
Optimal pH Range	:	4.5 – 6.0
Optimal Temperature	:	45°C – 60°C
Stability	:	Stable under feed & textile process conditions
Compatibility	:	Compatible with protease, xylanase, amylase
Source organism	:	Trichoderma reesei

Packing

Available in 50 Kg drums.

Storage

- Cool, dry place below 25°C
- Shelf Life: 12 months (sealed condition)

Benefits

Boots

cleaning performance at low temperatures

Softens

fabrics naturally

Environmentally safe

alternative to chemicals

Lipase Enzyme

Industrial grade. Targeted Lipid Hydrolysis for Detergent 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.

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)

Application

- Removal of fat- and oil-based stains from fabrics
- Inclusion in enzyme-based laundry formulations

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

Benefits

Effective

stain removal, especially in cold water washes

Reduced

need for harsh surfactants and chemicals

Environmentally friendly

and fabric-safe formulation

Synergistic

performance with protease and amylase





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