Infinita
Biotech Private Limited

BIOVOICE

KNOW, SHARE & GROW

ANNUAL 2025 I Volume No. 6

10TH YEAR ANNIVERSARY

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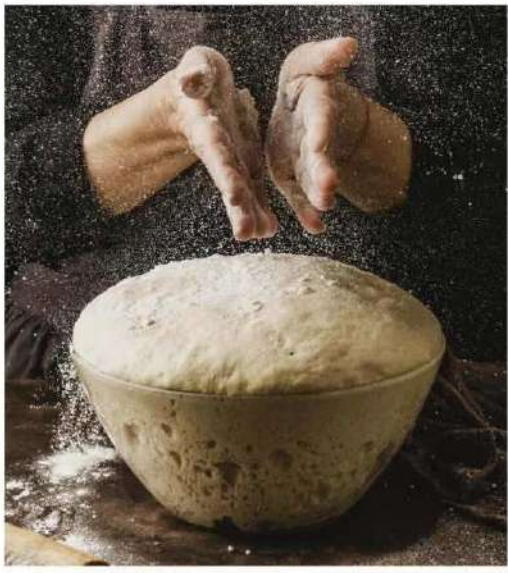


Our Mission

To continue to set the bar high as an industry leader in creating unique, eco-friendly enzymes formulations for industrial applications. We are committed to providing high-quality products with international standards to our esteemed clients and prioritising environmental concerns while carrying out our business and manufacturing activities.

Our Vision

To be the leading biotechnology company in the world in the field of eco-friendly enzymes formulations for industrial applications.

Our Values

These are the guiding force behind every action we take.

- I INNOVATION
- N NATURE
- F FOCUS
- I INTEGRITY
- N NOVEL
- I INCLUSION
- T TEAMWORK
- A AGILITY

Corporate Profile

Infinita Biotech Pvt. Ltd., founded in 2015, is a leading Indian multi-divisional biotechnology company engaged in manufacturing eco-friendly enzymatic solutions for a variety of industrial applications in India as well as overseas.

Our company is backed by technical professionals with over 35 years of experience in the field of industrial enzymes. Our leadership and extensive expertise in the domain of biotechnology have enabled us to grow with continued success. This can be attributed to our policy of providing innovative, effective, and high-quality products and solutions to meet specific customer needs through continuous research and development.

The desire for cutting-edge innovation is reflected in our best-in-class research laboratories and state-of-the-art manufacturing facilities. Our production mechanisms are handled by well-qualified and highly motivated personnel and adhere to stringent control protocols and in-process quality assurance procedures.

Our distinctive delivery processes are backed by a strong marketing and distribution network, which is strengthened by the relationship we share with our suppliers and dealers.

We strive to continuously improve our practices and as a part of this process we have acquired certifications and licences like ISO 9001:2015 through TUV India, FSSAI central licence, ISO 22000:2018, HALAL, Kosher, Oeko-Tex Eco Passport, ZED Gold and our Research and Development Centre has been recognized by the Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India.

Our concern for the environment is at the centre of everything we do. As a result, our products provide multiple benefits that cannot be obtained through traditional chemicals and processes such as superior quality, lower production cost, less wastage and reduced energy consumption.

As of today, our clients belong to a wide range of sectors like

The presence of
Infinita around the World

55+ COUNTRIES

200+ PRODUCTS

750+ CLIENTS WORLDWIDE

35+ YEARS TECHNICAL EXPERTISE

Message From The Managing Director

Adarsh Desai

WISHING YOU A HAPPY AND PROSPEROUS NEW YEAR!

MAY THIS YEAR BRING YOU JOY, SUCCESS, AND FULFILLMENT.

As we reflect on the past year, I am filled with immense pride and gratitude as we celebrate a decade of **Infinita Biotech's journey**. Our **10th Anniversary** marks a significant milestone, and I am thrilled to share with you the highlights of our achievements over the past year.

This year began with a bang, featuring a **30-minute episode about our company on national television-Har Ghar Startup on Tata Play**. Further, I was honored to receive the **Young Male Entrepreneur of the Year Award at the Western India EXIM Awards 2024**, presented by **EXIM Club**, recognizing our relentless efforts.

Our company was also the **Runner-Up at the Green Energy Awards 2025**, where we received the award from **Smt. Rekha Gupta, Hon'ble Chief Minister of Delhi**. This recognition motivates us to continue driving innovation in the biotech sector.

This year, we launched our **CSR division**, with a strong focus on **Animal Safety and Women Empowerment**. We became closely associated with **PETA (People for the Ethical Treatment of Animals) India** and made contributions to support their emergency response work, wherein our funds will be utilized to handle emergency calls and carry out necessary animal rescues across India. We will continue collaborating with organizations in this space.

Our commitment to growth and development is reflected in the numerous **training programs** conducted for our employees by specialists, covering **ISO awareness, fire safety, medical emergency training**, and more.

To celebrate our decade-long journey, we had a grand celebration in **Goa, India, with our entire staff**, marking a memorable trip and a toast to our beautiful decade of **commitment, determination, and dedication**.

A significant milestone this year was the selection of our company tagline, **"Driving Innovation for a Greener Tomorrow,"** which defines **Infinita Biotech's vision.**

I am pleased to report consistent **double-digit growth**, and we are on track to achieve our **short- and long-term goals**. Our family has grown to **over 100 members**, and I am deeply grateful for their dedication.

Thank you for your continued support. **Here's to many more years of innovation and growth!**

BIOSCOPE

Articles

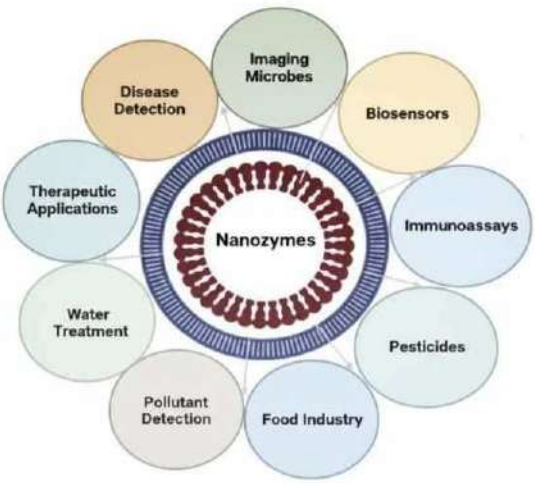
Applications of **Enzyme-Nanoparticles Systems**

Contributed by:
Milind Kulkarni, President Technical

Introduction

Enzymes are highly specific biological catalysts that drive diverse biochemical reactions under mild conditions. Their industrial use, however, is often restricted by instability, denaturation, and difficulty in reuse. Immobilizing enzymes onto nanoparticles effectively overcomes these challenges by enhancing stability, preserving catalytic activity, and allowing easy recovery.

Nanoparticles-such as metallic, polymeric, or silica-based materials-serve as versatile supports and carriers that improve enzyme performance through high surface area, tunable chemistry, and protective microenvironments. This enzyme–nanoparticle integration enhances efficiency and reusability, enabling broad applications in biofuel production, food processing, detergent formulation, environmental remediation, and biomedicine.



NANOZYME APPLICATIONS

Advantages of Enzyme–Nanoparticle Systems

Nanoparticle-mediated enzyme immobilization confers multiple advantages over conventional systems. The nanoscale environment acts as a protective microdomain, shielding enzymes from denaturation caused by temperature fluctuations, pH extremes, or organic solvents, thereby extending functional longevity. Nanoparticles' high surface-to-volume ratio allows dense enzyme loading and optimal exposure of active sites, while tunable surface chemistries enhance substrate accessibility and reduce diffusion limitations, leading to improved catalytic efficiency. Additionally, surface functionalization facilitates targeted enzyme delivery and controlled release in response to environmental cues such as pH, temperature, or light, offering considerable promise for precision therapeutics. Immobilized enzymes also often retain activity across wide pH and temperature ranges, enabling reactions with unconventional substrates or in non-aqueous systems. Collectively, these features enhance process efficiency, sustainability, and the scalability of nanoparticle-based biocatalysis.

Major Applications

The application spectrum of enzyme–nanoparticle systems is extensive. In biofuel production, immobilized cellulases and xylanases efficiently hydrolyze lignocellulosic biomass into fermentable sugars, supporting ethanol production, while lipase-functionalized nanoparticles improve biodiesel transesterification efficiency and stability.

Metallic nanoparticles, such as silver and gold, have also been reported to facilitate biohydrogen generation under anaerobic conditions. In detergents, immobilized proteases, lipases, and cellulases enhance the removal of proteinaceous stains, lipid residues, and fabric fuzziness, while nanoparticle supports increase enzyme stability and enable convenient recovery. Within the food industry, these systems aid in starch conversion to sugars, fruit juice clarification, and production of functional additives. Integration into packaging materials enhances mechanical strength, antimicrobial activity, and shelf life.

In agriculture, nanoparticles serve as carriers for fertilizers and pesticides, promoting controlled release, efficient nutrient uptake, and reduced environmental contamination, whereas enzyme–nanoparticle constructs contribute to the biodegradation of soil pollutants.

In the medical and therapeutic, enzyme-mimicking nanoparticles, or nanozymes, have garnered significant attention. Cerium oxide nanoparticles can emulate superoxide dismutase and catalase activities, modulating reactive oxygen species to suppress tumor proliferation. Vanadium pentoxide nanozymes replicate glutathione peroxidase activity, offering potential in oxidative stress regulation and thrombosis prevention. Enzyme-functionalized chitosan nanoparticles have also been investigated for wound healing and tissue regeneration due to their biocompatibility and bioactivity. In diagnostics, enzyme–nanoparticle conjugates enhance biosensor sensitivity for biomolecules, pathogens, and metabolic markers, while improving contrast and spatial resolution in imaging modalities such as MRI and CT. Environmental applications further benefit from these systems, which catalyze the degradation of organic pollutants, dyes, pesticides, and polycyclic aromatic hydrocarbons, converting hazardous compounds into environmentally benign products and supporting wastewater and soil remediation.

Challenges and Future Perspectives

Despite these advances, challenges remain. Maintaining enzyme activity post-immobilization may be hindered by conformational alterations. Certain nanoparticles, particularly silver-based systems, may exhibit toxicity toward biological and environmental systems. Furthermore, the high cost of nanoparticle synthesis and difficulties in translating laboratory protocols to industrial-scale operations constrain broader adoption. Looking forward, the development of stimuli-responsive "smart" enzyme–nanoparticle platforms activated by pH, temperature, or light is anticipated to drive future innovation. Green synthesis strategies utilizing biological templates or plant extracts are gaining momentum, and integrating multi-enzyme cascades on single nanoparticle platforms may enable complex biochemical transformations, advancing synthetic biology and personalized medicine.

In conclusion, enzyme–nanoparticle systems merge biological precision with nanotechnology's versatility, unlocking enhanced stability, efficiency, and reusability. As smart, eco-friendly designs evolve, these hybrid platforms are set to revolutionize industries-from clean energy to medicine-driving forward a new era of sustainable and intelligent biocatalysis.

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Sustainable **Soil Stabilization** with **Enzymes**

Contributed by:
Nisha Prasad, Marketing Executive

The Importance of Roads and Infrastructure Development

Roads are the lifelines of modern civilization. They connect cities, villages, and industries-facilitating trade, transportation, and social connectivity. A well-developed road network plays a pivotal role in a country's economic growth by enabling mobility, access to resources, and rural development. For developing nations where infrastructure expansion is rapid, durable and cost-effective road construction methods are essential.

However, one of the most persistent challenges in road construction lies beneath the surface-the soil. The strength, durability, and lifespan of a road largely depend on the quality and stability of the soil foundation. Weak, expansive, or moisture-sensitive soils can lead to cracks, deformation, and premature failure of roads. This is where soil stabilization becomes a game-changer.

Understanding Soil Stabilization

Soil stabilization is the process of improving the engineering properties of soil to enhance its strength, load-bearing capacity, and durability. It ensures that the subgrade-on which roads, airfields, or pavements are built-remains stable even under heavy loads and adverse climatic conditions.

Traditionally, soil stabilization is achieved by mechanical or chemical means: such as using stabilizing agents like cement, lime, fly ash, or polymers to alter the soil's properties. While these conventional methods have been effective, they come with certain challenges-including high cost, energy consumption, carbon emissions, and environmental impact. In recent years, the industry has been exploring greener and more sustainable alternatives

The Rise of Green Technologies in Road Construction

As the world moves towards sustainable infrastructure development, the demand for eco-friendly and cost-efficient soil stabilization methods has grown rapidly. Governments, contractors, and engineers are now seeking solutions that reduce their carbon footprint without compromising performance.

Biotechnology offers innovative solutions that harness the power of nature. Among these, enzyme-based soil stabilization has gained remarkable attention. It utilizes natural biochemical processes to improve soil properties without the environmental drawbacks associated with chemical stabilizers.

Enzymes-organic catalysts derived from natural sources-have been used successfully in agriculture, wastewater treatment, and bioremediation. Their application in road construction represents a fusion of biological science and civil engineering, offering a clean, sustainable alternative to conventional methods.

This has paved the way for bio-based technologies, and among them, enzyme-based soil stabilization has emerged as a promising innovation.

Introducing Infinita's Enzyme-Based Soil Stabilizer

At Infinita, we have developed a next-generation, enzyme-based soil stabilizer designed to enhance soil strength naturally and economically. Our solution leverages biotechnology to improve soil properties through biochemical reactions—offering a sustainable alternative to conventional stabilizers like cement and lime.

Our product represents a breakthrough in soil stabilization science. It is a highly concentrated, cost-effective, and environmentally safe enzymatic formulation that modifies the physical and chemical behavior of clay particles in the soil.

How Enzyme-Based Soil Stabilization Works

To understand how enzyme stabilization works, it's important to first look at the composition of soil-especially clay.

Clay particles carry negative surface charges, which attract water molecules and cause the particles to remain dispersed. This leads to swelling, high plasticity, and poor compaction-conditions that make clayey soil unsuitable for road construction.

When an enzyme-based stabilizer is applied, it initiates a biochemical reaction that alters the electrical charge on clay surfaces. Here's the step-by-step mechanism:

1. **Enzyme Reaction with Soil Minerals:**

   Enzymes are biological catalysts that accelerate natural reactions between soil minerals and organic matter. When mixed with water and soil, enzymes interact with clay minerals and promote cation exchange.

2. **Reduction of Soil Plasticity:**

   The enzyme treatment neutralizes negative charges on clay particles. This reduces their affinity for water, minimizing swelling and shrinkage.

3. **Formation of a Stable Soil Matrix:**

   As water is expelled and the soil becomes less plastic, the particles pack more closely during compaction, forming a dense, interlocked structure.

4. **Improved Load-Bearing Capacity:**

   The treated soil exhibits enhanced strength, durability, and resistance to erosion-creating a solid base for road construction.

Unlike chemical stabilizers, enzymes do not alter the chemical composition of soil. Instead, they enhance the natural binding ability of soil particles, creating a stable and resilient subgrade that can last for decades.

Advantages of Enzyme-Based Soil Stabilization

1. Cost-Effective Solution

One of the biggest advantages of enzyme-based stabilizers is their remarkable cost efficiency. Compared to traditional materials like cement and lime, enzymes require:

- Lower dosage (a few liters per cubic meter of soil)
- Minimal transportation and handling costs
- No need for additional aggregates or curing materials

This results in savings in total construction cost-making it ideal for rural, low-cost, and large-scale infrastructure projects.

2. Environmentally Friendly

Enzymes are biodegradable and non-toxic. They do not release harmful gases, or residues into the environment. Unlike cement or lime, which generate high carbon emissions during production, enzyme stabilizers are sustainable and carbon-neutral.

This makes them a perfect fit for green road construction initiatives and projects seeking to achieve sustainability certifications.

3. Enhanced Soil Performance

- Enzyme-treated soils demonstrate:
- Higher California Bearing Ratio (CBR) values
- Improved compaction density
- Reduced permeability and erosion
- Excellent resistance to moisture and weathering
- Stable performance under wet-dry cycles

These improvements directly translate into longer road life, reduced maintenance, and better performance under heavy traffic.

4. Easy to Apply

Enzyme application is straightforward and does not require specialized equipment. The stabilizer is mixed with water and sprayed and mixed into the soil using standard road construction machinery like graders or rotavators. This makes it ideal for remote or rural road projects as well.

5. Reduced Construction Time

Since enzyme treatment promotes faster compaction and stabilization, roads can be constructed and opened to traffic much quicker compared to traditional methods—saving both time and operational costs.

6. Versatile Applications

Beyond road construction, Infinita's enzyme-based stabilizer can be used for a variety of applications, including:

- Dust suppression and unpaved road construction
- Mining haul roads, and construction sites
- Construction of industrial access routes
- Airfield and parking lot subgrade stabilization etc

Enzyme-based stabilization offers a unique balance of performance, sustainability, and cost advantage-making it a future-ready choice for infrastructure development.

Additional Benefits: Dust Suppression and Beyond

Apart from stabilization, Infinita's enzyme solution serves as an excellent dust suppressant. When sprayed on the surface of unpaved roads or mine haul routes, it binds loose particles and forms a semi-permanent crust-reducing dust generation significantly.
This leads to:

- Improved air quality
- Safer driving conditions
- Lower maintenance costs
- Extended lifespan of roads.

Such dual functionality makes enzyme-based technology a multi-purpose solution for modern infrastructure needs.

Infinita's Mission for Sustainable Infrastructure

At Infinita, our mission is to redefine how the world builds roads. We believe that sustainability and performance can go hand-in-hand, and our enzyme-based technology is proof of that vision.

Our product development focuses on:

- Minimizing construction costs
- Reducing carbon emissions
- Improving long-term performance
- Simplifying on-site applications

The Future of Enzyme Technology in Construction

As global infrastructure expands, the need for eco-friendly and economical road-building solutions will continue to rise. Enzyme-based soil stabilization is not just a substitute for cement or lime-it is a revolutionary step forward in sustainable construction practices.

With continuous R&D and field validation, technologies like enzymatic soil stabilizer will play a central role in:

- Smart city development
- Rural connectivity programs
- Mining and industrial access roads
- Climate-resilient infrastructure

By embracing bioengineering, we can build roads that are stronger, greener, and more affordable for generations to come.

Conclusion :

The strength of every great road lies in the soil beneath it. For decades, engineers have sought ways to make weak soils stronger, more stable, and more resilient. Today, with biotechnology and innovation, that goal has been achieved.

Infinita's enzyme-based soil stabilization stands at the forefront of this transformation-offering an eco-friendly, cost-efficient, and high-performance alternative to conventional stabilizers. By harnessing the power of nature, we have created a solution that not only strengthens soil but also safeguards the planet.

As nations around the world commit to green infrastructure goals, enzyme-based technology will emerge as a cornerstone of sustainable development-balancing performance with environmental responsibility.

At Infinita, we take pride in leading this change. Every road built with our enzyme stabilizer is a step toward a cleaner, stronger, and more sustainable future—paving the way for progress, one road at a time.

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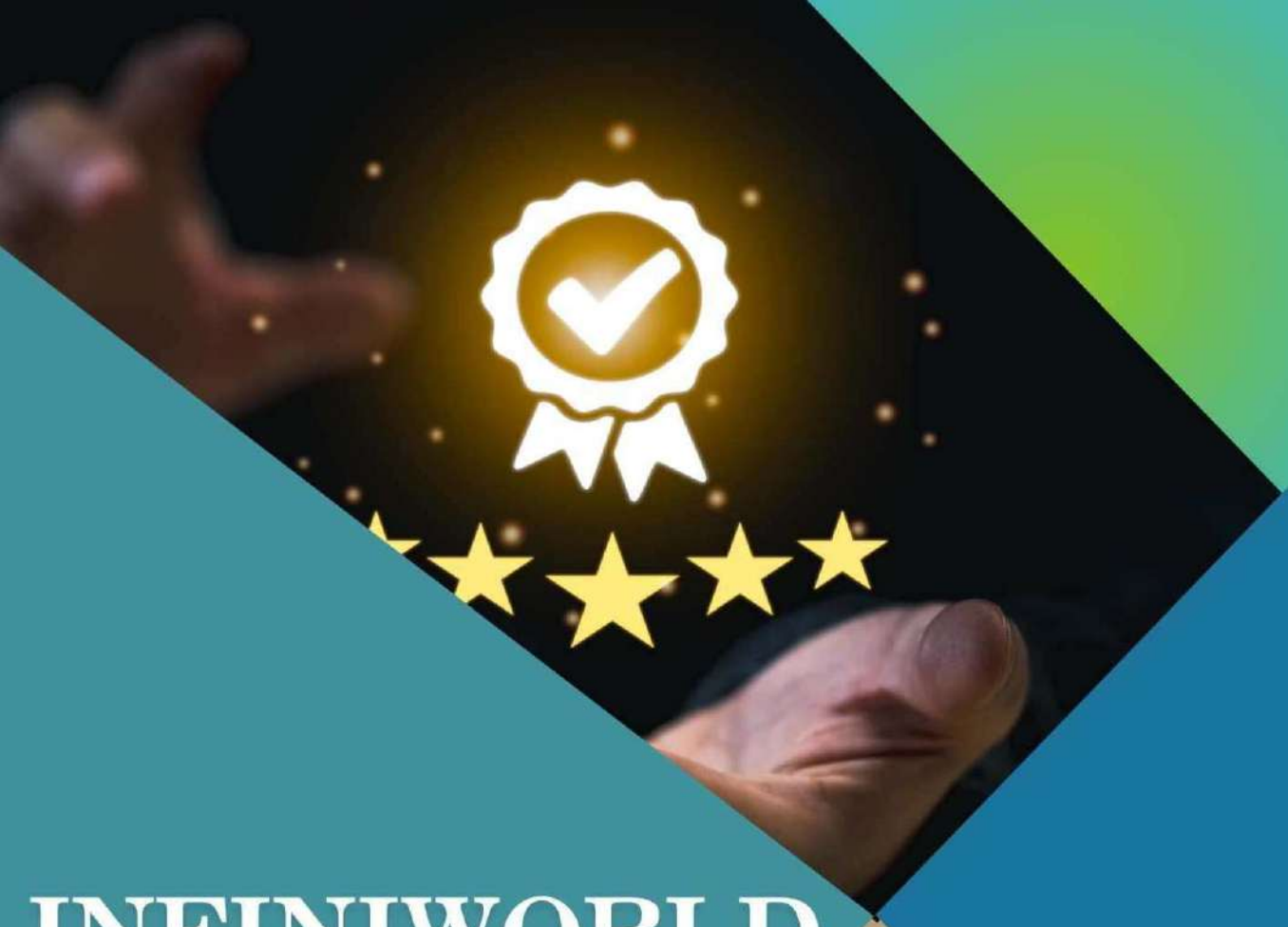


INFINIWORLD

Featured

Awards and **Recognition**

Young Male Entrepreneur Of The Year (Under 40) - Western India Exim Club Awards 2024

Runner-Up-at-5th-India-Green-Energy-Awards-2025-Category-Grain-Ethanol-Producer

Exhibitions

HPCI INDIA 2025, MUMBAI

CHEMEXPO INDIA 2025, MUMBAI

IN COSMETICS GLOBAL 2025, THE NETHERLANDS

12TH ANNUAL AFRICA SUGAR CONFERENCE 2025, KENYA

INTERFOOD 2025, AZERBAIJAN

XXXII ISSCT CENTENNIAL CONGRESS 2025, COLOMBIA

INTEX 2025, SRILANKA

WORLD OF CONCRETE INDIA 2025, MUMBAI

FI INDIA 2025, DELHI

SEPAWA CONGRESS 2025, GERMANY

GULFOOD MANUFACTURING 2025, UAE

OEKO-TEX SUMMIT & EXHIBITION 2025, MUMBAI

CSR: Empowering Lives, Inspiring Compassion

At Infinita, we believe that business growth is most meaningful when it also creates a positive impact on the world around us. With this in mind, this year we established our dedicated CSR Division, focusing on two causes close to our hearts: Animal Welfare and Women Empowerment.

We supported PETA India's Emergency Response work, helping animals in distress across the country, and contributing to their mission of promoting animal safety and ethical treatment. Our support also enables timely action during emergencies, ensuring that help reaches animals when they need it most.

Alongside this, we continue to work on initiatives that empower women by providing opportunities for skill development, confidence-building, and long-term independence. We believe that when women thrive, families and communities thrive too.

Through these efforts, we aim to create a positive, lasting impact and foster a culture of care, responsibility, and inclusivity in everything we do.

Certifications and Accreditations

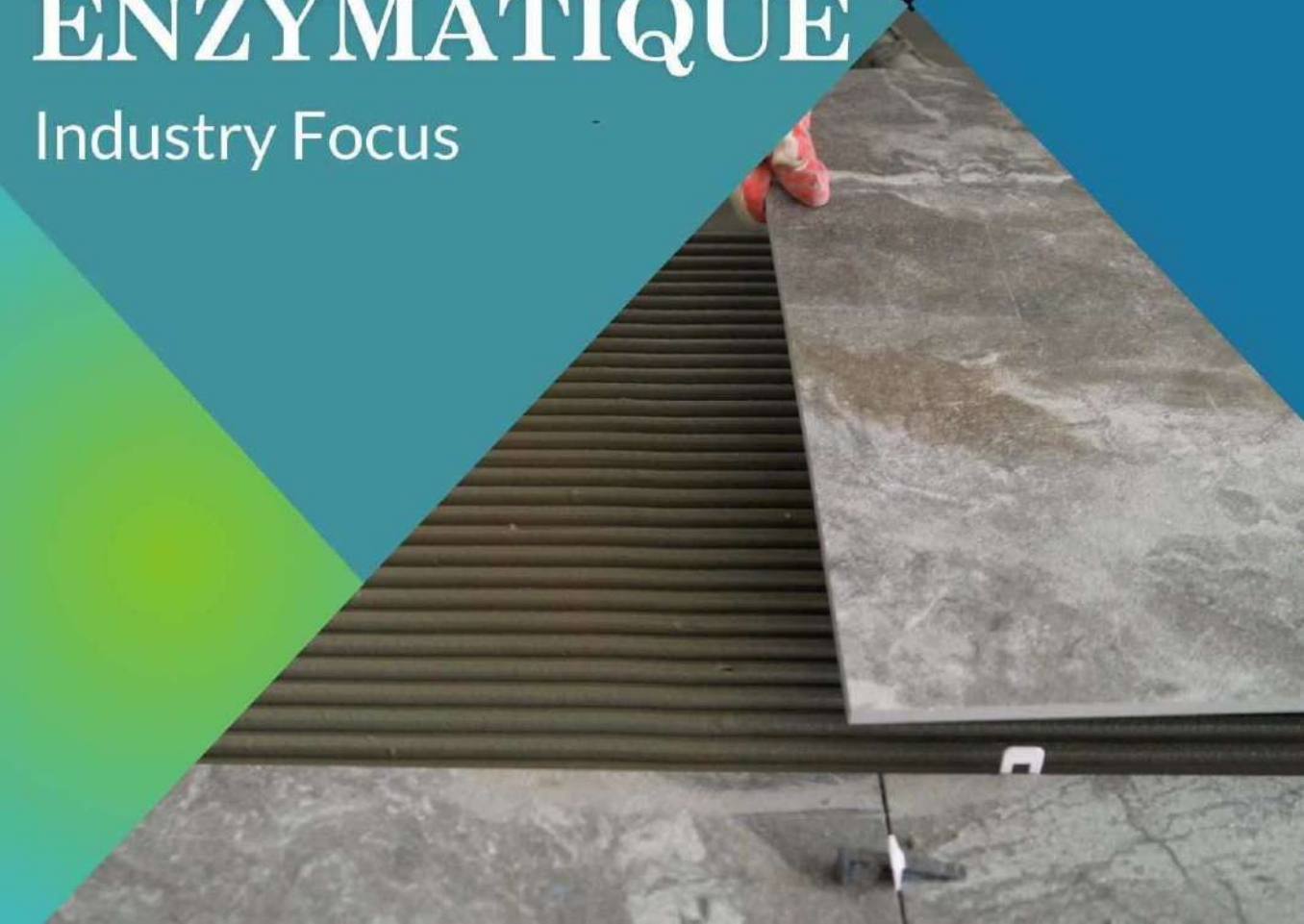
ISO 22000:2018

ECO PASSPORT

Media Coverage

ENZYMATIQUE

Industry Focus



Revolutionizing **Brewing**: The Rise of Sustainable **Enzymatic Solutions**

Brewery enzymes are reshaping the global brewing landscape by introducing sustainable, efficient, and versatile solutions that enhance beer quality, increase production capacity, and reduce operational costs. As consumer preferences shift toward superior taste, healthier options, and responsibly crafted beverages, enzymatic technology has become central to modern brewing innovation. Advancements in enzyme formulations now empower breweries to achieve greater technical precision, improved environmental stewardship, and consistently high-quality output.

Brewing Enzymes: Transforming Tradition

Enzymes have long been integral to brewing, catalyzing essential biochemical reactions that influence mashing, fermentation, clarity, and flavor development. While historically used mainly to standardize malt performance, modern enzymatic advancements have significantly expanded their role. Today's brewing enzymes give producers the flexibility to explore alternative raw materials, create distinct flavor profiles, improve processing efficiency, and respond quickly to shifting global beer trends. This blend of tradition and biotechnology allows breweries of all sizes to achieve higher consistency, reduce variability, and maintain product quality even as they diversify their offerings.

Industry Trends and the Road Ahead

The global brewing enzyme market reached USD 555.37 million in 2025 and is projected to grow steadily to USD 802.51 million by 2030, supported by a strong CAGR of 7.64%. This momentum is driven by rising beer consumption in emerging markets such as India, China, Vietnam, and Indonesia, where breweries are expanding capacity and refining quality standards. The craft beer movement also plays a major role, encouraging experimentation with grains like oats, rice, and sorghum, as well as the development of gluten-free and low-calorie formulations that rely heavily on enzymatic support.

Sustainability has become a key driver in modern brewing. With increasing emphasis on reducing energy use, minimizing water consumption, and improving extraction efficiency, breweries are integrating enzymes into their processes to meet both economic and environmental goals. Enzymes also enable the use of locally sourced, non-germinated grains, aligning breweries with green manufacturing practices and supporting regional agriculture.

Looking ahead, regions such as Asia-Pacific-particularly India-are expected to contribute significantly to future industry growth. Rising consumer interest in premium, differentiated beers is pushing breweries to adopt more sophisticated processing aids. As biotechnology continues to advance, enzymatic solutions will remain central to enabling consistency, creativity, and responsible manufacturing across global brewing operations.

Range of Enzymatic Products Used in the Brewery Industry

A variety of specialized enzymes support different stages of brewing and improve overall process efficiency:

Alpha Amylase – Liquefies starch efficiently, enhancing mashing performance and supporting optimal starch breakdown.

Gluco Amylase – Ensures complete saccharification and enables simultaneous fermentation, improving alcohol yield and process robustness.

Papain – Breaks down protein gels to reduce viscosity and improve filtration, enhancing clarity and beer stability.

Beta Glucanase – Degrades non-starch polysaccharides, reduces mash viscosity, and increases extraction efficiency.

Multi-Enzyme Blends – Provide broad-spectrum action for handling adjuncts and protein-rich grains, improving filtration and flexibility in raw material selection.

Alpha-Acetolactate Decarboxylase (ALDC) – Prevents diacetyl formation, ensuring clean, crisp flavor profiles without lengthy maturation.

These enzymes collectively help breweries streamline production, maintain consistency, and achieve targeted flavor and quality outcomes.

Advantages of Enzymatic Solutions in Brewing

Enzymatic solutions deliver a wide range of benefits that strengthen the technical, operational, and environmental performance of breweries. Their increasing adoption reflects the industry's growing need for precision, efficiency, and sustainability.

Enhanced Processing Efficiency

Enzymes significantly improve efficiency across mashing, fermentation, and filtration. Better starch conversion increases fermentable sugar availability, resulting in improved alcohol yields. Enzymes also reduce mash viscosity, improving wort separation and filtration speed-particularly valuable for breweries using adjuncts or alternative grains. This improved processing efficiency helps increase throughput and supports consistent batch performance.

Improved Beer Quality and Stability

Enzymes contribute directly to product quality by enhancing clarity, reducing haze, and improving flavor stability. Proteolytic enzymes help remove haze-forming proteins, while ALDC minimizes diacetyl formation, ensuring a cleaner taste and shorter maturation times. Brewers gain better control over flavor outcomes, leading to improved consistency across batches and longer shelf life for finished products.

Sustainability and Resource Optimization

One of the most impactful advantages of enzyme use in brewing is their contribution to sustainability. Enzymes help breweries reduce energy use during mashing, lower water consumption, and minimize raw-material wastage by maximizing extraction efficiency. The ability to use locally available grains-such as rice, maize, and sorghum-further reduces environmental impact and supports local agriculture. As global sustainability standards continue to strengthen, enzymatic brewing serves as a practical pathway for breweries seeking greener production practices.

Conclusion

Enzymatic innovations are redefining the possibilities within modern brewing. By integrating advanced biotechnology with established brewing traditions, enzymes help producers elevate beer quality, streamline operations, and reduce environmental impact. As the global industry continues to evolve toward more efficient, flexible, and sustainable practices, enzymatic solutions will remain essential to meeting consumer expectations and driving brewing innovation. The future of beer production lies in the balance of science, creativity, and responsibility—and brewery enzymes are central to shaping that future.

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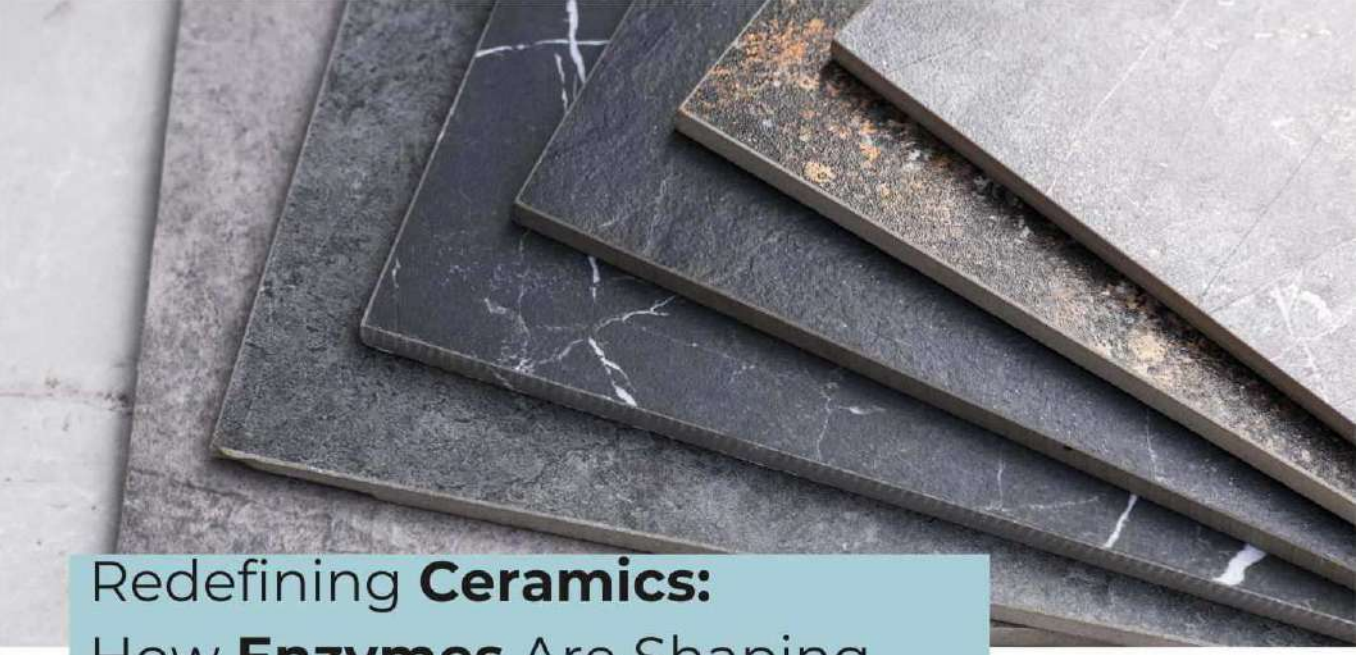

Redefining **Ceramics:** How **Enzymes** Are Shaping **Sustainable Manufacturing**

Ceramic enzymes are transforming the landscape of ceramic manufacturing by enabling more sustainable, controlled, and energy-efficient production methods. As industries increasingly prioritize lower environmental impact and improved material performance, enzyme-based processes are emerging as a practical and powerful alternative to conventional high-temperature ceramic synthesis. These biocatalytic methods not only reduce the energy burden associated with ceramics but also expand the range of applications for advanced materials.

Enzymes: The Science Behind Ceramic Innovation

Traditional ceramic production requires extremely high temperatures and significant energy input, limiting compatibility with heat-sensitive materials and contributing to higher carbon emissions. Enzyme technology introduces a refined, biocatalytic pathway. By using proteins and peptides to mediate ceramic formation, manufacturers can work under milder conditions—lower temperatures, neutral pH, and controlled reaction environments. This approach supports the development of ceramics with improved uniformity, enhanced mechanical strength, and smoother surface characteristics.

Enzymatic processes generally fall into two categories:

- Precipitate-generating reactions, where enzymes catalyze chemical changes that form ceramic precursors.

- Direct interaction with metal-containing substrates, allowing enzymes to help structure or assemble ceramic materials at a molecular level.

Together, these pathways enable more precise, energy-conscious ceramic engineering and facilitate innovations that were previously limited by thermal processing constraints.

How Enzyme-Based Ceramic Processing Works

In many enzyme-assisted systems, gelatin-specific enzymes are combined with urea to support controlled structuring of ceramic suspensions. The process begins with ball milling and degassing a mixture of alumina and gelatin. Urea prevents premature bonding of gelatin molecules, maintaining suspension stability. When the enzyme blend is introduced, urea gradually decomposes, allowing gelatin to form a three-dimensional network through hydrogen bonding.

This network stabilizes the ceramic suspension, resulting in a consolidated green ceramic body at room temperature-a significant departure from traditional thermal or chemical consolidation methods. The outcome is a more uniform microstructure and improved overall product quality, achieved through a process that consumes far less energy.

Advantages of Enzyme-Assisted Ceramic Manufacturing

Enzymatic pathways offer numerous technical and operational benefits. One of the key advantages is controlled, site-selective synthesis, enhancing precision and consistency in advanced ceramic formulations. Operating at mild conditions allows manufacturers to reduce energy consumption and carbon emissions-a major step toward greener operations. Additionally, enzyme-assisted processing improves material homogeneity, strength, and surface smoothness. It also facilitates integration with heat-sensitive polymers, coatings, and functional additives that would degrade under conventional high-temperature conditions. Improved yields, reduced waste, and streamlined processing steps make enzyme-based methods both environmentally and economically advantageous.

Application Spectrum Across the Ceramic Industry

Enzyme-assisted approaches are being adopted across multiple ceramic segments-from traditional tiles and porcelain to advanced bioceramics and composite structures. They support improved material homogeneity, enable room-temperature shaping of complex forms, and enhance compatibility with polymers, coatings, and bioactive molecules. Enzymes are also used in ceramic membranes, where immobilization allows continuous biocatalytic processing.

Sustainability and Market Direction

The shift toward enzyme-assisted ceramics strongly aligns with global sustainability goals. By lowering energy requirements and minimizing emissions, enzymatic methods provide a cleaner alternative to traditional high-temperature processing. Improved synthesis control and reduced raw-material waste contribute to more responsible resource utilization.

As industries ranging from construction and consumer goods to biomedical and filtration technologies demand

high-quality, cost-effective, and environmentally friendly materials, enzyme-based processes are gaining broader relevance. This trend encourages ongoing collaboration between biotechnology and materials science, driving innovation in biocatalyst development, enzyme immobilization, and hybrid ceramic–biopolymer systems.

Advances in enzyme engineering and scalable manufacturing techniques are expected to expand the adoption of these methods further. Enzyme-assisted ceramics can deliver enhanced performance, reduced production footprints, and greater functional adaptability-allowing manufacturers to meet sustainability targets while innovating new product designs.

Conclusion

Enzyme-assisted ceramic manufacturing represents a paradigm shift in industrial ceramics. By combining scientific precision, energy efficiency, and eco-friendly technology, these processes enable high-performance materials with lower environmental impact. As global industries continue to prioritize sustainability and operational efficiency, ceramic enzymes are poised to play a central role in the next generation of ceramic products, offering versatility, performance, and greener manufacturing solutions.

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AD INFINITUM

Unique Enzymatic Solutions
for a better tomorrow

Enzymes for **Bakery**: Enhancing **Quality** and **Shelf Life Naturally**

Infinita Biotech provides advanced enzymatic solutions tailored specifically for the bakery industry. Enzymes have been used for decades to improve dough properties, texture, and the shelf life of baked products, and today they form the backbone of modern, sustainable bakery production. Unlike traditional chemical additives, enzymes work naturally by acting on starches, proteins, and lipids, enhancing dough elasticity, gas retention, and moisture distribution. This ensures a uniform, fluffy crumb, soft crust, and longer-lasting freshness in breads, pastries, cakes, and biscuits.

The adoption of enzymes also supports healthier, cleaner-label products by reducing the reliance on chemical improvers or artificial additives, aligning with growing consumer demand for natural and safe ingredients. Beyond quality and shelf life, bakery enzymes optimize production efficiency by improving dough handling, reducing waste from stale products, and ensuring consistent performance across large-scale industrial baking.

By leveraging targeted enzymatic actions, bakers can achieve specific functional goals-such as improving volume in bread, softening texture in cakes, stabilizing dough in laminated pastries, or reducing acrylamide formation—without compromising taste or appearance. This combination of quality, safety, and efficiency has made enzymes an indispensable tool in modern baking operations, driving innovation and market growth across both artisanal and industrial segments.

Our Bakery Enzyme Portfolio

ECOENZYME - FAA (BAKERY)

Form: Powder | Enzyme: Fungal Alpha Amylase

ECOENZYME - FAA (BAKERY) enhances fermentation by breaking down damaged starch into smaller dextrins, improving dough flexibility and loaf volume. It ensures consistent gas retention, resulting in soft, airy bread with uniform crumb structure. Ideal for breads requiring high rise and a fluffy texture, it supports better fermentation control while reducing reliance on chemical improvers.

ECOENZYME - GO (BAKERY)

Form: Powder | Enzyme: Glucose Oxidase

ECOENZYME - GO (BAKERY) enhances dough strength by oxidizing glucose into gluconic acid and hydrogen peroxide. It improves texture, shelf life, and overall oxidation stability, delivering superior results in cakes, meringues, pastries, and other specialty baked products.

ECOENZYME - LIP (BAKERY)

Form: Powder | Enzyme: Lipase

ECOENZYME - LIP (BAKERY) breaks down lipids into monoglycerides, diglycerides, and free fatty acids, increasing dough tolerance and improving loaf volume. It enables a reduction in shortening usage without compromising texture or flavor, supporting healthier formulations while maintaining soft, tender baked goods.

ECOENZYME - TG (BAKERY)

Form: Powder | Enzyme: Transglutaminase

ECOENZYME - TG (BAKERY) strengthens gluten networks, improving dough elasticity and baking performance. It produces a uniform crumb structure, enhances loaf volume, and slows staling, enabling longer-lasting freshness in breads and pastries. This enzyme is particularly valuable for ready-to-bake and industrial bakery products.

ECOENZYME - NP (BAKERY)

Form: Powder | Enzyme: Protease

ECOENZYME - NP (BAKERY) improves dough elasticity and modifies rheology for better handling in breads and biscuits. By selectively breaking down specific proteins, it softens dough, enhances volume, and ensures a tender, uniform crumb, contributing to high-quality end products.

ECOENZYME - XYL B (BAKERY)

Form: Powder | Enzyme: Bacterial Xylanase

Specifically developed for bakery use, ECOENZYME - XYL B (BAKERY) improves dough handling, enhances the gluten network, and increases gas retention in whole wheat and high-fiber breads. It supports a soft crumb and uniform structure.

ECOENZYME - XYL F (BAKERY)

Form: Powder | Enzyme: Fungal Xylanase

Designed for flour pre-treatment, ECOENZYME - XYL F (BAKERY) converts insoluble hemicelluloses into soluble forms, stabilizing dough and promoting gluten formation. This results in voluminous, soft loaves with improved shelf life.

ECOENZYME - MA (BAKERY)

Form: Powder | Enzyme: Maltogenic Amylase

ECOENZYME - MA (BAKERY) reduces staling and extends shelf life by gradually breaking down starch into fermentable sugars during storage. It keeps breads, cakes, and pastries soft for longer, minimizing the need for chemical preservatives and ensuring consistent product quality.

ECOENZYME - BAA (BAKERY)

Form: Powder | Enzyme: Bacterial Alpha Amylase

ECOENZYME - BAA (BAKERY) hydrolyzes starch into glucose polymers, providing extra fuel for yeast. It enhances dough consistency, promotes higher loaf volume, and helps maintain softness over time. Its natural activity reduces chemical additive dependency, supporting cleaner labeling and more sustainable baking.

ECOENZYME - GA (BAKERY)

Form: Powder | Enzyme: Gluco Amylase

ECOENZYME - GA (BAKERY) converts starch into fermentable sugars, improving dough handling, yeast activity, and loaf volume. It enhances crumb softness and delays staling, supporting longer freshness in breads, cakes, and pastries.

ECOENZYME - PL (BAKERY)

Form: Powder | Enzyme: Phospholipase

ECOENZYME - PL (BAKERY) boosts dough stability and gas retention by generating emulsifier-like molecules. It delivers a finer crumb, better volume, a softer texture, and supports cleaner-label baking by reducing chemical emulsifiers.

Enzymes for **Detergents**: Efficient **Cleaning**, **Eco-Friendly Solutions**

Infinita Biotech provides advanced enzymatic solutions tailored for the detergent industry. Enzymes have long been used to enhance cleaning performance by breaking down proteins, fats, starches, and carbohydrates. Modern detergent enzymes are highly effective at lower temperatures, reducing energy consumption, protecting fabrics, and minimizing environmental impact. By replacing harsh chemicals, these enzymes ensure superior stain removal while supporting eco-friendly washing practices in laundry and dishwashing applications.

Granular Multi-Enzyme Blends

ECOENZYME - DET G PA

Enzymes Included: Protease, Amylase

Combines protease and amylase for effective removal of protein-based and starch-based stains, suitable for both laundry and dishwashing applications.

ECOENZYME - DET G

Enzymes Included: Protease, Amylase, Lipase

Removes protein, starch, and fat-based soils including grease, sauces, and food residues. Provides broad-spectrum cleaning for daily laundry needs.

ECOENZYME - DET G LAM

Enzymes Included: Lipase, Amylase, Mannanase

Breaks down oily stains and mannan-based food thickeners found in processed foods. Enhances soil release and prevents redeposition during the wash cycle.

ECOENZYME - DET G PACM

Enzymes Included : Protease, Amylase, Cellulase, Mannanase

Delivers multi-stain removal across protein, starch, and mannan soils. Cellulase action improves fabric appearance and softness.

ECOENZYME - DET G PALC

Enzymes Included : Protease, Amylase, Lipase, Cellulase

Effective against protein, starch, and fat stains for enhanced cleaning. Supports fabric care with cellulase activity for smoother surface feel.

ECOENZYME - DET G +

Enzymes Included: Protease, Amylase, Lipase, Cellulase, Mannanase

Comprehensive 5 enzyme system tackling multiple household stains across categories. Ideal for premium detergent formulations requiring broad performance.

ECOENZYME - DET G600

Enzymes Included: Protease, Amylase, Lipase, Cellulase, Mannanase, Pectinase

Advanced 6 enzyme blend addressing protein, starch, fat, mannan, and pectin stains, with fabric care enhancement. Designed for challenging soils from fruits, vegetables, dairy, and processed foods.

Liquid Multi-Enzyme Blends

ECOENZYME - DET L PA

Enzymes Included: Protease, Amylase

Targets protein and starch stains commonly found in laundry and dishwashing. Provides reliable cleaning performance in liquid detergent systems.

ECOENZYME - DET L200

Enzymes Included: Protease, Amylase (Concentrated)

High-strength dual-enzyme blend for compact, low-dosage detergent formulations. Delivers efficient stain removal while optimizing formulation cost.

ECOENZYME - DET L3

Enzymes Included: Protease, Amylase, Lipase

Removes protein, starch, and fat-based soils including oils, gravies, and food residues. Suitable for both laundry and dishwashing applications requiring multi-soil cleaning.

ECOENZYME - DET L PAC

Enzymes Included: Protease, Amylase, Cellulase

Targets protein and starch stains while enhancing fabric care. Cellulase improves fabric softness and brightness during repeated washing.

ECOENZYME - DET L500

Enzymes Included: Protease, Amylase, Lipase, Mannanase, Pectinase

Multi-stain removal for tough soils including oils, thickeners, and fruit-based residues. Performs effectively in both laundry and automatic dishwashing systems.

ECOENZYME - DET L

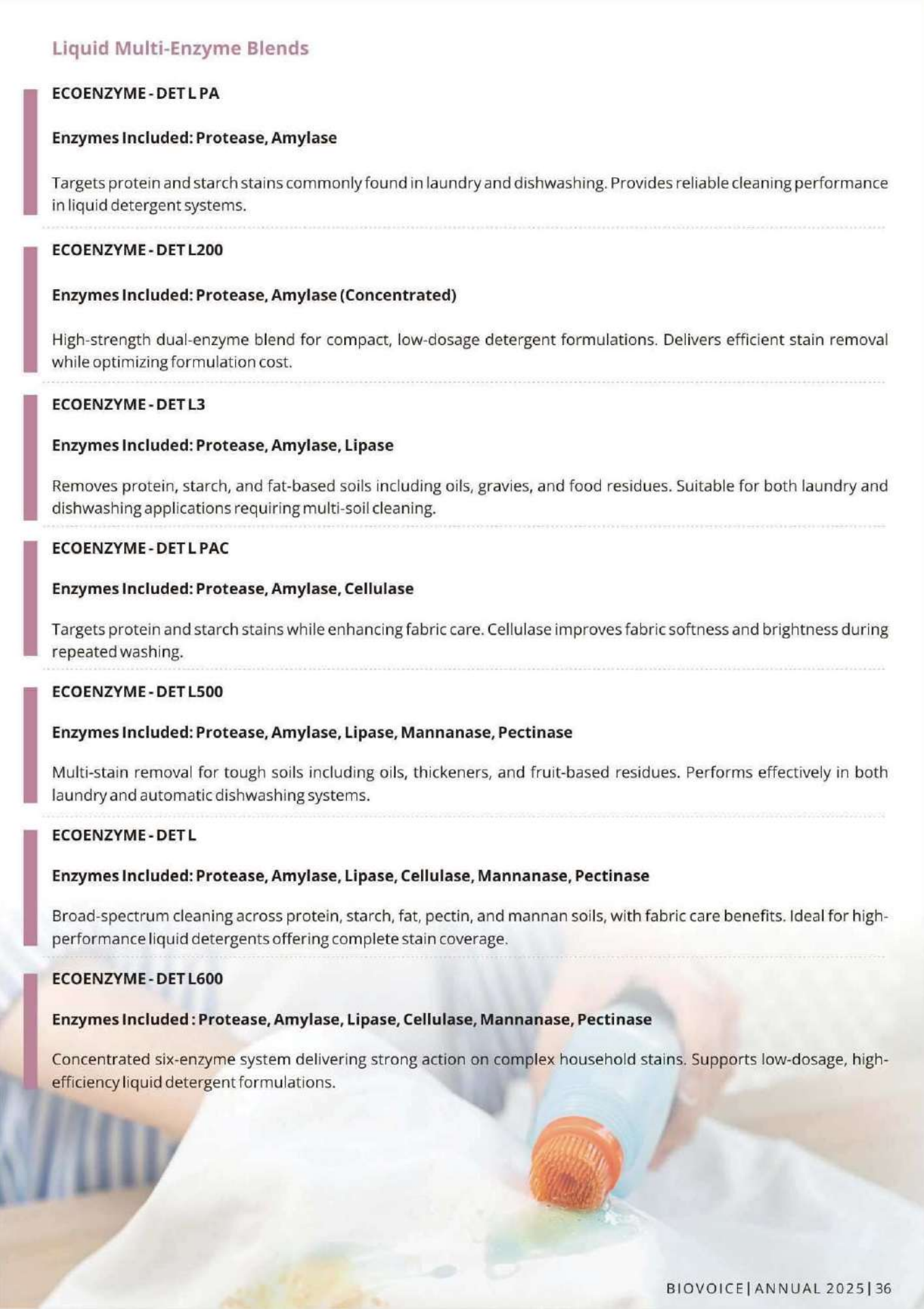
Enzymes Included: Protease, Amylase, Lipase, Cellulase, Mannanase, Pectinase

Broad-spectrum cleaning across protein, starch, fat, pectin, and mannan soils, with fabric care benefits. Ideal for high-performance liquid detergents offering complete stain coverage.

ECOENZYME - DET L600

Enzymes Included : Protease, Amylase, Lipase, Cellulase, Mannanase, Pectinase

Concentrated six-enzyme system delivering strong action on complex household stains. Supports low-dosage, high-efficiency liquid detergent formulations.



Monozymes

ECOENZYME - PRO DET

Form: Granules / Liquid | Enzyme: Protease

Breaks down protein-based stains like blood, grass, and food residues for improved laundry and dishwashing performance.

ECOENZYME - PRO DET G200

Form: Granules (Concentrated) | Enzyme: Protease

High-strength protease designed for compact granular detergents requiring lower dosage with maximum protein stain removal.

ECOENZYME - PRO DET L200

Form: Liquid (Concentrated) | Enzyme: Protease

Concentrated liquid protease offering superior breakdown of protein stains in low-dosage, high-efficiency detergent formulations.

ECOENZYME - AMY DET

Form: Granules / Liquid | Enzyme: Amylase

Targets starch-based stains like sauces, gravies, puddings, and chocolate for effective low-temperature cleaning.

ECOENZYME - LIP DET

Form: Granules / Liquid | Enzyme: Lipase

Hydrolyzes fats, oils, and greasy residues, ideal for laundry and automatic dishwashing formulations.

ECOENZYME - CELL DET

Form: Granules / Liquid | Enzyme: Cellulase

Improves fabric softness, reduces pilling, and enhances soil release.

ECOENZYME - MANN DET

Form: Granules / Liquid | Enzyme: Mannanase

Breaks down mannan-based thickeners from sauces, ice creams, and processed foods.

ECOENZYME - PECT DET L

Form: Liquid | Enzyme: Pectinase

Degrades pectin-rich stains from fruits, juices, jams, and vegetables.

INFINITEAM

Employee Corner

Infinitians VIBE CHECK

We asked Infinitians a series of quick This-or-That questions.

Here's what our teammates chose-find out which side your vibe matches!

Infinitians Speak: This-or-That Edition!

Quick choices. Real vibes.

Tea	64%	Coffee	36% Bean me up!
Books	42% Bookworm Alert!	Netflix	58% Binge Boss!
Planner	54% Plan it Stan!	Last-Minute Rockstar	46% Wing it King!
Fast Walker	64% Zoom Zoom!	Slow Stroller	36% Stroll Patrol.
Mountains	64% Peak Seeker!	Beaches	36% Sandy Toes!
Early Sleeper	42% Lights Out!	Midnight Scroller	58% Scroll & Roll!
Short Calls	70% Quick Chat!	Long Texts	30% Text Marathon...
Organized Desk	54% Tidy Triumph!	Creative Mess	46% Chaos Champion!

Different choices. One team. One vibe.

The Pulse of our Workplace

Milind Kulkarni
President Technical

Inquisitive
Growing
Futuristic

Rashmi Upadhyay
Quality Assurance

Visionary
Innovative
Reliable

Sulagna Roy
Research and Development

Ever-Growing
Dynamic
Jumbo circus

Dharti Joshi
Quality Control

Brain Domain
The motivational black hole
The hustle hunt

Jimesh Patel
Marketing

Reliability
Freedom
Innovative

Srujal Patel
Production

Party
Emotional Attachment
Reliable

Tejas Shah
Accounts

Culture
Growth
Party

Shilpi Mishra
Human Resource

Learnings
Fun
Parties

Ajay Thakkar
Purchase

Professionalism
Supportiveness
Improvement

Kunal Panchal
Logistics

Discipline
Friends
Fun

Ashiyana Pathan
Admin

Endless growth
Unlimited opportunity
Freedom

INFINITALK
Events and Celebrations

Birthday Celebration

IPL Match Night with the Team

Har Ghar Startup Live Telecast

Independence Day Celebration

Celebrating Women's Day

Holi Celebration

Ganesh Chaturthi Celebration

Dussehra

Diwali

Christmas Celebration

Trainings


Basic Life Support



Fire and Safety

ISO 9001:2015 Awareness


Health and Medical Safety

Enzyme Applications in Distillery and Wastewater Treatment Industry

Celebrating 10 Years of Excellence with a Special Trip to Goa

Vadodara

Goa

Driving Innovation for
A Greener Tomorrow!

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