



INTRODUCTION

Proteins are among the most structurally complex and functionally diverse biomolecules, forming the foundation of food systems, animal nutrition, pharmaceuticals, and industrial biotechnology. Efficient utilization and modification of proteins require highly specific biochemical catalysts capable of functioning under defined processing conditions.

Proteases constitute one of the most valuable enzyme classes due to their ability to catalyze peptide bond hydrolysis, converting macromolecular proteins into smaller peptides and free amino acids. These reactions are essential for improving digestibility, enhancing fermentation performance, optimizing processing yields, and generating functional protein derivatives.

Acid proteases possess a distinct advantage in low-pH environments, where many neutral or alkaline enzymes lose activity. Their stability and catalytic efficiency under acidic conditions make them indispensable across food processing, fermentation industries, animal feed applications, and pharmaceutical biotechnology.

Keywords

Acid protease, low-pH proteolysis, protein hydrolysis, fermentation efficiency, enzyme biotechnology, AcidProZyme®

PRODUCT OVERVIEW: ACID PROTEASE – ACIDPROZYME

AcidProZyme is a high-performance acid protease enzyme preparation developed to deliver consistent and efficient proteolytic activity in acidic processing environments. The enzyme is produced through controlled microbial fermentation using *Aspergillus niger*, ensuring high purity, stability, and batch-to-batch consistency.

Functionally, AcidProZyme catalyzes the breakdown of complex protein structures into smaller, soluble peptides and amino acids, thereby enhancing nutrient availability, fermentation efficiency, and processing performance across multiple industrial applications.

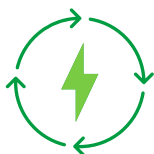
WHY ACIDPROZYME? – A SPECIALIZED PROTEASE FOR LOW-PH PROCESSING

Proteolytic enzymes play a pivotal role in modern bioprocessing, food technology, animal nutrition, and pharmaceutical manufacturing by enabling controlled protein conversion under defined environmental conditions. Acid proteases, in particular, demonstrate superior functionality in acidic systems where conventional enzymes exhibit reduced activity or instability.

This paper presents AcidProZyme, a high-performance acid protease produced via controlled microbial fermentation, designed for reliable protein hydrolysis under low-pH environments. The enzyme's biochemical performance, mechanism of action, industrial applicability, and technical specifications are discussed, highlighting its role as a clean, sustainable alternative to chemical protein processing.



FUNCTIONAL ADVANTAGES OF ACIDPROZYME



EFFICIENT PROTEIN HYDROLYSIS AT LOW PH

AcidProZyme is optimized for acidic systems, enabling:

- Rapid and controlled protein degradation
- Improved solubility of protein substrates
- Stable enzymatic performance under low-pH conditions



IMPROVED DIGESTIBILITY AND NUTRIENT RELEASE

In nutritional and animal feed applications, AcidProZyme supports:

- Enhanced protein digestibility
- Increased amino acid bioavailability
- Reduction of anti-nutritional protein complexes

These effects contribute to improved feed efficiency and nutrient utilization.



ENHANCEMENT OF DISTILLERY AND FERMENTATION PERFORMANCE

AcidProZyme enhances fermentation productivity by:

- Converting proteins into assimilable nitrogen sources
 - Supporting yeast metabolism and growth
 - Improving alcohol yield and overall process efficiency
- This makes it a key enzymatic input for distillery and brewery operations.

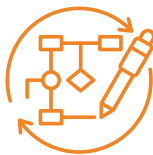




CONTROLLED PRODUCTION OF PROTEIN HYDROLYSATES

The enzyme enables precise hydrolysis for the production of:

- Functional protein peptides
 - Nutraceutical protein hydrolysates
 - Flavor-enhancing amino acid fractions
- Widely used in food, health, and functional ingredient industries.



FOOD PROCESSING AND TEXTURE IMPROVEMENT

In food applications, AcidProZyme contributes to:

- Protein modification in bakery and processed foods
- Improved processing consistency
- Enhanced softness, texture, and product stability



SUSTAINABLE AND CLEAN-LABEL PROCESSING

AcidProZyme supports environmentally responsible manufacturing by:

- Reducing dependence on chemical hydrolysis
- Enabling mild, enzymatic processing conditions
- Supporting clean-label and sustainable biotechnology practices





MECHANISM OF ACTION

AcidProZyme catalyzes the hydrolysis of peptide bonds within protein substrates under acidic pH conditions. The enzymatic action results in the controlled conversion of complex proteins into smaller peptides and free amino acids.



KEY FUNCTIONAL MECHANISMS INCLUDE:

- **Peptide bond cleavage:** Reduces protein molecular complexity
- **Protein solubilization:** Enhances substrate availability
- **Nitrogen release:** Supports fermentation and metabolic efficiency
- **Controlled hydrolysis:** Enables precision processing without harsh chemical treatments

INDUSTRIAL APPLICATIONS

FOOD INDUSTRY	• Bakery and processed food protein modification • Functional protein hydrolysate development • Texture and stability enhancement
DISTILLERY AND BREWERY INDUSTRY	• Fermentation nutrient release • Yeast performance optimization • Improved alcohol yield
ANIMAL FEED INDUSTRY	• Enhanced protein digestibility • Improved growth performance • Better feed conversion ratios
BIOTECHNOLOGY AND NUTRACEUTICAL PROCESSING	• Peptide and amino acid production • Bioactive hydrolysate development • Functional ingredient preparation
INDUSTRIAL PROTEIN PROCESSING	• Enzymatic alternative to chemical hydrolysis • Sustainable protein conversion systems

TECHNICAL SPECIFICATIONS

PARAMETER SPECIFICATION

PRODUCT NAME	ACID PROTEASE
Source of Organism	Aspergillus niger
Exp.Date	2 Years from manufacturing
Carrier Material	Maltodextrin
Application	For Food/ Nutraceutical/ Pharma

TEST	LIMITS
Description	Off white to light brown coloured powder
Moisture	NMT 7 %
Heavy Metal Arsenic Lead	NMT 30 ppm NMT 5 ppm NMT 5 ppm
Activity Acid Protease	NLT 50000 / 100000 / 300000 / 500000 / 600000 HUT /g
Microbial Limit – Total Viable Count Yeast & Mold Count E.coli Salmonella Staphylococcus aureus	NMT 10000 cfu/g NMT 100 cfu/g Should be Absent Should be Absent Should be Absent

OTHER INFORMATION

GMO Status	GMO free
Irradiation	Non Irradiated
TSE/BSE status	TSE/BSE free
Source	Veg Source
Gluten free status	Gluten free
Country of Origin	India

QUALITY, SAFETY, AND COMPLIANCE

AcidProZyme is manufactured under controlled GMP conditions with strict monitoring of enzyme activity, microbial safety, and quality parameters to ensure consistent performance and regulatory readiness.

HANDLING, STORAGE, AND PACKAGING

AcidProZyme should be stored in a cool, dry place, protected from heat, moisture, and direct sunlight.

Appropriate protective measures should be followed to avoid inhalation of enzyme dust.

Standard Packaging: 25 kg drum

Custom Packaging: Available upon request



WHY CHOOSE ENZYME BIOSCIENCE

Enzyme Bioscience integrates advanced R&D capabilities, fermentation expertise, and robust quality control systems to deliver reliable enzyme solutions such as AcidProZyme. The organization is committed to innovation, regulatory documentation support, and long-term customer partnerships in industrial and pharmaceutical biotechnology.

REGULATORY DISCLAIMER

AcidProZyme is intended for B2B use only. Final application suitability, formulation claims, and regulatory compliance are the responsibility of the customer in accordance with applicable local regulations.