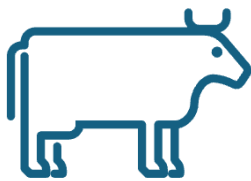


Protease (neutral) Technical Sheet

High activity protease for digesting protein



DIGESTS PROTEIN



FOOD ENHANCER



BREWING



VALORISING



BULK OPTION

 Scientific & Technical™

Protease (neutral) Technical Datasheet

1. Product Overview

Unlock superior flavour profiles and product quality with our premium food-grade protease enzyme, developed specifically for industrial applications. Designed for exceptional performance across a wide range of neutral pH's and temperature conditions, this enzyme delivers rapid and consistent protein hydrolysis, improving texture, flavour development, and nutritional value in your final products. Whether you work in dairy, brewing, baking, plant-protein processing, or flavour manufacturing, our protease enhances throughput, reduces processing time, and supports clean-label formulations. Backed by rigorous quality control and full regulatory compliance, it's the reliable, high-purity solution that elevates both productivity and product excellence.

2. Product Characteristics

Parameter	Specification
Enzyme Class	Peptidase (EC 3.2.3.1)
Source	<i>Bacillus subtilis</i> (non-GM strain)
Appearance	Brown liquid
Activity	1800 U / g
Units	Where 1 U is the amount of enzyme required to release 1 µg of tyrosine (or equivalent peptides) per minute from casein
Total Protein	10-14 % w/v
Density	1.1-1.2 g per mL
Temperature Range	15–60 °C (operational)
Optimal Temperature	50–55 °C
pH Range	5.5–9.0
Optimal pH	6.5–8.5
Shelf Life	12 months (sealed and kept under recommended storage conditions)

3. Enzymatic Properties

3.1 Mechanism of Action:

Protease (neutral) is a zinc-dependent metalloprotease that catalyzes peptide bond hydrolysis through activation of a bound water molecule. In the active site, a Zn²⁺ ion—coordinated by histidine residues and a catalytic glutamate—binds and polarises the carbonyl group of the substrate's scissile peptide bond, increasing the electrophilicity of the carbonyl carbon. The glutamate residue acts as a general base to deprotonate the zinc-bound water, generating a reactive hydroxide ion that performs a nucleophilic attack on the carbonyl carbon, forming a tetrahedral intermediate stabilised by the zinc

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ion. Collapse of this intermediate results in cleavage of the peptide bond and release of two peptide fragments, after which a new water molecule binds to Zn^{2+} to regenerate the active enzyme, completing the catalytic cycle without formation of a covalent acyl–enzyme intermediate.

Protease (neutral)



3.2 Kinetics:

Protease (neutral) follows classic Michaelis–Menten kinetics for a single-substrate enzymatic process in which the enzyme (E) reversibly binds the substrate (S) to form an enzyme–substrate complex (ES), which then converts to product (P) and regenerates free enzyme. Under steady-state conditions, the reaction velocity (v) is described by the Michaelis–Menten equation. At substrate concentrations much lower than (k_m), the reaction rate is first-order with respect to substrate concentration, while at substrate concentrations much higher than (K_m), the enzyme becomes saturated and the reaction approaches zero-order kinetics, proceeding at its maximum velocity.

3.3 Inhibitors:

- Heavy metals (Hg^{2+} , Cu^{2+})
- Urea, Guanidine hydrochloride, SDS
- Extreme low or high pH
- High temperatures above 60 deg. C
- High chelator concentrations (EDTA)

4. Applications

- 4.1 Tissue dissociation and primary cell isolation** – Neutral proteases gently degrade extracellular matrix proteins, enabling efficient release of viable cells from tissues while preserving cell surface markers.
- 4.2 Stem cell and cell culture processing** – They are used to detach adherent cells and process sensitive cell types under mild, near-neutral pH conditions to maintain cell integrity and functionality.
- 4.3 Meat tenderisation** – Neutral proteases hydrolyse muscle proteins and connective tissue components, improving tenderness and texture in meat products.
- 4.4 Production of protein hydrolysates** – They catalyse controlled protein breakdown to generate hydrolysates used in nutritional supplements, infant formulas, and functional foods.
- 4.5 Flavour enhancement in food processing** – By breaking down proteins into peptides and amino acids, neutral proteases contribute to flavour development and enhancement in various food products.
- 4.6 Dairy and plant protein modification** – They modify protein structure to improve solubility, emulsification, foaming capacity, and digestibility in dairy and plant-based formulations.
- 4.7 Peptide production for research and pharmaceuticals** – Neutral proteases are used for controlled enzymatic digestion to produce specific peptide fragments for analytical and therapeutic applications.

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4.8 Protein removal during bioprocessing and purification – They assist in degrading unwanted proteins or impurities during downstream processing in biotechnology and pharmaceutical manufacturing.

4.9 Detergent formulations for protein stain removal – Neutral proteases break down protein-based stains such as blood, egg, and grass at moderate temperatures and neutral pH conditions.

4.10 Leather processing (dehairing and bating) – They selectively hydrolyse non-collagenous proteins in hides, improving softness and flexibility while reducing harsh chemical usage.

4.11 Waste treatment of protein-rich industrial effluents – Neutral proteases help degrade proteinaceous waste materials, reducing biological oxygen demand (BOD) in wastewater streams.

5. Handling & Storage

5.1 Storage Conditions:

- Store at 4–25 °C in sealed containers
- Avoid direct sunlight and freezing
- Keep away from acids, oxidizing agents, and heavy metals

5.2 Stability on Storage:

- Activity loss ~1–5% per month at room temperature
- Refrigeration improves stability

5.3 Safety Information:

- Non-toxic and biodegradable
- May cause allergic reactions via inhalation or skin contact
- Use protective clothing, gloves, goggles
- Avoid aerosol formation

Refer to product MSDS for complete safety details.

6. Packaging Options

- 0.1 L, 1 L, 10 L, 25 L (1000 kg totes available upon request)

7. Quality Control Specifications

Test	Specification
Activity assay	≥ labelled activity

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Test	Specification
Density (liquid)	1.1–1.2 g / mL
Moisture (powder)	≤ 8%
Microbial load	Total plate count ≤ 50,000 CFU / g
Pathogens	<i>Salmonella</i> negative, <i>E. coli</i> negative

9. Shelf Life

- **Liquid:** 12 months

10. Disclaimer

This technical data sheet provides general information. Application testing is recommended to determine optimal use conditions.

NOTE: THIS DOCUMENT CANCELS AND SUPERSEEDS ALL OTHER EDITIONS