

Cutinase Technical Sheet

High activity enzyme to digest cutin



HIGH ACTIVITY



DIGESTS CUTIN



MAXIMISE YIELDS



BULK OPTION

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1. Product Overview

Unlock exceptional performance in your bioprocessing with our next-generation high-activity cutinase enzyme—engineered to deliver unmatched efficiency, speed, and substrate flexibility. Designed for robust hydrolysis of polyesters and natural cutin-based materials, this advanced biocatalyst accelerates reactions even at low dosages, reducing operating costs while maximising throughput. Its superior stability across broad pH and temperature ranges ensures reliable performance in demanding industrial environments, from textile recycling and surface modification to specialty chemical synthesis. With proven high turnover rates and exceptional purity, our cutinase empowers you to boost productivity, enable greener workflows, and bring innovative sustainable solutions to market faster than ever. Let this powerful enzyme elevate your process to the next level.

2. Product Characteristics

Parameter	Specification
Enzyme Class	EC 3.1.1.74 (cutin hydrolase / serine esterase)
Source	<i>Aspergillus niger</i>
Activity	2,500 U per mL
Appearance	Light brown liquid
Temperature Range	15-65 °C
Optimal Temperature	45-65 °C
pH Range	6.0-9.0
Optimal pH	7.0-8.0
Shelf Life	12 months (sealed and kept under recommended storage conditions)

3. Enzymatic Properties

3.1 Mechanism of Action:

Cutinase enzymes typically act as serine hydrolases that break ester bonds in cutin, a waxy polyester found in plant cuticles. Their active site usually contains a catalytic triad, commonly serine, histidine, and aspartate, with the serine acting as the main nucleophile. During catalysis, the serine hydroxyl group attacks the carbonyl carbon of an ester bond in the cutin polymer, forming a short-lived tetrahedral intermediate that is stabilised by an oxyanion hole. The intermediate collapses, releasing the alcohol portion of the substrate and forming an acyl-enzyme intermediate. Water then enters the

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active site and is activated by histidine, allowing it to attack the acyl-enzyme bond. This produces a second tetrahedral intermediate, which collapses to release the fatty acid product and regenerate the free enzyme. Unlike many lipases, cutinases often have a relatively accessible active site without a large lid domain, allowing them to act efficiently at interfaces and on insoluble polyester surfaces.

3.2 Inhibitors:

- Heavy metals (Hg^{2+} , Cu^{2+})
- Urea, Guanidine hydrochloride, SDS
- Extreme low or high pH
- High temperatures above 90 deg. C
- High chelator concentrations (EDTA)

4. Applications

- 4.1 Textile bioprocessing** — surface modification of polyester, PET, and synthetic blends to improve hydrophilicity, dyeability, wettability, and fabric handle.
- 4.2 PET and plastic degradation** — enzymatic hydrolysis of PET and related polyesters into monomers or oligomers, supporting plastic recycling and depolymerisation research.
- 4.3 Detergent formulations** — removal of fatty, waxy, and polyester-based stains, especially stains containing cutin-like or lipid-ester materials.
- 4.4 Food processing** — modification of plant cuticles and waxy fruit or vegetable surfaces to improve peeling, extraction, clarification, or processing efficiency.
- 4.5 Agricultural and biomass processing** — degradation of plant cuticle barriers to improve access to plant tissues during biomass conversion, composting, or bioprocessing.
- 4.6 Pulp and paper processing** — removal or modification of hydrophobic extractives, waxes, and ester-containing contaminants that can affect paper quality.
- 4.7 Biocatalysis and ester synthesis** — catalysis of ester hydrolysis, transesterification, and esterification reactions for specialty chemicals, fragrances, flavours, and fine chemical intermediates.
- 4.8 Surface cleaning and de-waxing** — enzymatic removal of waxy, fatty, or polyester-like coatings from industrial surfaces, fibres, or plant-derived materials.
- 4.9 Biodegradable polymer modification** — hydrolysis or surface functionalization of aliphatic polyesters such as PLA, PCL, PBS, and related materials.
- 4.10 Leather and hide processing** — potential use in enzymatic cleaning or degreasing steps where ester-containing lipids and waxes need to be broken down.

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:

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- 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 SDS for complete safety details.

6. Packaging Options

- 0.1 mL, 1 L, 10 L, 25 L

7. Quality Control Specifications

Test	Specification
Activity assay	≥ labelled activity
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. When stored in original container, sealed, in cool conditions.

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