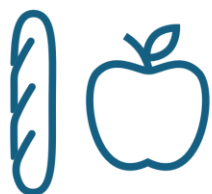


Pullulanase Technical Sheet

High activity enzyme for digesting pullulan



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1) Product description

Pullulanase is a debranching enzyme that hydrolyzes α -1,6 glycosidic linkages in branched polysaccharides such as pullulan, amylopectin, and limit dextrans, producing shorter linear oligosaccharides and improving downstream saccharification and syrup yields.

Primary action: α -1,6 debranching

Secondary action: Minimal α -1,4 activity (product-dependent)

2) Typical applications

- Glucose, maltose, and high-maltose syrup production (improves debranching of liquefied starch dextrans)
- Brewing & distilling (enhanced fermentability / attenuation when used with amylases)
- Starch processing for improved conversion efficiency (used alongside glucoamylase/ α -amylase)
- Specialty oligosaccharides and dextrin tailoring

3) Enzyme activity

Declared activity: 5,000 U/mL

Activity assay

- Substrate: Pullulan
- Reaction conditions: 40–50°C, pH 4.5–5.5 (method-dependent)
- Readout: Release of reducing sugars

Unit definition (U): One Unit is the amount of enzyme that releases 1 μ mol of reducing sugar (as glucose equivalents) per minute from pullulan under the specified assay conditions.

Note: Enzyme activity values depend strongly on assay conditions and substrate specification. If you have your preferred in-house or customer method, align the unit definition and conditions to that method.

4) Typical properties (guidance ranges)

These are typical operating ranges and should be confirmed by application trials.

- Optimum pH: ~4.5–5.5 (commonly aligned to saccharification conditions)
- Optimum temperature: ~50–60°C (varies by source/grade)
- pH stability: typically pH 4.0–6.0 (short-term)
- Thermal stability: decreases rapidly above 60–65°C unless specifically stabilised

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5) Product specifications

- Activity: 5,000 U/mL
- Appearance: Clear to slightly hazy liquid
- Colour: Colourless to amber (batch-dependent)
- Odor: Mild fermentation-like odour
- Density: ~1.0–1.2 g/mL (typical)
- pH (as supplied): commonly 4.0–6.0 (batch-dependent)

Composition (typical):

- Pullulanase enzyme protein in aqueous solution
- Stabilizers/preservatives (if applicable; confirm per batch CoA)
- Salts/buffers (if applicable)

6) Recommended dosage

Dosage depends on substrate, DE, temperature, residence time, and target syrup profile.

Starch saccharification (typical start):

- 0.2–2.0 mL per kg dry starch (i.e., 1,000–10,000 U/kg dry starch)

Brewing/distilling (typical start):

- 0.1–1.0 mL per kg grist (trial recommended)

Always optimise by measuring: DE profile, viscosity, fermentability, filtration behaviour, and final yield.

7) Handling & storage

- Storage temperature: 4–22°C recommended
- Do not freeze unless confirmed acceptable for your specific formulation
- Shelf life: typically 12 months when stored as recommended (confirm per CoA)
- After opening: reseal tightly; avoid contamination; minimise headspace exposure

8) Compatibility & process guidance

- Avoid strong oxidisers and extreme pH conditions outside stability range.
- Enzyme performance can be affected by:
 - high calcium/salt levels (varies)
 - residual sanitizers (e.g., peracetic acid, chlorine)
 - high shear foaming (can denature proteins)

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- Inactivation: Heat treatment or strong pH shift (site-specific validation required).

9) Safety & regulatory notes

- Enzymes may cause respiratory sensitization; avoid aerosols and use appropriate PPE (gloves, eye protection; respiratory protection where mists/aerosols may occur).
- Provide and consult the SDS and CoA for final regulatory, allergen, and microbiological status.
- Food-use acceptability and compliance depend on jurisdiction and the manufacturing organism/process—confirm with your supplier documentation.

10) Packaging

- 1 kg, 5 kg, 25 kg HDPE containers (other sizes available on request)