

Feruloyl Esterase Technical Sheet

High activity enzyme to hydrolase ester bonds



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1. Product Overview

Our Feruloyl Esterase is a highly effective accessory enzyme that helps unlock the full value of plant biomass by breaking the ester bonds that link ferulic acid to plant cell wall polysaccharides. By disrupting these structural cross-links within lignocellulosic material, the enzyme improves the accessibility of cellulose and hemicellulose, allowing other enzymes such as cellulases and xylanases to work more efficiently. This results in improved biomass degradation, higher conversion efficiency, and increased overall process yields. In addition, Feruloyl Esterase releases ferulic acid, a valuable antioxidant widely used in the food, nutraceutical, cosmetic, and pharmaceutical industries. Because of these benefits, the enzyme is increasingly used in applications such as animal feed to improve digestibility, in biofuel and biorefinery processes to enhance saccharification of agricultural residues, and in food and biotechnology sectors to recover high-value phenolic compounds. For companies working with plant-based raw materials or agricultural by-products, Feruloyl Esterase offers a powerful way to improve efficiency, extract additional value, and support more sustainable bioprocessing.

2. Product Characteristics

Parameter	Specification
Enzyme Class	EC number 3.1.1.73
Source	<i>Aspergillus niger</i>
Activity	1,000 U per mL
Appearance	Light brown powder
Temperature Range	30-50 °C
Optimal Temperature	45-50 °C
pH Range	4.5-8.0
Optimal pH	5.0-7.0
Shelf Life	12 months (sealed and kept under recommended storage conditions)

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3. Enzymatic Properties

3.1 Mechanism of Action:

Feruloyl esterase acts by hydrolysing ester bonds that link ferulic acid and related hydroxycinnamic acids to plant cell-wall polysaccharides, especially arabinoxylans and pectic side chains. In lignocellulosic material, ferulic acid often forms cross-links between hemicellulose and lignin, helping strengthen the plant cell wall. The enzyme binds to these esterified feruloyl groups and uses a catalytic hydrolysis mechanism—commonly involving a serine-based active site in many FAEs—to cleave the ester linkage, releasing free ferulic acid and leaving the carbohydrate backbone more accessible. This action can loosen the plant cell-wall matrix and improve access for other enzymes such as xylanases, cellulases, and pectinases, which is why feruloyl esterase is often important in biomass degradation, feed digestibility, and the recovery of antioxidant phenolic compounds.

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

- **Release of ferulic acid** from cereal brans, corn fiber, sugar beet pulp, and other plant materials.
- **Biomass degradation** by breaking ester cross-links between hemicellulose and lignin, improving lignocellulose breakdown.
- **Biofuel production**, where it supports cellulases and xylanases by making plant cell walls more accessible.
- **Animal feed improvement**, especially for increasing fiber digestibility and nutrient availability in cereal-based feeds.
- **Food processing**, including modification of cereal fibers, improvement of dough or bran functionality, and production of bioactive phenolic extracts.
- **Nutraceutical and antioxidant production**, because released ferulic acid has antioxidant activity and can be used in functional ingredients.
- **Vanillin production**, since ferulic acid can be bioconverted into natural vanillin by suitable microorganisms.
- **Pulp and paper processing**, where it can assist enzymatic delignification or fiber modification.
- **Wine, brewing, and beverage processing**, where it can influence phenolic release, aroma precursor availability, and plant material extraction.
- **Biorefinery applications**, especially valorisation of agro-industrial residues such as wheat bran, corn bran, rice bran, and sugar beet pulp.

5. Handling & Storage

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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 SDS for complete safety details.

6. Packaging Options

- 0.1 kg, 1 kg, 10 kg, 25 kg

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

Powder: 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