

Lipase (Cellulose Granules) Technical Sheet

High activity enzyme to digest fats & oils for cleaning applications



HIGH ACTIVITY ECONOMICAL



CLEANING



WASHING



BULK OPTION

1. Product Overview

Our detergent-grade lipase enzyme delivers powerful, targeted removal of fats, oils, and greasy stains, enabling superior cleaning performance even in cold-water and short-cycle washes. Engineered for exceptional stability in high-surfactant, variable-pH detergent systems, it enhances stain-fighting efficiency while allowing formulators to reduce chemical load and improve sustainability. Compatible with both liquid and powder formats, this advanced lipase gives detergent manufacturers a clear competitive edge—boosting product performance, consumer satisfaction, and eco-friendly positioning in an increasingly demanding market.

2. Product Characteristics

Parameter	Specification
Enzyme Class	EC3.1.1.3
Source	<i>Aspergillus spp.</i>
Activity	100,000 U / g
Unit Definition/s	* Where 1 U is the amount of enzyme required to release 1 µmol of fatty acids per minute from olive oil
Carrier	Cellulose
Moisture	5-10 %
Appearance	Off white powder
Typical Dosage	1-3% w/w
Temperature Range	15–70 °C (operational)
Optimal Temperature	35–45 °C
pH Range	6.5–12.0
Optimal pH	10.5–11.0

3. Enzymatic Properties

3.1 Mechanism of Action:

Lipase enzymes remove fatty and greasy stains by catalysing the hydrolysis of triglycerides—the main components of oils and fats—into smaller, more water-soluble molecules such as diglycerides, monoglycerides, free fatty acids, and glycerol. Acting at the oil–water interface, lipases recognize and bind to hydrophobic fat droplets, then use a catalytic triad (typically serine–histidine–aspartate) to break the ester bonds within triglycerides. This reaction reduces the size and hydrophobicity of lipid soils, allowing surfactants in the detergent to more easily solubilize, disperse, and wash them away. Because this enzymatic cleavage works efficiently even at low

Lipase (Cellulose Granules) Technical Datasheet

temperatures, lipases significantly enhance cleaning performance in modern cold-wash and energy-saving detergent formulations.

3.2 Kinetics:

Lipase enzyme reaction kinetics follow typical Michaelis–Menten behavior, where the rate of triglyceride hydrolysis increases with substrate concentration until reaching a maximum velocity (V_{max}) governed by the enzyme's catalytic capacity. Lipases often exhibit interfacial activation, meaning their activity sharply increases once they encounter the oil–water interface, where a conformational change exposes the active site. Factors such as pH, temperature, and the presence of surfactants strongly influence kinetic parameters by affecting enzyme stability, substrate emulsification, and active-site accessibility. In detergents, optimized kinetics ensure rapid breakdown of fats and oils even under diluted, low-temperature wash conditions, contributing to faster stain removal and improved cleaning efficiency.

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 Laundry Detergents (Liquid, Powder and Pods)

- Broad-spectrum removal of starch-, protein- and fat-based stains
- Effective against food residues, sauces, dairy, egg, grease, oils and body soils
- Enhanced cleaning performance at lower wash temperatures and during short-cycle washes
- Suitable for household and professional laundry detergent formulations

4.2 Pre-Soak and Pre-Treat Stain Removers

- Targeted enzymatic breakdown of complex and mixed organic stains
- Effective against starch-based food stains, proteinaceous residues, grease, oils and sebum
- Helps loosen stubborn soils prior to the main wash cycle
- Suitable for concentrated pre-treatment and soaking formulations

4.3 High-Efficiency (HE) Washing Machine Detergents

- Effective enzymatic cleaning under low-water washing conditions
- Multi-enzyme action supports efficient stain removal during shorter wash cycles
- Helps improve cleaning performance without relying solely on high temperatures or increased chemical loading

4.4 Automatic Dishwashing Detergents

- Breakdown of starch residues, proteinaceous food soils, oils and fats
- Helps remove dried and baked-on food residues from dishes and cookware
- Supports effective cleaning in low-temperature and rapid-wash programmes

Lipase (Cellulose Granules) Technical Datasheet

- Suitable for powder, tablet and other automatic dishwashing formulations

4.5 Industrial & Institutional Cleaning

- Suitable for commercial laundry applications including hotels, healthcare facilities, restaurants and workwear
- Broad-spectrum degradation of starch-, protein- and lipid-based soils
- Enhanced cleaning of heavily soiled textiles, uniforms and washable materials
- Suitable for professional and institutional detergent formulations

4.6 Multi-Enzyme Detergent Formulations

- Provides synergistic amylase, protease and lipase activity for broad-spectrum stain removal
- Simultaneously targets starch-, protein- and fat-based components of complex soils
- Suitable for premium and high-performance detergent formulations
- Enables formulation of concentrated multi-enzyme cleaning products

4.7 Eco-Friendly & Low-Chemical Detergent Lines

- Supports effective cleaning at reduced wash temperatures
- May enable optimisation of surfactant and other cleaning-agent concentrations
- Supports development of energy-efficient and enzyme-based cleaning formulations
- Biodegradable cellulose carrier provides a practical granular enzyme delivery system

4.8 Fabric Care & Laundry Products

- Enzymatic removal of organic soils under comparatively mild washing conditions
- Helps reduce dependence on aggressive cleaning conditions for stain removal
- Suitable for everyday, professional and concentrated laundry formulations
- Effective against a broad range of common food and body-derived stains

4.9 Household & Hard-Surface Cleaners

- Breakdown of food residues, grease, oils and proteinaceous soils on washable surfaces
- Suitable for kitchen and general-purpose enzymatic cleaning formulations
- Effective on suitable counters, tiles, filters and other washable hard surfaces
- Can be incorporated into compatible spray, foam and concentrated cleaning formulations

4.10 Septic Tank & Waste Treatment Products

- Suitable for incorporation into enzyme-based septic tank and waste treatment formulations
- Amylase, protease and lipase provide complementary breakdown of starch-, protein- and fat-based organic matter
- Helps hydrolyse complex organic materials into smaller, more readily biodegradable components
- Suitable for biological maintenance products designed for septic tanks, drains and associated wastewater systems

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 ~1–2% 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

8. Shelf Life

Powder: 12 months. When stored in original container, sealed, in cool conditions.

9. 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