

Phospholipase Technical Sheet

High activity enzyme to hydrolyse fatty acids



**PHOSPHOLIPID
HYDROLYSIS**



**FOOD GRADE
QUALITY**



**THERMOSTABLE
PERFORMANCE**



**PROCESS
EFFICIENCY**



**BULK
SUPPLY OPTION**

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1. Product Overview

Our food-grade phospholipase enzyme is a powerful solution for improving efficiency, yield, and product quality in food processing. By breaking down phospholipids—natural emulsifiers that often hinder oil recovery and complicate processing—it helps unlock more value from raw materials while streamlining operations. The result is increased oil yield, more efficient degumming with reduced chemical usage, and enhanced final product quality through lower impurities and improved clarity and stability. Easy to integrate into existing processes and fully compliant with food-grade standards, it enables manufacturers to reduce waste, boost throughput, and ultimately improve margins, turning a common processing challenge into a clear commercial advantage.

2. Product Characteristics

Parameter	Specification
Enzyme Class	Peptidase (EC 3.1.1.32)
Source	<i>Aspergillus oryzae</i> (non-GM strain)
Format	Liquid / Powder
Appearance	Brown liquid / off-white powder
Activity	10,000 U / g
Units	Where 1 U is the amount of enzyme required to release 1 μ mol of free fatty acid per minute from oil under standard conditions
Total Protein	10-14 % w/v
Density	1.10-1.20 g per mL
Temperature Range	15–55 °C (operational)
Optimal Temperature	45–55 °C
pH Range	3.5–8.0
Optimal pH	5.5–6.5
Shelf Life	12 months (sealed and kept under recommended storage conditions)

3. Enzymatic Properties

3.1 Mechanism of Action:

Phospholipase A1 (PLA1) catalyses the selective hydrolysis of the ester bond at the sn-1 position of phospholipids, including phosphatidylcholine (lecithin) and other glycerophospholipids. During this reaction, PLA1 releases the fatty acid attached at the sn-1 position, producing a free fatty acid and a 2-acyl lysophospholipid. This enzymatic modification changes the physicochemical properties of the

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original phospholipid, particularly its hydrophilic-lipophilic balance, interfacial behaviour and emulsifying characteristics. The resulting lysophospholipids generally exhibit enhanced dispersibility and surface activity, allowing them to interact more effectively at oil-water interfaces. In industrial processes, controlled phospholipid hydrolysis can therefore be used to modify lecithin functionality, improve emulsion stability, facilitate oil degumming and separation, enhance processing efficiency, and optimise the performance of phospholipid-containing formulations.

3.2 Kinetics:

Phospholipase A1 typically follows Michaelis–Menten-type kinetics, with the reaction rate increasing as phospholipid substrate concentration rises until the enzyme approaches saturation and a maximum reaction velocity (V_{max}) is reached. Because phospholipids are poorly soluble and commonly occur as emulsions, micelles, membranes or other aggregated structures, PLA1 activity is strongly influenced by interfacial factors as well as conventional enzyme–substrate interactions. Reaction rate therefore depends on substrate concentration and accessibility, available oil–water interfacial area, enzyme dosage, mixing, pH and temperature. Under suitable conditions, increasing enzyme concentration generally increases the initial hydrolysis rate, while prolonged reactions may progressively slow as accessible substrate is depleted and reaction products accumulate. For industrial applications, effective agitation and control of temperature and pH are therefore important for achieving consistent and efficient phospholipid conversion.

3.3 Inhibitors:

- Heavy metals (Hg^{2+} , Cu^{2+})
- Urea, Guanidine hydrochloride, SDS
- Extreme low or high pH
- High temperatures above 70 deg. C
- High chelator concentrations (EDTA)

4. Applications

- **Edible oil degumming** – hydrolyses phospholipids to improve their removal from crude vegetable oils and increase oil yield.
- **Lecithin modification** – converts phospholipids into lysophospholipids to produce modified lecithins with enhanced functionality.
- **Emulsifier production** – improves the dispersibility, surface activity and emulsifying performance of phospholipid-based ingredients.
- **Food processing** – used to improve emulsion stability, texture, processing characteristics and ingredient functionality.
- **Baking applications** – modification of phospholipids can support dough handling, crumb structure, volume and product consistency.
- **Dairy and plant-based products** – supports emulsion formation and stability in fat-containing formulations.

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- **Sauces, dressings and mayonnaise** – improves oil–water emulsification and stability.
- **Oil and fat processing** – assists refining, separation and downstream processing by modifying troublesome phospholipids.
- **Industrial biotechnology** – used for controlled phospholipid modification and the production of lysophospholipids and other lipid-derived ingredients.

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

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

7. Quality Control Specifications

Test	Specification
Activity assay	≥ labelled activity
Density (liquid)	1.1–1.2 g / mL
Moisture (powder)	≤ 8%
Microbial load	Total plate count ≤ 50,000 CFU / g

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Test	Specification
Pathogens	<i>Salmonella</i> negative, <i>E. coli</i> negative

9. Shelf Life

- **Liquid:** 12 months - stored in original container, sealed, in cool conditions.
- **Powder:** 12 months - 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