

TECHNICAL INFORMATION

Catalog Number: 100831, 100834, 191335, 195303

Lysozyme

CAS # : 9001-63-2

Synonym: Muramidase

Physical Appearance: White to off white lyophilized crystalline powder

Description: Lysozyme (muramidase) hydrolyzes preferentially the b-1,4 glucosidic linkages between N-acetylmuramic acid and N-acetylglucosamine which occur in the mucopeptide cell wall structure of certain microorganisms, such as *Micrococcus lysodeikticus*.

In humans, Osserman, et al.¹⁴ have indicated that lysozyme may be the mediator in the anti-tumor function of macrophages which, it has been shown, secrete the enzyme.⁸ There is evidence that cartilage lysozyme has a role in cartilage calcification.¹² The enzyme has been used for lysing *E. coli* and *Streptomyces* for extraction purposes⁹ such as extracting group specific antigen.¹⁸ It would appear that lysozyme may act as a germinative agent of bacterial spores.^{2,7}

Molecular weight: 14,388 (Chicken¹¹); 17,000 (human).

Optimum pH: 9.2.⁵

Extinction coefficient: = 26.4.³

Isoelectric point: pH 11.0.¹

Inhibitors: The enzyme is inhibited by surface-active reagents such as dodecyl sulfate, alcohols and fatty acids.¹⁷ Imidazole and indole derivatives are inhibitors via formation of charge-transfer complexes.¹⁵

Stability: Solutions at pH 4-5 are stable for several weeks refrigerated and for days at ambient temperatures.

Assay: Mintz, et al.¹³ describe a sensitive fluorimetric assay.

Unit Definitions:

From Chicken: One unit will cause a decrease in A450 of 0.001 per minute at pH 6.24 and 25°C using *Micrococcus lysodeikticus* as substrate.

Shugar Unit:¹⁶ One unit is defined as the amount of enzyme that will digest powdered cells of *Micrococcus lysodeikticus*, causing a decrease in absorbancy of 0.001 per minute at 37°C, pH 7.0

Availability:

Catalog Number	Description	Size
100831	Lysozyme, from chicken egg white, 3X crystallized; Activity: 20,000 - 25,000 units/mg protein	100 mg 500 mg 1 g 5 g 10 g 25 g 100 g
100834	Lysozyme, from chicken egg white, 2X crystallized; Activity: > 9,000 units/mg protein	1 g 5 g 10 g
195303	Lysozyme, from chicken egg white, Type VI, 3X crystallized; Activity: ~60,000 units/mg protein	1 g 5 g 25 g
191335	Lysozyme, from human neutrophils; Activity: ~30,000 Shugar units/mg protein	100 ug

References:

- Alderton, G., Ward, W., and Febold, H., "Isolation of Lysozyme from Egg White," *J. Biol. Chem.*, **v. 157**, 43 (1945).
- Ando, Y., "The Effect of Lysozyme on Ionic Forms of Spores of *Clostridium perfringens* Type A," *J. Bacteriol.*, **v. 122**, 794 (1975).
- Aune, K., and Tanford, C., "Thermodynamics of the Denaturation of Lysozyme by Guanidine Hydrochloride. I. Dependence on pH at 25°C," *Biochem.*, **v. 8**, 4579 (1969).
- Dahlquist, F., Borders, C., Jacobson, G., and Raftery, M., "The Stereospecificity of Human, Hen and Papaya Lysozymes," *Biochem.*, **v. 8**, 694 (1969).
- Davies, A., Neuberger, A., and Wilson, B., "The Dependence of Lysozyme Activity on pH and Ionic Strength," *Biochim. Biophys. Acta*, **v. 178**, 294 (1969).
- Dubois, T., Guillard, R., Prieels, J., and Perraudin, J., "Comparison between the Folding of Reduced Hen Egg White

Lysozyme and that of Reduced Human Milk Lysozyme," *Biochem.*, **v. 21**, 6516 (1982).

– Duncan, C., Labbe, R., and Reich, R., "Germination of Heat- and Alkali-Altered Spores of *Clostridium perfringens* Type A by Lysozyme and Initiation Protein," *J. Bacteriol.*, **v. 109**, 550 (1972).

– Gordon, S., Todd, J., and Cohn, Z., "In Vitro Synthesis and Secretion of Lysozyme by Mononuclear Phagocytes," *J. Exp. Med.*, **v. 139**, 1228 (1974).

– Haas, M., and Dowding, J., "Aminoglycoside-Modifying Enzymes," in *Methods in Enzymology*, **XLIII**, (Hash, J., ed.), Academic Press, NY, 621 (1965).

– Hankiewicz, J., and Swierczek, E., "Lysozyme in Human Body Fluids," *Clin. Chim. Acta*, **v. 57**, 205 (1974).

– Jollés, P., "Lysozyme," in *The Enzymes*, **IV**, 2nd Ed., (Boyer, P., Lardy, H., and Myrback, K., eds.), Academic Press, NY, 431 (1960).

– Kuettner, K., Sorgente, N., Croxen, R., Howell, D., and Pita, J., "Lysozyme in Preosseous Cartilage. VII. Evidence for Physiological Role of Lysozyme in Normal Endochondral Calcification," *Biochim. Biophys. Acta*, **v. 372**, 335 (1974).

– Mintz, G., Herbold, D., and Glaser, L., "A Fluorescent Assay for Bacterial Cell Wall Lytic Enzymes," *Anal. Biochem.*, **v. 66**, 272 (1975).

– Osserman, E., Kockars, M., Halper, J., and Fischel, R., "Effects of Lysozyme on Normal and Transformed Cells," *Nature*, **v. 243**, 331 (1973).

– Shinitzky, M., Katchalski, E., Grisaro, V., and Sharon, N., "Inhibition of Lysozyme by Imidazole and Indole Derivatives," *Arch. Biochem. Biophys.*, **v. 116**, 332 (1966).

– Shugar, D., "Measurement of Lysozyme Activity and the Ultra Violet Inactivation of Lysozyme," *Biochim. Biophys. Acta*, **v. 8**, 302 (1952).

– Smith, G., and Stoker, C., "Inhibition of Crystalline Lysozyme," *Arch. Biochem.*, **v. 21**, 383 (1949).

– Watson, B., Moellering, R., and Kunz, L., "Identification of *Streptococci*: Use of Lysozyme and *Streptomyces albus* Filtrate in the Preparation of Extracts for Lancefield Grouping," *J. Clin. Microbiol.*, **v. 1**, 274 (1975).