

Product Information

Mutanolysin from *Streptomyces globisporus* ATCC 21553

Lyophilized powder, ≥4000 units/mg protein (Biuret), Chromatographically purified

M9901

Product Description

The Gram-positive bacterium *Streptomyces globisporus* ATCC 21553 (also known as the B-1829 strain of *Streptomyces*) produces three extracellular bacteriolytic enzymes:

- The lytic enzymes *N*-acetylmuramidase M1 and *N*-acetylmuramidase M2, and
- The proteolytic enzyme *N*-Acetylmuramyl-L-alanine amidase.¹⁻⁵

Collectively, these enzymes are referred to as mutanolysin.² Particular properties of the three enzymes include the following:

1. *N*-acetylmuramidase M1
 - Activity: β-1,4-*N*,6-*O*-diacetylmuramidase¹
 - Molecular mass: ~20 kDa,^{3,4} ~27 kDa⁶
2. *N*-acetylmuramidase M2
 - Activity: β-1,4-*N*-acetylmuramidase¹
 - Molecular mass: ~11 kDa^{3,4}
3. *N*-Acetylmuramyl-L-alanine amidase⁵
 - Activity: cleavage at the lactylamide bond of bacterial peptidoglycans
 - Molecular mass: ~18.5 kDa
 - Isoelectric point: 6.6

The crystal structure of the *N*-acetylmuramidase M1 constituent of mutanolysin has been reported.⁷

For isolation of nucleic acids, mutanolysin has been used in the lysis of Gram-positive bacteria (such as *Listeria*, *Lactobacillus*, *Lactococcus*),⁸ and also generally on bacteria that are difficult to lyse with lysozyme.⁹

Several theses^{10,11} and dissertations¹²⁻²³ have cited use of product M9901 in their protocols.

Precautions and Disclaimer

For R&D use only. Not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

Solutions of mutanolysin can be prepared in 50 mM TES buffer, pH 7.0, with 1 mM MgCl₂, at the equivalent of 1 mg/mL. Mutanolysin can also be dissolved in water²⁴ or TE buffer.²⁵

Storage/Stability

Mutanolysin stock solutions can be stored at -20 °C in frozen aliquots, at such concentrations as:

- 1,000 units/mL in water²⁴
- 3,000 units/mL in TE buffer²⁵

References

1. Brönneke, V., and Fiedler, F., *Appl. Environ. Microbiol.*, **60(3)**, 785-791 (1994).
2. Yokogawa, K. *et al.*, *Antimicrob. Agents Chemother.*, **6(2)**, 156-165 (1974).
3. Yokogawa, K. *et al.*, *Agric. Biol. Chem.*, **39(8)**, 1533-1543 (1975).
4. Kawata, S. *et al.*, *Agric. Biol. Chem.*, **47(7)**, 1501-1508 (1983).
5. Kawata, S. *et al.*, *Agric. Biol. Chem.*, **48(2)**, 261-269 (1984).
6. Lichenstein, H.S. *et al.*, *Gene*, **88(1)**, 81-86 (1990).
7. Harada, S. *et al.*, *J. Mol. Biol.*, **207(4)**, 851-852 (1989).
8. Fliss, I. *et al.*, *Biotechniques*, **11(4)**, 453-457 (1991).
9. Liu, D., "Isolation of Bacterial DNA from Cultures", in *Handbook of Nucleic Acid Purification* (Liu, D., ed.). CRC Press (Boca Raton, FL), pp. 85-105 (2009).
10. Heggenhougen, Maria Victoria, "A penicillin resistant *Streptococcus pneumoniae* in the making: characterizing resistance development and cell fitness after acquiring low-affinity penicillin-binding proteins and a mosaic MurM". Norwegian University of Life Sciences, M.Sc. thesis, p. 27 (2019).

11. Bharadwaj, Lalit, "The Cystic Fibrosis Microbiome and its Association with Incident Infections with *Mycobacteroides (Mycobacterium) abscessus*". Johns Hopkins University, M.Sc. thesis, p. 30 (2021).
12. Al-Zoreky, Nageb, "Effect of Selected Lactic Acid Bacteria On The Growth Of Food-borne Pathogens And Spoilage Microorganisms in Raw Milk And Milk Products". Oregon State University, Ph.D. dissertation, p. 105 (1992).
13. Verheul, Annette, "Physiology of *Listeria monocytogenes* in relation to food components and biopreservation". Wageningen University, Ph.D. dissertation, p. 141 (1997).
14. Nguyen, Hoang Duc, "Construction of plasmid-based expression and secretion vectors and study of the immobilization of proteins on the surface of *Bacillus subtilis* cells". Universität Bayreuth, Dr. rer. nat. dissertation, p. 28 (2006).
15. Chung, Yoon-Suk Alexander, "Characterization of Phagocytic Pattern Recognition Receptors in *Drosophila melanogaster*". Universität zu Köln, Dr. rer. nat. dissertation, p. 26 (2011).
16. Miller, Kelly Ann Heintzelman, "Characterization of the Unique Flagellar Hook Structure of the Spirochetes *Borrelia burgdorferi* and *Treponema denticola*". West Virginia University, Ph.D. dissertation, pp. 46, 73 (2013).
17. Collins, Andrea M., "Lower Respiratory Tract Infection in Adults - Carriage as a Diagnostic, Home-based Care and Vaccine Development". University of Liverpool, Ph.D. dissertation, p. 319 (2016).
18. Brown, Richard Gailon, "The vaginal microbiome in preterm prelabour rupture of the fetal membranes". Imperial College London, Ph.D. dissertation, p. 75 (2018).
19. Soderholm, Amelia, "The Group A *Streptococcus* M1T1 clone post-transcriptionally modifies innate immune signalling to promote infection". University of Queensland, Ph.D. dissertation, p. 90 (2018).
20. Thoroughgood, Christopher William, "Functional and structural studies of an Enterococcal Serine/Threonine kinase and its contribution to antibiotic resistance mechanisms". University of Warwick, Ph.D. dissertation, p. 108 (2018).
21. Marin, Lina Maria, "Effect of histatin- and statherin-derived engineered salivary peptides on *Streptococcus mutans* adhesion and on enamel demineralization provoked by cariogenic biofilms". University of Western Ontario, Ph.D. dissertation, p. 12 (2019).
22. Demaree, Benjamin Robert, "Single-cell droplet microfluidics for metagenomics and cancer multiomics". University of California San Francisco, Ph.D. dissertation, p. 29 (2020).
23. Patty, Olivia, "*Streptococcus equi* subsp. *Zooepidemicus* in New Zealand Horses". University of Waikato, Ph.D. dissertation, p. 22 (2020).
24. Rossello-Mora, R. *et al.*, "DNA-DNA Hybridization", in *Taxonomy of Prokaryotes* (Raine, F., and Oren, A., eds.). *Methods in Microbiology*, Vol. 38, Academic Press (London, UK), pp. 325-348 (2011).
25. Deodhar, D. *et al.*, *J. Glob. Infect. Dis.*, **7(3)**, 97-102 (2015).

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