3050 Spruce Street, St. Louis, MO 63103 USA
Tel: (800) 521-8956 (314) 771-5765 Fax: (800) 325-5052 (314) 771-5757
email: techservice@sial.com sigma-aldrich.com

Product Information

α-Amylase from *Bacillus licheniformis* (*Bacillus globigii*)

Catalog Number **A4551**
Storage Temperature 2–8 °C

CAS RN 9000-85-5
EC 3.2.1.1
Synonyms: 1,4-α-D-Glucan-glucanohydrolase

Product Description

α-Amylase breaks down starch into sugars, by hydrolysis of the α-(1→4) glucan linkages in polysaccharides of three or more α-(1→4) linked D-glucose units, without hydrolyzing the α-(1→6) bond. α-Amylase occurs in many natural sources, including animals and plants, but also notably in microorganisms, such as different *Bacillus* species:[1]

- *B. amyloliquefaciens*
- *B. licheniformis*
- *B. stearothermophilus*
- *B. subtilis*
- *B. megaterium*
- *B. circulan*

α-Amylase from *Bacillus licheniformis* NCIB 6346 has been reported to maintain >98% of activity after 60 minutes at pH 6.2 at 85 °C.[2] Other α-amylases have been reported to maintain 100% of activity after storage for 1 hour at 91 °C.[3] For routine experimental work, the natural substrates starch or glycogen can be replaced, to a limited extent, by low molecular weight compounds.[4]

Different molecular mass values of α-amylases from different strains of *Bacillus licheniformis* have been published:

NCIB 6346:[2] 62 kDa
44MB82-A:[5] 58 kDa
MTCC 1483:[6] 58 kDa

Crystal structures for α-amylase from *B. licheniformis* have been reported, in both a Ca^{2+}-depleted form[7] and a metal-ion bound form.[8,9]

α-Amylase has a pH range for activity of 5-9, with an optimal pH range of 7-9.

The product is supplied as a lyophilized powder containing potassium phosphate.

Precautions and Disclaimer

This product is 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

Sigma-Aldrich does not run a separate solubility test for this product. One publication reports preparation of stock solutions of this product at 20 mg/mL in phosphate buffer, pH 6.9.[10] Another reference indicates preparation of 1.5 mg/mL solutions of this product in 100 mM HEPBS buffer, pH 9.0.[11]

Storage/Stability

Store the product at 2–8 °C. Solutions of α-amylase in 25 mM Trizma®-HCl, pH 7.5, with 100 mM KCl are stable at 0 °C or –20 °C for at least 9 days. Solutions in 1 mM phosphate, pH 7.3, with 30 mM $CaCl_2$ may be stored at –15 °C.[12]

Solutions in 20 mM sodium phosphate, pH 6.9, with 6.7 mM NaCl were stored for 2 weeks at different temperatures with the following results:

Temperature	% Activity Remaining
–20 °C	65%
5 °C	80%
Ambient Temperature	70%

Under all three conditions, activity loss occurred in the first 5 days with no additional loss of activity thereafter.

References

1. Divakaran, D. *et al.*, *Braz. J. Microbiol.*, **42(4)**, 1397-1404 (2011).
2. Morgan, F.J., and Priest, F.G., *J. Appl. Bacteriol.*, **50(1)**, 107-114 (1981).
3. Medda, S., and Chandra, A., *J. Appl. Bacteriol.*, **48(1)**, 47-58 (1980).
4. Barman, T.E., *Enzyme Handbook*, Springer-Verlag (New York: 1969) Vol. II, EC 3.2.1.1, p. 560.
5. Ivanova, V.N. *et al.*, *J. Biotech.*, **28(2-3)**, 277-289 (1993).
6. Rao, M.D. *et al.*, *World J. Microbiol. Biotech.*, **18** , 547-550 (2002).
7. Machius, M. *et al.*, *J. Mol. Biol.*, **246(4)**, 545-559 (1995).
8. Hwang, K.Y. *et al.*, *Mol. Cells*, **7(2)**, 251-258 (1997)
9. Machius, M. *et al.*, *Structure*, **6(3)**, 281-292 (1998).
10. Attia, M.S., and Youssef, A.O., *New J. Chem.*, **40**, 7529-7535 (2016).
11. Shaw, B.F. et al., *Protein Sci.*, **17(8)**, 1446-1455 (2008).
12. Schomburg, D., and Salzmann, M., *The Enzyme Handbook*, Springer-Verlag (Berlin Heidelberg: 1991), Vol. 4, EC 3.2.1.1, p. 7.

GCY,MES,AJH,MAM 07/18-1