

Tools of Recombinant DNA Technology

S1 Nuclease

For single-strand DNA/RNA digestion

S1 Nuclease, purified from *Aspergillus* sp. is a single-stranded-specific endonuclease that hydrolyzes single-stranded DNA and RNA into acid-soluble 5' - mononucleotides. It hydrolyzes single-stranded regions in duplex DNA such as loops and gaps. S1 Nuclease catalyzes the chemical reaction of endonucleolytic cleavage to 5'-phosphomononucleotide and 5'-phosphooligonucleotide end-products.

Single-stranded RNA



or

DNA molecules



Double-stranded nucleotides



5' -mononucleotides



Applications

- S1 Mapping (Mapping DNA sequences that encodes RNA)
- Removal of single-stranded regions of DNA fragments
- Preparation of single-strand templates
- Cleavage of hairpin loops
- Blunting ends of double-stranded DNA by removing single stranded tails from DNA molecules
- Probing the existence of duplex DNA regions
- Localization of intron and exon boundaries
- Increasing the specificity of nucleic acid hybridization
- Introduction of deletion mutations at D loops in duplex DNA

Features

- Does not degrade double-stranded DNA or DNA-RNA hybrids
- Highly efficient Digestion of single-stranded DNA

Specifications

Storage 10 mM sodium acetate, pH4.6
 150 mM NaCl
 0.05 M ZnSO₄
 50% glycerol

Activity ≥ 100 units/ μ l
 Molecular Weight 32,000 glycoprotein containing Zn²⁺
 Optimum pH and temperature See overleaf Fig. 1, 2
 pH and thermal stability See overleaf Fig. 1, 2

Unit Definition

One unit of enzyme hydrolyzes 1 μ g of heat-denatured calf thymus DNA into acid-soluble form at 37°C, pH4.6 in one minute

S1 Nuclease

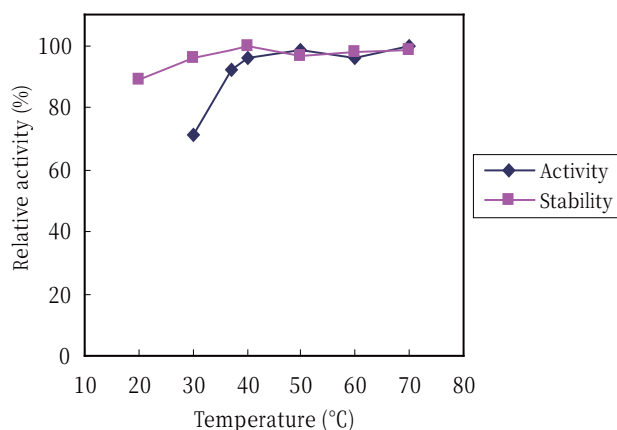


Fig.1 Thermal-stability and activity stability:
30 minutes treatment
Activity: pH4.6

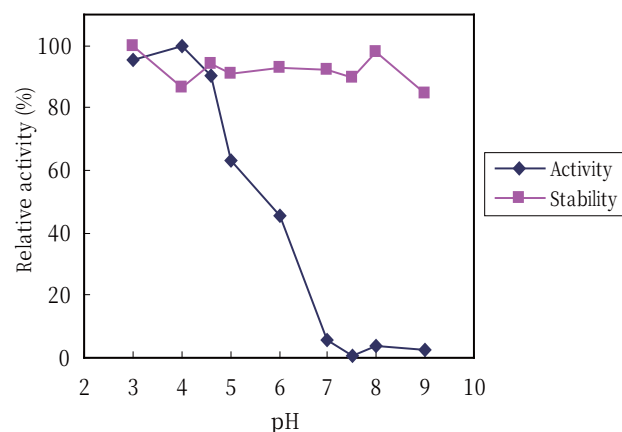


Fig.2 pH-stability and activity stability:
2 hours treatment at 5°C
Activity: 37°C

Procedure

After incubation for 15 minutes at 23°C, terminate by EDTA. Blunting of protruding termini with T4 DNA Polymerase or Klenow Fragment.

Application Example

Selective degradation of single DNA

DNA	1 µg
S1 Nuclease	10 U
10×S1 Buffer	2 µL
dH ₂ O	up to 20 µL
Total volume	20 µL

References:

- 1) Lee, B. R., Kitamoto, K., Yamada, O. and Kumagai, C. (1995) Appl Microbial Biotechnol, 44, 425-431.
- 2) Vogt, V.M. (1973) Eur. J. Biochem, 33, 192-200.
- 3) Berk, A. J. and Sharp, P. A. (1978) Proc. Natl. Acad. Sci. USA, 75, 1274-1278.
- 4) Wiegand, R. C., Godson, G. N. and Radding, C. M. (1975) J. Biol. Chem., 250, 8848-8855.

Description	Cat. No.	Quantity	Storage
S1 Nuclease	OZK-OZ-40-EX	200 µL (20,000 units)	-20°C

S1 Nuclease is supplied with a vial of 10X S1 Nuclease buffer [300 mM sodium acetate (pH 4.6), 10 mM zinc sulfate, 2800 mM NaCl], vial of dilution buffer, vial of 3 M NaCl. Store at -20 °C.



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