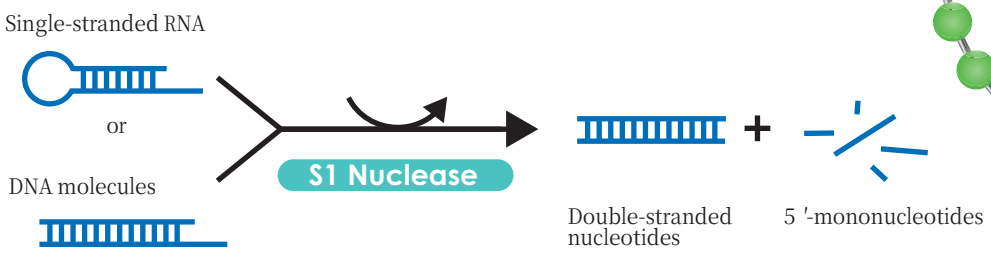
## Tools of Recombinant DNA Technology

# 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.




## 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<br>150 mM NaCl<br>0.05 M $ZnSO_4$<br>50% glycerol |
| Activity | ≧100 units/μl |
| Molecular Weight | 32,000 glycoprotein containing $Zn^{2+}$ |
| 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 μg of heat-denatured calf thymus DNA into acid-soluble form at 37°C, pH4.6 in one minute

# S1 Nuclease

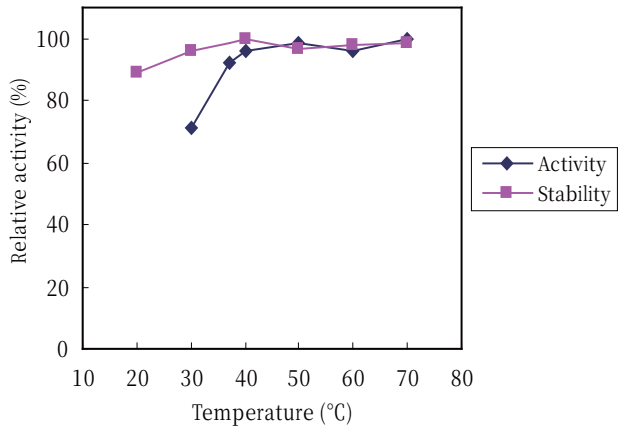



**Fig.1 Thermal-stability and activity stability:**
30 minutes treatment
Activity: pH4.6

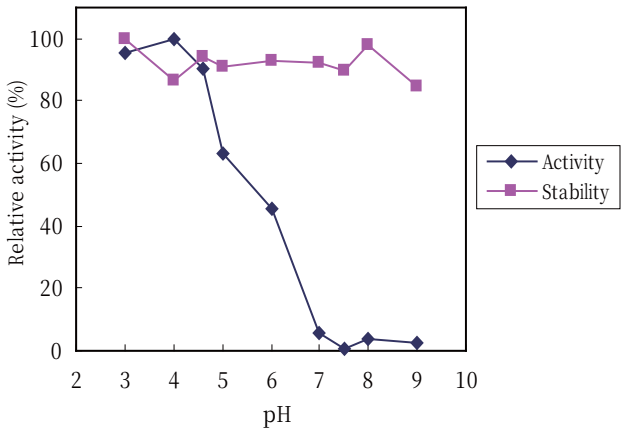



**Fig.2 pH-stability and activity stability:**
2 hours treatment at 5℃
Activity: 37℃

## Procedure

After incubation for 15 minutes at 23℃, 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 |
| $dH_2O$ | up to 20 µL |
| Total volume | 20 µL |

## References:


1) Lee, B. R., Kitamoto, K., Yamada, O. and Kumagai, C. (1995) Appl Microbial Biotechinol, 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℃ |

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 ℃.

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