

NUCQX® Deoxyribonuclease I (DNase I) from bovine pancreas

Cat. no. LM105013

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Product Information

Product	NUCQX® Deoxyribonuclease I (DNase I) from bovine pancreas
CAS No.	9003-98-9
Molecular Weight	~31 kDa
Kunitz Units	≥2000 Kunitz Units/mg protein
Size	15000 U /10×15000 U
Type	Type IV
Optimal pH	7-8
Appearance	White to light brown lyophilized powder
Purity	Protein ≥80% by Biuret method
Solubility	5 mg/mL in 0.15 M NaCl, forms a colorless transparent solution
Activators	Various divalent metal ions such as Mg ²⁺ , Mn ²⁺ , Ca ²⁺ , Co ²⁺ , and Zn ²⁺
Inhibitors	β-mercaptoethanol; chelating agents; SDS; actin
Unit Definition	One Kunitz unit is defined as the amount of enzyme that causes an increase in absorbance at 260 nm (ΔA ₂₆₀) of 0.001 per minute per mL under the conditions of 25°C and pH 5.0, using DNA as a substrate.
Storage Conditions	Part I component: Store at -25°C to -15°C; shelf life of 2 years. Part II component: Store at room temperature; shelf life of 2 years.

2. Product Description

NUCQX® Deoxyribonuclease I (DNase I) from bovine pancreas is a type of endonuclease found in various cells and tissues. It cleaves phosphodiester bonds adjacent to pyrimidine nucleotides, producing polynucleotides with 5'-phosphate and 3'-hydroxyl termini. The average minimum digestion product is a tetramer. DNase I catalyzes the hydrolysis of various forms of DNA, including single-stranded DNA, double-stranded DNA, and even chromatin (its cleavage rate is influenced by histones). The optimal working pH is 7-8. DNase activity depends on Ca²⁺ and can be activated by divalent metal ions such as Co²⁺, Mn²⁺, and Zn²⁺. A 5 mM concentration of Ca²⁺ protects the enzyme from autolysis. In

the presence of Mg^{2+} , DNase I cleaves DNA randomly at any site on either strand. In contrast, in the presence of Mn^{2+} , it can cleave both strands at nearly the same site. DNase I was first isolated from the pancreas, and the mammalian pancreas remains one of the primary sources of the enzyme.

This product is derived from bovine pancreas and consists of four chromatographically separated components A, B, C, and D, with a molar ratio of 4:1:1, while component D is present in trace amounts. In molecular biology, DNase I is commonly used for removing DNA from protein preparations or introducing nicks into DNA to allow labeled base incorporation. The product is supplied as a lyophilized powder containing calcium chloride, with an enzymatic activity ≥ 2000 Kunitz Units/mg protein. Low salt concentrations (0-100 mM NaCl) can be used to cleave single-stranded RNA, double-stranded RNA, and RNA strands formed by RNA-DNA hybridization. However, at high salt concentrations (≥ 0.3 M), RNase A specifically cleaves only single-stranded RNA. The most common application of RNase A is in the removal of RNA during plasmid DNA or genomic DNA preparation, where the presence or absence of DNase activity is a critical factor. DNase activity can be inactivated by the traditional method of boiling in a water bath. Additionally, this product can also be used for RNA protection analysis, RNA sequencing analysis, and other molecular biology experiments.

3. Components

Category	Component Code	Component Name	LM105013-15000 U	LM105013-10×15000 U
Part I	LM105013-A	DNase I	15,000 U	10 × 15,000 U
	LM105013-B	Buffer A	12 mL	120 mL
Part II	LM105013-C	0.1 M PMSF	20 μ L	200 μ L
	LM105013-D	1 M $MgCl_2$	12 mL	120 mL

4. Protocol

4.1. DNase I Storage Solution

Composition: 20 mM sodium acetate (pH 6.5), 5 mM $CaCl_2$, 0.1 mM PMSF, and 50% glycerol.

Note:

- The kit includes the components for preparing DNase I storage solution: Buffer A (composed of 20 mM sodium acetate (pH 6.5), 5 mM $CaCl_2$, and 50% glycerol) and 0.1 M PMSF.
- Preparation of DNase I storage solution: Before use, add 0.1 M PMSF to Buffer A to a final concentration of 0.1 mM. For example, add 1 μ L of 0.1 M PMSF to 1 mL of Buffer A.
- $MgCl_2$ is required in the DNase I enzymatic reaction. Refer to the "Protein Extraction Experiment" below for detailed usage.

4.2. DNase I Inactivation or Inhibition

DNase I can be inactivated by adding EDTA to a final concentration of 2.5 mM, followed by incubation at 65°C for 10 minutes. Phenol-chloroform extraction can also inactivate DNase I. DNase I activity is significantly inhibited by metal ion chelators, millimolar concentrations of zinc ions, 0.1% SDS, reducing agents such as DTT and β -mercaptoethanol, and salt concentrations above 50-100 mM.

4.3. Usage Instructions (For Protein Extraction Only, For Reference)

Preparation of DNase I working solution: Dissolve DNase I powder in the storage solution to a final concentration of 2000 U/mL.

Reaction system: Add the DNase I working solution to the protein extraction buffer at a 1:100 volume ratio (final concentration of 20 U/mL), and simultaneously add 1 M MgCl_2 at a 1:100 volume ratio.

Reaction conditions: Incubate at 37°C for 30–60 minutes. Continue with the subsequent protein extraction steps.

Note: Since EDTA chelates Ca^{2+} and Mg^{2+} ions essential for DNase activity, it should be removed from the initial protein lysis buffer. The presence of EDTA may reduce the efficiency of DNase I digestion.

5. Notes

- 1) For your safety and health, please wear a lab coat and disposable gloves during operations.
- 2) This product is for research use only.