

Product Information

Ribonuclease A from bovine pancreas

Catalog Numbers **R5125, R4875, R5503, R5000, R5250, and R5500**

Storage Temperature $-20\text{ }^{\circ}\text{C}$

CAS RN 9001-99-4

EC 3.1.27.5

Synonyms: Ribonuclease I, Pancreatic ribonuclease, Ribonuclease 3'-pyrimidinooligonucleotidohydrolase, RNase A, Endoribonuclease I

Product Description

RNase A is an endoribonuclease that attacks at the 3' phosphate of a pyrimidine nucleotide. The sequence of pG-pG-pC-pA-pG will be cleaved to give pG-pG-pCp and A-pG. The highest activity is exhibited with single stranded RNA.¹ RNase A is a single chain polypeptide containing 4 disulfide bridges. In contrast to RNase B, it is not a glycoprotein.² RNase A can be inhibited by alkylation of His¹² or His¹¹⁹, which are present in the active site of the enzyme.³ Activators of RNase A include potassium and sodium salts.

Molecular mass:⁴ 13.7 kDa (amino acid sequence)

Extinction coefficient:⁵ $E^{1\%} = 7.1$ (280 nm)

Isoelectric point:⁶ $pI = 9.6$

Optimal temperature: $60\text{ }^{\circ}\text{C}$ (activity range of $15\text{--}70\text{ }^{\circ}\text{C}$)

Optimal pH:⁷ 7.6 (activity range of 6–10)

Inhibitors: ribonuclease inhibitor

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Note: RNase A is stable to both heat and detergents. In addition, it adsorbs strongly to glass. Scrupulous precautions are necessary to ensure RNase A residue does not cause artifacts in processes requiring intact RNA.

Preparation Instructions

When Sigma tests the activity of RNase A, a stock solution is prepared in water at 1 mg/ml.

Solutions prepared from powdered RNase A products can be made free of DNase by boiling. According to a literature method,⁸ prepare a 10 mg/mL stock solution in 10 mM sodium acetate buffer, pH 5.2. Heat to $100\text{ }^{\circ}\text{C}$ for 15 minutes, allow to cool to room temperature, and then adjust to pH 7.4 using 0.1 volume of 1 M Tris-HCl, pH 7.4. Aliquot and store at $-20\text{ }^{\circ}\text{C}$. If RNase A is boiled at a neutral pH, precipitation will occur. When boiled at the lower pH, some precipitation may occur because of protein impurities that are present.

Storage/Stability

Store at RNase A at $-20\text{ }^{\circ}\text{C}$. Stock solutions stored in frozen aliquots remain active for at least 6 months.

RNase A is a very stable enzyme and solutions have been reported to withstand temperatures up to $100\text{ }^{\circ}\text{C}$. At $100\text{ }^{\circ}\text{C}$, an RNase A solution is most stable between pH 2.0 and 4.5.⁹

Procedure

A major application for RNase A is the removal of RNA from preparations of plasmid DNA. For this application, DNase free RNase A is used at a final concentration of $10\text{ }\mu\text{g/ml}$.¹⁰

References

1. Burrell, M.M., *Enzymes of Molecular Biology*, Vol.16, 263-270 (1993).
2. Plummer, T.H., and Hirs, C.H.W., *J. Biol. Chem.*, **238**, 1396-1397 (1963).
3. Heinrikson, R.L. *et. al.*, *J. Biol. Chem.*, **240**, 2921-2934 (1965).
4. Smyth, D.G. *et. al.*, *J. Biol. Chem.*, **238**, 227-234 (1963).
5. Keller, P.J. *et al.*, *J. Biol. Chem.*, **233**, 344 (1958).
6. Tanford, C., and Hauenstein, J. D., *J. Am. Chem. Soc.*, **78**, 5287-5291 (1956).
7. Schomberg, D., and Salzmann, M., *Enzyme Handbook*, Vol. 3, 1-3 under E.C. 3.1.27.5 (1990).
8. Sambrook, J. *et. al.*, *Molecular Cloning, A Laboratory Manual*, 2nd ed., 1.51 (1989).
9. Crestfield, A.M. *et. al.*, *J. Biol. Chem.*, **238**, 618-621 (1963).
10. Sambrook, J. *et. al.*, *Molecular Cloning, A Laboratory Manual*, 2nd ed., B.17.

RBG,MAM,KTA 08/12-1