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Product Information

Deoxyribonuclease I, bovine
recombinant, expressed in *Pichia pastoris*
buffered aqueous glycerol solution

Catalog Number **D5319**
Storage Temperature –20 °C

CAS RN 9003-98-9
EC 3.1.21.1
Synonyms: DNase I,
Deoxyribonucleate 5′-Oligonucleotidohydrolase

Product Description
Deoxyribonuclease I (DNase I) is found in most cells and tissues. In mammals, the pancreas is one of the best sources for the enzyme. Pancreatic DNase I was the first isolated DNase.

DNase I is an endonuclease that acts on phosphodiester bonds adjacent to pyrimidines to produce polynucleotides with terminal 5′-phosphates. A tetranucleotide is the smallest average digestion product. DNase I hydrolyzes single- and double-stranded DNA. In the presence of Mg^{2+} ions, DNase I attacks each strand of DNA independently and the cleavage sites are random. If Mn^{2+} ions are present, both DNA strands are cleaved at approximately the same site.[1] When chromatin DNA is digested, the reaction rate is restricted by the association of DNA with histones.[1]

DNase I can be used to remove DNA from protein and nucleic acid samples, and to nick DNA as a first step to incorporate labeled bases into DNA.

Activators:
DNase I has an absolute requirement for divalent metal cations. Mg^{2+} is the most commonly used divalent cation.[2] Mn^{2+}, Ca^{2+}, Co^{2+}, and Zn^{2+} will also activate DNase I.[2,3] A concentration of 5 mM Ca^{+2} will stabilize DNase I against proteolytic digestion. 0.1 mM Ca^{+2} is needed to reduce the rate of inactivation by one-half.[4]

Inhibitors:
2-Mercaptoethanol (the reduced enzyme is inactive, but can be reactivated in the presence of Ca^{2+} or Mg^{2+} ions);[3] chelators (e.g. EDTA); sodium dodecyl sulfate (SDS);[5] actin.[7] There is no general inhibitor specific for DNase I.[2] Citrate inhibits Mg^{2+}-activated DNase I, but not Mn^{2+}-activated DNase I.

Optimal pH:
The optimal pH of DNase I activity is dependent on the divalent ion present. In the presence of both Mg^{2+} and Ca^{2+}, the optimal pH is between 7–8, while in the absence of Ca^{2+}, the optimal pH is between 5.5–6.0.[6]

Extinction Coefficient: $E_{280}^{1\%} = 11.1$

This recombinant bovine DNase I is a glycoprotein, produced without the addition of any animal-derived materials. It is supplied as a **solution** in 4 mg/ml glycine, pH 5.0, 5 mM calcium acetate, and 50% glycerol.

Molecular mass: ~39 kDa

Specific activity: ≥5,000 units/mg protein

Unit definition: One unit will produce a change in A_{260} of 0.001 per minute per ml at pH 5.0 at 25 °C using DNA, Type I or III, as the substrate. This enzyme assay reaction is performed in 83 mM acetate buffer, pH 5.0, at 25 °C, containing 4.2 mM Mg^{2+}, in a 3 ml reaction.

Impurities:
Protease – None Detected
RNase – None detected

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.

Storage/Stability
This product retains activity for at least two years when stored at –20 °C.

References

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3. Price, P.A., *et al.*, Effect of divalent cations on the reduction and re-formation of the disulfide bonds of deoxyribonuclease. *J. Biol Chem.*, **244**, 929-932 (1969).
4. Price, P.A., *et al.*, Properties of chromatographically purified bovine pancreatic deoxyribonuclease. *J. Biol Chem.*, **244**, 917-923 (1969).
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