

# Product Information

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## Acid Phosphatase, Prostatic from bovine prostate

Catalog Number **P6409**

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

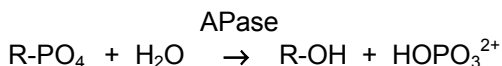
CAS RN 9001-77-8

EC 3.1.3.2

Synonyms: prostatic acid phosphatase (PAP);  
Orthophosphoric-monoester phosphohydrolase (acid  
optimum)

### Product Description

Acid phosphatases (APase) are a family of enzymes that non-specifically catalyze the hydrolysis of monoesters and anhydrides of phosphoric acid to produce inorganic phosphate at an optimum pH of 4 to 7 by the following reaction:



Their function in the production, transport, and recycling of phosphate is critical for the metabolic and energy transduction processes of the cell. As a group APases may be as important as kinases in regulatory processes.<sup>1</sup>

Acid phosphatase is a monomeric glycoprotein containing galactose, mannose, and glucosamine.<sup>2</sup>

Molecular mass:<sup>2</sup> 41.5 kDa

pH optimum:<sup>3</sup> 5.5

pH range:<sup>4</sup> 4.0–6.0

Optimum temperature:<sup>5</sup>  $37\text{ }^{\circ}\text{C}$

Activators:<sup>3,5</sup>

$\text{Fe}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Zn}^{2+}$  (below 1 mM)

Inhibitors:

$\text{Hg}^{2+}$ ,<sup>7</sup>  $\text{MoO}_4^{2-}$ ,<sup>6</sup>  $\text{Zn}^{2+}$ ,<sup>3</sup>  
PCMB,<sup>3</sup> NEM,<sup>7</sup>  $\text{F}^-$

*p*-nitrophenyl sulfate<sup>6</sup>  
tartrate (inhibits 95% of acid phosphatase activity)

Substrates:

$\alpha$ -glycerophosphate<sup>7</sup> 2-glycerophosphate<sup>7</sup>  
fructose-6-phosphate<sup>6</sup> galactose-6-phosphate<sup>7</sup>  
glucose-1-phosphate<sup>6</sup> glucose-6-phosphate<sup>6</sup>  
*p*-nitrophenyl phosphate<sup>3</sup> AMP,<sup>6</sup> ATP,<sup>3</sup> GTP,<sup>3</sup> UMP<sup>6</sup>

$K_M$  (mM):

1.71, *p*-nitrophenyl phosphate<sup>5</sup>  
0.45, DL-phosphotyrosine,<sup>3</sup> pH 8  
1.0,  $\alpha$ -glycerophosphate<sup>6</sup>

This product (Catalog Number P6409) is partially purified from bovine prostate and is supplied as a lyophilized powder.

Specific activity:  $\sim 10$  units/g solid

Unit definition: One unit will hydrolyze 1.0  $\mu\text{mole}$  of *p*-nitrophenyl phosphate per minute at pH 4.8 at  $37\text{ }^{\circ}\text{C}$ . Prostatic acid phosphatase activity is the difference between the total acid phosphatase activity and the acid phosphatase activity in the presence of 20 mM tartrate.

APase is assayed spectrophotometrically in a 1.2 ml reaction mixture containing 38 mM citrate buffer at pH 4.8 and  $37\text{ }^{\circ}\text{C}$ , 4.7 mM *p*-nitrophenyl phosphate, and 0.004 unit APase. To assay for tartrate-resistant APase, tartrate is added to a final concentration of 20 mM.

### 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.

### Preparation Instructions

APase is soluble in cold water (0.015–0.025 unit/ml). Prepare solution immediately before use.

### Storage/Stability

Store the product at  $-20\text{ }^{\circ}\text{C}$ . When stored at  $-20\text{ }^{\circ}\text{C}$ , the enzyme retains activity for at least one year.

## References

1. Vincent, J.B., *et al.*, Hydrolysis of phosphate monoesters: a biological problem with multiple chemical solutions. *Trends Biochem. Sci.*, **17**, 105-10 (1992).
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3. Lau, K.H.W., *et al.*, Bone acid phosphatase is a neutral pH phosphoryl protein phosphatase. *Adv. Protein Phosphatases*, **4**, 165-98 (1987).
4. Andrews, A.T., and Pallavicini, C., Bovine milk acid phosphatase. I. Some kinetic studies and other properties using a partially purified preparation. *Biochim. Biophys. Acta*, **321**, 197-209 (1973).
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6. Chaimovich, H., and Nome, F., Purification and properties of an acid phosphatase from bovine brain. *Arch. Biochem. Biophys.*, **139**, 9-16 (1970).
7. Hollander, V.P., Acid phosphatases. In *The Enzymes*, Vol. 4, 3<sup>rd</sup> ed., Boyer, P.D., ed., Academic Press, (New York, NY; 1971) pp. 449-98.

KAD,RBG,JWM,MAM 11/07-1

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