



Product Information

Catalase From bovine liver

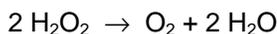
Product Number **C 30**
Storage Temperature 2-8 °C

Product Description

Enzyme Commission (EC) Number: 1.11.1.6
CAS Number: 9001-05-2
Molecular weight: 250 kDa¹
pI: 5.4²
Extinction Coefficient: E^{1%} = 36.5 (276 nm)³
Stoke's radius: 5.12 nm⁴

Catalase from bovine liver is a tetramer consisting of 4 equal subunits with a molecular weight of 60 kDa each.⁵ Each subunit contains iron bound to a protoheme IX group. The enzyme also strongly binds NADP, which is in close proximity to the heme group (13.7 Å apart).⁶

Catalase catalyzes the following reaction:



Catalase can also react with alkylhydrogen peroxides instead of H₂O₂, such as methylperoxide and ethylperoxide. In addition, many compounds can replace the second H₂O₂ molecule as the hydrogen donor, including methanol, ethanol, propanol, formate, and nitrate.⁷

Catalase does not require any activators, but is inhibited by 3-amino-1-H-1,2,4 triazole, cyanide, azide, hydroxylamine, cyanogen bromide, dithiothreitol, 2-mercaptoethanol, dianisidine, and nitrate.⁸ Catalase is also inhibited by ascorbate and ascorbate complexed with Cu²⁺. Incubation of catalase with ascorbate or ascorbate/Cu²⁺ results in degradation of the catalase molecule.⁹ Catalase activity is constant over the pH range of 4.0-8.5.¹⁰ Sigma determines the activity of this enzyme at pH 7.0.

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

This product is offered as a suspension of catalase crystals in water containing 0.1% (w/v) thymol. To remove the thymol preservative, the catalase crystals may be pelleted by centrifugation, the supernatant discarded, the pellet resuspended in water, and then pelleted again. The pellet should then be resuspended in 50 mM phosphate buffer, pH 7.0. Warming (30 °C) and slight agitation are required to dissolve the catalase crystals.

Storage/Stability

Solutions of catalase should not be frozen. Freezing stock solutions will cause a 50-70% loss in activity.

References

1. Schroeder, W.A., et al., Some amino acid sequences in bovine liver catalase. *Biochim. Biophys. Acta*, **89**, 47-65 (1964).
2. Samejima, T., et al., Dissociation of bovine liver catalase at low pH. *J. Biochem. Japan*, **51**, 181-187 (1962).
3. *Handbook of Biochemistry and Molecular Biology*, 3rd Ed., Vol. II, Fasman, G.D., ed., CRC Press (Cleveland, OH: 1976), p. 403.
4. *Journal of Chromatography*, **152**, 21 (1978).
5. Sund, H., et al., Dissociation of beef liver catalase in its subunits. *Eur. J. Biochem.*, **1**, 400-410 (1967).
6. Fita, I., and Rossmann, M.G., The NADPH binding site on beef liver catalase. *Proc. Natl. Acad. Sci. USA*, **82**, 1604-1608 (1985).

7. Methods of Enzymatic Analysis, 2nd Ed., Vol. I, Bergmeyer, H.U., Ed., Academic Press (New York, NY: 1974), pp. 483-489.
8. The Enzyme Handbook, Vol. 7, Schomburg, D., ed., Springer-Verlag (Berlin: 1994), EC 1.11.1.6, p. 2.
9. Orr, C.W., Studies on ascorbic acid II. Physical changes in catalase following incubation with ascorbate or ascorbate and copper (II). *Biochemistry*, **6**, 3000-3006 (1967).
10. Chance, B., Effect of pH upon the reaction kinetics of the enzyme-substrate compounds of catalase. *J. Biol. Chem.*, **194** 471-481 (1952).

TMG/AJH 1/03

Sigma brand products are sold through Sigma-Aldrich, Inc.

Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.