3050 Spruce Street
Saint Louis, Missouri 63103 USA
Telephone 800-325-5832 • (314) 771-5765
Fax (314) 286-7828
email: techserv@sial.com
sigma-aldrich.com

ProductInformation

Superoxide Dismutase
from bovine erythrocytes

Catalog Number **S2515**
Storage Temperature –20 °C

CAS RN 9054-89-1
EC 1.15.1.1
Synonyms: Superoxide:superoxide oxidoreductase; SOD

Product Description

SOD from bovine erythrocytes was the first SOD to be found in mammalian tissues. Before its enzymatic activity was discovered the protein was known as haemocuprein or erythrocuprein.[1]

Superoxide Dismutase (SOD) catalyzes the conversion of superoxide radicals into hydrogen peroxide and molecular oxygen.

$$2\ O_2^- + 2\ H^+ \xrightarrow{SOD} O_2 + H_2O_2$$

SOD plays a critical role in the defense of cells against the toxic effects of oxygen radicals. It competes with nitric oxide (NO) for superoxide anions, which react with NO to form peroxynitrite. SOD has suppressed apoptosis in cultured rat ovarian follicles, neural apoptosis in neural cell lines, and transgenic mice by preventing the conversion of NO to peroxynitrate, an inducer of apoptosis.[2-4]

Molecular weight:[5] 32.5 kDa

SOD from bovine erythrocytes is a homodimeric non-covalently bound protein with two 16.3 kDa subunits of 151 amino acids. Each monomer has one intrachain disulfide and one free sulfhydryl, two Cu^{+2} atoms and two Zn^{+2} atoms.[5,6]

There are three forms of SOD differentiated by the metal ions in the active site. These are Cu^{+2}/Zn^{+2}, Mn^{+2}, and Fe^{+2} SOD. In vertebrate organisms Cu/Zn-SOD is found in the cytoplasm and the mitochondrial intermembrane space, while Mn-SOD is found in the mitochondrial matrix space.[7] Fe-SOD is found in prokaryotes and some higher plants.[8]

Extinction coefficient:[1] E^{mM} = 10.3 (258 nm)
SOD has no significant absorbance peak at 280 nm because of the absence of tryptophan.[9]

pH optimum:[9] 7.8

pH range:[10] 7.6–10.5

Temperature optimum:[9] 25 °C

Isoelectric point:[11] 4.95

Inhibitors: cyanide,[12] OH^- (competitive),[12] hydrogen peroxide[13]

This product (Catalog Number S2515) is highly purified from bovine erythrocytes. It is supplied as a light blue lyophilized powder.

Protein: ~98% (biuret), balance primarily potassium phosphate buffer salts

Specific activity: 2,500-7,000 units/mg protein

Unit Definition: One unit will inhibit the rate of reduction of cytochrome c by 50% in a coupled system, using xanthine and xanthine oxidase, at pH 7.8 at 25 °C in a 3.0 ml reaction volume. The xanthine oxidase concentration should produce an initial (uninhibited) ΔA_{550} of 0.025 ± 0.005 per minute.

SOD is assayed spectrophotometrically in a 3.00 ml reaction mix. The final concentrations are 50 mM potassium phosphate, 0.1 mM EDTA, 0.01 mM cytochrome c, 0.05 mM xanthine, 0.005 unit of xanthine oxidase, and 1 unit of superoxide dismutase at pH 7.8 at 25 °C.

SOD has also been assayed photochemically in a system containing methionine, riboflavin, and nitroblue tetrazolium.[14]

Precautions & 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
SOD is soluble in water (20 mg/ml) yielding a colorless to blue-green solution. SOD is also soluble in aqueous buffers such as 0.1 M potassium phosphate, pH 7.5.

Storage/Stability
Store the product at –20 °C. When stored at –20 °C, representative lots of SOD have remained within specifications for at least two years.

A solution of SOD in 0.1 M potassium phosphate, pH 7.5 shows no loss of activity after one hour at 60 °C, after six hours at room temperature, or at least two days at 4 °C. For long term storage, store in aliquots at –20 °C.

References

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