

## Product Information

### Superoxide Dismutase from human erythrocytes

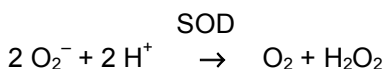
Catalog Number **S9636**  
Storage Temperature  $-20\text{ }^{\circ}\text{C}$

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.<sup>1</sup>

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



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 cell lines, and transgenic mice by preventing the conversion of NO to peroxynitrate, an inducer of apoptosis.<sup>2-4</sup>

Molecular mass:<sup>5</sup> 32.0 kDa

Human erythrocyte SOD is a homodimeric non-covalently bound protein with two 16.3 kDa subunits of 153 amino acids.<sup>6-8</sup> There are eight half-cystines/mole, four of which are involved in disulfide linkages.<sup>5</sup> Each dimer contains two  $\text{Cu}^{2+}$  atoms and two  $\text{Zn}^{2+}$  atoms.<sup>9</sup> The SOD from human erythrocytes has 82% homology with the bovine enzyme.<sup>6</sup>

There are three forms of SOD differentiated by the metal ions in the active site. These are  $\text{Cu}^{2+}/\text{Zn}^{2+}$ ,  $\text{Mn}^{2+}$ , and  $\text{Fe}^{2+}$  SOD. In vertebrate organisms  $\text{Cu}/\text{Zn}$ -SOD is found in the cytoplasm and the mitochondrial intermembrane space, while  $\text{Mn}$ -SOD is found in the mitochondrial matrix space and in prokaryotes.<sup>10</sup>  $\text{Fe}$ -SOD is found in prokaryotes and some higher plants.<sup>11</sup>

Extinction coefficient:<sup>1</sup>  $E^{\text{mM}} = 18.4$  (265 nm)

pH optimum:<sup>12</sup> 7.8

pH range:<sup>13</sup> 7.6–10.5

Isoelectric point:<sup>9</sup> 4.75

Inhibitors:  
azide<sup>14</sup>  
cyanide<sup>15</sup>  
diethyldithiocarbamate<sup>16</sup>  
hydrogen peroxide<sup>14</sup>  
penicillamine<sup>16</sup>  
phenyl mercuric acetate<sup>13</sup>  
sodium dodecyl sulfate<sup>15</sup>

This product (Catalog Number S9636) is highly purified from human erythrocytes.

Protein (biuret):  $\geq 80\%$

Specific activity:  $\geq 2,500$  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  $25\text{ }^{\circ}\text{C}$  in a 3.0 ml reaction volume. The xanthine oxidase concentration should produce an initial (uninhibited)  $\Delta A_{550}$  of  $0.025 \pm 0.005$  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  $25\text{ }^{\circ}\text{C}$ .

SOD has also been assayed photochemically in a system containing methionine, riboflavin, and nitroblue tetrazolium.<sup>17</sup>

### 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.

### 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  $-20\text{ }^{\circ}\text{C}$ .

A solution of SOD in 0.1 M potassium phosphate, pH 7.5, shows no loss of activity after one hour at  $60\text{ }^{\circ}\text{C}$ , after six hours at room temperature, or at least two days at  $4\text{ }^{\circ}\text{C}$ . For long term storage, store in aliquots at  $-20\text{ }^{\circ}\text{C}$ .

### References

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GA,FF,KAD,RGB,JWM,MAM 11/15-1