

## Product Information

### L-Serine

Product Number **S 4500**

#### Product Description

Molecular Formula: C<sub>3</sub>H<sub>7</sub>NO<sub>3</sub>

Molecular Weight: 105.1

CAS Number: 56-45-1

pK<sub>a</sub>: 2.19 (-COOH), 9.21 (-NH<sub>2</sub>)<sup>2</sup>

Melting point: 228 °C (with decomposition)<sup>1</sup>

Synonym: (S)-2-amino-3-hydroxypropionic acid, β-hydroxyalanine, α-amino-β-hydroxypropionic acid, Ser<sup>1</sup>

L-Serine is one of the two biological amino acids with a hydroxyl substituted side chain, and thus is hydrophilic in character. The L-serine side chain is a hydroxymethyl (HOCH<sub>2</sub>-) group. Serine is biosynthesized from the glycolysis intermediate 3-phosphoglycerate through the formation of 3-phosphohydroxypyruvate and 3-phosphoserine as intermediates. In turn, serine can be converted into the gluconeogenesis intermediate 3-phosphoglycerate. Serine is also a precursor for the biosynthesis of glycine, cysteine, and selenocysteine.<sup>3,4</sup>

The role of L-serine in brain development and function has been reviewed.<sup>5</sup> The biosynthesis and degradation of L-serine in *Escherichia coli* has been discussed.<sup>6</sup> A comprehensive review of the chemistry of serine has been published.<sup>7</sup>

The influence of pulsed applications of serine on polyglucose synthesis by *Fusobacterium nucleatum* cultures has been studied.<sup>8</sup> Supplementation of minimal media with serine has been shown to restore growth in *Escherichia coli* that lack the *Pil* and *GlnK* genes.<sup>9</sup>

#### Precautions and Disclaimer

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

#### Preparation Instructions

This product is soluble in water (50 mg/ml), yielding a clear, colorless solution. The solubility of L-serine in water has also been reported to be 250 mg/ml (20 °C).<sup>2</sup>

#### References

1. The Merck Index, 12th ed., Entry# 8604.
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3. Textbook of Biochemistry with Clinical Correlations, 5th ed., Devlin, T. M., ed., Wiley-Liss (New York, NY: 2002), pp. 95, 793-794.
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5. de Koning, T. J., et al., L-serine in disease and development. *Biochem. J.*, **371(Pt 3)**, 653-661 (2003).
6. Sawers, G., The anaerobic degradation of L-serine and L-threonine in enterobacteria: networks of pathways and regulatory signals. *Arch. Microbiol.*, **171(1)**, 1-5 (1998).
7. Chemistry of the Amino Acids, Vol. 3, Greenstein, J. P., and Winitz, M., eds., Robert E. Krieger Publishing Company (Malabar, FL: 1984), pp. 2202-2237.
8. Zilm, P. S., et al., Growth pH and transient increases in amino acid availability influence polyglucose synthesis by *Fusobacterium nucleatum* grown in continuous culture. *FEMS Microbiol. Lett.*, **215(2)**, 203-208 (2002).
9. Blauwkamp, T. A., and Ninfa, A. J., Nac-mediated repression of the *serA* promoter of *Escherichia coli*. *Mol. Microbiol.*, **45(2)**, 351-363 (2002).

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