

L-Asparagine Monohydrate, from non-animal source Cell Culture Tested

Product Number **A7094**
Store at Room Temperature

Product Description

Molecular Formula: $C_4H_8N_2O_3 \cdot H_2O$
Molecular Weight: 150.1
CAS Number: 5794-13-8
 pK_a : 2.14 (-COOH), 8.72 (-NH₂)¹
pI: 5.43¹
Specific Rotation: +32.6 ° (10 mg/ml, 0.1 M HCl, 20 °C)
Melting Point: 234-235 °C²
Synonyms: (S)-2-aminosuccinic acid 4-amide, L-aspartic acid 4-amide, α -aminoauccinamic acid, aspartic acid β -amide²

This product is cell culture tested (0.02 mg/ml) and is tested for endotoxin levels.

The amino acid L-asparagine is a structural analog of L-aspartic acid, where the side chain of the carboxylic acid moiety is amidated, to give a terminal amine group. This renders L-asparagine neutral at physiological pH. The amide group of asparagine is derived from glutamate, in the reaction of aspartate and glutamine in the presence of ATP to yield asparagine and glutamate.³ *In vivo*, asparagine is hydrolyzed to aspartate and NH₄⁺ by asparaginase.⁴ Asparagine is also an important amino acid in glycopeptide bonds, via *N*-glycosyl linkages to the sugar rings.³

L-Asparagine is used in cell culture media and is a component of MEM non-essential amino acids solution (Product No. M 7145). L-Asparagine has been shown to enhance ornithine decarboxylase activity in cultured human colon adenocarcinoma Caco-2 cells and in cultured IEC-6 intestinal epithelial cells.^{5,6} Spore germination in *Bacillus subtilis* has been increased in the presence of L-asparagine.⁷

An isoxazoline RGD mimic platelet GPIIb/IIIa antagonist has been prepared by chiral synthesis with L-asparagine as a starting material.⁸ L-Asparagine has

been utilized in the synthesis of 4-azalysine building blocks for application to combinatorial chemistry.⁹

Precautions and Disclaimer

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

Preparation Instructions

This product is soluble in water (20 mg/ml).

References

1. Molecular Biology LabFax, Brown, T. A., ed., BIOS Scientific Publishers (Oxford, UK: 1991), p. 29.
2. The Merck Index, 12th ed., Entry# 872.
3. Textbook of Biochemistry with Clinical Correlations, 5th ed., Devlin, T. M., ed., Wiley-Liss (New York, NY: 2002), pp. 97, 680-681, 785-786.
4. Biochemistry, 3rd ed., Stryer, L., W. H. Freeman (New York, NY: 1988), pp. 18, 504.
5. Chabanon, H., et al., Increased translation efficiency and antizyme-dependent stabilization of ornithine decarboxylase in amino acid-supplemented human colon adenocarcinoma cells, Caco-2. *Biochem. J.*, **348(Pt 2)**, 401-408 (2000).
6. Ray, R. M., et al., Interaction of asparagine and EGF in the regulation of ornithine decarboxylase in IEC-6 cells. *Am. J. Physiol.*, **276(3 Pt 1)**, G773-780.
7. Cabrera-Martinez, R. M., et al., Effects of overexpression of nutrient receptors on germination of spores of *Bacillus subtilis*. *J. Bacteriol.*, **185(8)**, 2457-2464 (2003).
8. Zhang L. H., et al., The Enantiospecific synthesis of an isoxazoline. A RGD mimic platelet GPIIb/IIIa antagonist. *J. Org. Chem.*, **62(8)**, 2466-2470 (1997).
9. Chhabra, S. R., et al., Homochiral 4-azalysine building blocks: syntheses and applications in solid-phase chemistry. *J. Org. Chem.*, **67(12)**, 4017-4029 (2002).

GCY/RXR 11/08

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.