



Product Information

L-Glutamine

Product Number **G 3126**
Store at Room Temperature

Product Description

Molecular Formula: $C_5H_{10}N_2O_3$

Molecular Weight: 146.1

CAS Number: 56-85-9

pK_A: 2.17 (-COOH), 9.13 (α -NH₂)¹

Synonyms: (S)-2,5-diamino-5-oxopentanoic acid,
L-2-aminoglutaramic acid, L-glutamic acid 5-amide,
GLN, Q

L-Glutamine, the uncharged and amidated analog of L-glutamic acid, is an important amino acid for the incorporation of NH₄⁺ into biomolecules. It is biosynthesized from NH₄⁺ and glutamate via the enzyme glutamate synthetase. In turn, degradation of glutamine to free the ammonia moiety is mediated by glutaminase. Glutamine also participates in acid-base regulation *in vivo*.^{3,4}

A study of the activation of the *glnA*, *glnK*, and *nac* promoters in *Escherichia coli* with glutamine as the sole nitrogen source has been reported.⁵ Under glucose deprivation, higher compensatory glutamine levels prevent decreased intracellular glutamate and GABA levels, while leading to enhanced intracellular aspartate levels, ammonia production, and neuronal damage.⁶

The utilization of glutamine under carbon starvation conditions by cultured *Saccharomyces cerevisiae* and its relation to the cytoplasmic compartmentation of the transcriptional activator *Gln3* has been studied.⁷ The use of glutamine in cultured rat islets to probe α -ketoisocaproate oxidation has been investigated.⁸

Precautions and Disclaimer

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

Preparation Instructions

This product is soluble in 1 M HCl (50 mg/ml), yielding a clear, colorless solution. The solubility in water (25 °C) has been reported at 36 mg/ml.¹

Storage/Stability

A study of glutamine in Basal Medium Eagle with Earle's salts indicated that glutamine was most stable in medium stored at 4 °C and at neutral pH. Loss of glutamine accelerates at temperatures above 4 °C, such as room temperature and 35 °C. Glutamine was found to deteriorate at acidic and basic pH at similar rates. Further information on stability studies of glutamine is solution is available in a bulletin under Product No. G 7513 (200 mM L-glutamine solution)

References

1. Molecular Biology LabFax, Brown, T. A., ed., BIOS Scientific Publishers Ltd. (Oxford, UK: 1991), p. 29.
2. The Merck Index, 12th ed., Entry# 4479.
3. Biochemistry, 3rd ed., Stryer, L., W. H. Freeman (New York, NY: 1988), pp. 20, 505, 577, 579.
4. Textbook of Biochemistry with Clinical Correlations, 5th ed., Devlin, T. M., ed., Wiley-Liss (New York, NY: 2002), pp. 97, 784, 896-897.
5. Atkinson, M. R., et al., Activation of the *glnA*, *glnK*, and *nac* promoters as *Escherichia coli* undergoes the transition from nitrogen excess growth to nitrogen starvation. *J. Bacteriol.*, **184**(19), 5358-5363 (2002).
6. Honegger, P., et al., Alteration of amino acid metabolism in neuronal aggregate cultures exposed to hypoglycaemic conditions. *J. Neurochem.*, **81**(6), 1141-1151 (2002).

7. Cox, K. H., et al., Cytoplasmic compartmentation of *Gln3* during nitrogen catabolite repression and the mechanism of its nuclear localization during carbon starvation in *Saccharomyces cerevisiae*. *J. Biol. Chem.*, **277(40)**, 37559-37566 (2002).
8. Gao, Z., et al., Distinguishing features of leucine and α -ketoisocaproate sensing in pancreatic beta-cells. *Endocrinology*, **144(5)**, 1949-1957 (2003).

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