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ProductInformation

Urea

Product Number **U 5378**
Store at Room Temperature

Product Description
Molecular Formula: CH_4N_2O
Molecular Weight: 60.06
CAS Number: 57-13-6
Melting Point: 132.7 °C[1]
Synonyms: carbamide, carbonyldiamide[1]

This product is designated as Molecular Biology grade and is suitable for molecular biology applications. It has been analyzed for the absence of nucleases and proteases.

Urea is a prinicipal protein metabolite and the major product for the removal of free ammonia (NH_4^+) *in vivo*. In the urea cycle, the nitrogen atoms that are incorporated into urea are derived from the amino group of asparate and from free ammonia. The initial biosynthesis of urea occurs outside of the urea cycle, with the condensation of ammonia ion and bicarbonate to give carbamoyl phosphate. Carbamoyl phosphate then enters the urea cycle and undergoes successive enzymatic conversion to citrulline, argininosuccinate, fumarate, and arginine. Arginine is then hydrolyzed by arginase to urea and ornithine.[2,3]

Urea is commonly utilized in biochemistry and molecular biology in various applications. The use of urea in protocols for denaturing fusion proteins, solubilization of inclusion bodies, and denaturing polyacrylamide gel electrophoresis has been described.[4] In protein electrophoresis, urea helps in protein denaturation and solubilization, although care must be exercised because of the potential for urea to carbamoylate proteins.[5] A review of separation methods for high molecular weight proteins that discusses the use of urea and thiourea has been published.[6] A method for MALDI-MS analysis of proteins that allows for high urea content in the samples has been described.[7]

Urea has been shown to act as an aldosterone antagonist in the development of peanut agglutinin-binding in cultured embryonic renal collecting duct epithelial cells.[8] The use of 2 g/L urea in the culture of *Kluyveromyces marxianus* to produce a thermostable extracellular lipase has been described.[9]

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

Preparation Instructions
This product is soluble in water (480 mg/ml, 8 M), yielding a clear, colorless solution. The solubility in water has also been reported to be 1 g/ml. It is also soluble in 95% alcohol (100 mg/ml), absolute alcohol (50 mg/ml), methanol (166 mg/ml), and glycerol (500 mg/ml).[1]

Storage/Stability
Solutions of urea develop a significant concentration of reactive cyanate ions on standing. It is advised to prepare fresh solutions, or to decompose the cyanate by acidification before use. Autoclaving solutions may cause some decomposition, as indicated by a strong ammonia odor.[1]

References
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4. Molecular Cloning: A Laboratory Manual, 3rd ed., Sambrook, J. and Russell, D.W., CSHL Press (Cold Spring Harbor, NY: 2001), pp. 7.58, 12.74, 12.78, 15.52, 15.54.
5. Görg, A., and Westerheimer, R., High Resolution Gel-Electrophoresis Techniques, in Microcharacterization of Proteins, Kellner, R., et al., eds., Wiley-VCH (Weinheim, Germany: 1999), p. 17.

6. Oh-Ishi, M., and Maeda, T., Separation techniques for high-molecular-mass proteins. J. Chromatogr. B Analyt. Technol. Biomed. Life Sci., **771(1-2)**, 49-66 (2002).
7. Laugesen, S., and Roepstorff, P., Combination of two matrices results in improved performance of MALDI MS for peptide mass mapping and protein analysis. J. Am. Soc. Mass Spectrom., **14(9)**, 992-1002 (2003).
8. Schumacher, K., et al., Urea restrains aldosterone-induced development of peanut agglutinin-binding on embryonic renal collecting duct epithelia. J. Am. Soc. Nephrol., **14(11)**, 2758-2766 (2003).
9. Deive, F. J., et al., Production of a thermostable extracellular lipase by *Kluyveromyces marxianus*. Biotechnol. Lett., **25(17)**, 1403-1406 (2003).

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