

Product Information

4-Methylumbelliferyl β -D-glucopyranoside

Product Number **M 3633**

Storage Temperature -0 °C

Product Description

Molecular Formula: C₁₆H₁₈O₈

Molecular Weight: 338.3

CAS Number: 18997-57-4

Melting Point: 211 °C¹

Specific Rotation: -89.5° (0.5% (w/v) in water)¹

Extinction Coefficient: E^{mm} = 13.9 (317.5 nm, methanol)²

Synonym: MUGlc

4-Methylumbelliferyl- β -D-glucopyranoside is a sensitive, fluorogenic substrate for β -glucosidase. This product is tested for suitability as a substrate for β -glucosidase at pH 5.0. The pH optima for animal tissues lie within the range 5.1-5.7.¹ The product of the enzymatic reaction (4-methylumbelliferone) is measured at pH 10.3.¹ 4-Methylumbelliferone has an excitation at 365 nm with emission at 445 nm.³

MUGlc has been extensively used in work on Gaucher's disease, a lipid storage disease characterized by the accumulation of glucocerebroside due to a genetic deficiency of a β -glucosidase, glucosylceramidase.⁴⁻⁸ Substrate specificity, pH optima, and interrelation of the enzyme activities have been discussed.^{6,7}

In the test for Gaucher's disease, MUGlc is hydrolyzed by glucosylceramidase in the presence of sodium taurocholate, which suppresses the activity of other β -glucosidases. The assay is performed at pH 5.8 (for fibroblasts) or pH 5.4 (for leukocytes). The reaction is stopped with glycine, pH 10.8, and the product is measured spectrophotometrically with excitation at 365 nm and emission at 448 nm.⁵

MUGlc and other fluorogenic substrates have been used to compare normal acid hydrolase activity with that of patients with various forms of mucopolysaccharidoses⁹ and in a study of four acid hydrolases in human kidney and urine.¹⁰ The use of MUGlc has also been reported in a rapid method for identifying bacterial enzymes.¹¹

Precautions and Disclaimer

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

Preparation Instructions

This product is soluble in N,N-dimethylformamide (DMF, 50 mg/ml), yielding a clear, colorless to faint yellow solution. For enzyme assays, it is dissolved at 5 mM (1.7 mg/ml) in water or 0.2 M sodium citrate-phosphate buffer.

Storage/Stability

A 5 mM solution of MUGlc was prepared fresh daily and stored in the refrigerator until needed, since it was found to decompose overnight at room temperature.¹

References

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