

Product Information

O-Phospho-L-tyrosine

Catalog Number **P9405**

Storage Temperature $-20\text{ }^{\circ}\text{C}$

CAS RN 21820-51-9

Synonyms: L-tyrosine-O-phosphate,
L-3-(4-hydroxyphenyl)alanine 4'-phosphate,
phosphotyrosine, P-Tyr

Product Description

Molecular Formula: $\text{C}_9\text{H}_{12}\text{NO}_6\text{P}$

Molecular Weight: 261.17

Melting Point: 225 C

λ_{max} : 275 nm (H_2O)

Extinction coefficient:² $E^{\text{M}} = 1,350$

pK_a values: <2 (phosphate), 2.4 (-COOH),

5.8 (phosphate), 9.4 (- NH_2)

Fluorescent Properties:²

Excitation maximum: 265 nm (H_2O)

Emission maximum: 293 nm (H_2O)

Many cellular proteins are regulated by post-translational phosphorylation and dephosphorylation. Phosphorylation often acts as a molecular switch for cell regulatory and signal transduction processes.^{4,5} In eukaryotic cells, reversible protein modification by phosphorylation occurs at specific tyrosine, serine, and/or threonine amino acid residues. Phosphorylation of tyrosine occurs at the hydroxyl group on the aromatic ring of the tyrosine, via the action of protein tyrosine kinases (PTKs). Conversely, dephosphorylation of phosphotyrosine and phosphotyrosinated proteins occurs through the action of protein tyrosine phosphatases. The free phosphorylated tyrosine is O-phospho-L-tyrosine (P-Tyr).

The inhibition of growth of human renal and breast carcinoma cells in the presence of P-Tyr has been reported.⁶ Exogenously applied P-Tyr has been shown to increase total cellular PTPase activity in MDA-MB 468 breast carcinoma cells, and lead to diminution of epidermal growth factor receptor (EGFR) phosphorylation and subsequent activity.⁷ The protective effect of P-Tyr on TP53 wild-type cells against ionizing radiation has been investigated.⁸

A GC-MS assay for the detection of free and bound forms of O-phosphotyrosine in urine samples has been published.⁹ A base hydrolysis protocol for phosphotyrosine in proteins has been reported.¹⁰ A general review of the detection of phosphorylated proteins by various techniques, including radiolabelling, antibody recognition, chromatographic methods, electrophoresis, Edman sequencing, and mass spectrometry has been published.¹¹

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

This product is soluble in 4 M NH_4OH (50 mg/ml), with sonication as needed, yielding a clear, colorless to faint yellow solution. It is also soluble in water at pH 7.²

References

1. Chemistry of the Amino Acids, vol. 3, Greenstein, J. P., and Winitz, M., ed., Wiley (New York, NY: 1961), p. 2362.
2. Cooper, J. A., et al., Detection and quantification of phosphotyrosine in proteins. *Methods Enzymol.*, **99**, 387-402 (1983).
3. Alewood, P. F., et al., A Simple Preparation of O-Phospho-L-tyrosine. *Synthesis*, 30-31 (1983).
4. Ballou, L. M., and Fischer, E. H., in *The Enzymes*, 3rd ed., Boyer, P. D., and Krebs, E. G., eds., Academic Press (Orlando, FL: 1986), pp. 311-361.
5. Yaffe, M. B., Phosphotyrosine-binding domains in signal transduction. *Nat. Rev. Mol. Cell Biol.*, **3(3)**, 177-186 (2002).
6. Mishra, S., and Hamburger, A. W., O-phospho-L-tyrosine inhibits cellular growth by activating protein tyrosine phosphatases. *Cancer Res.*, **53(3)**, 557-563 (1993).

7. Mishra, S., and Hamburger, A. W., Exogenous phosphotyrosine modulates epidermal growth factor receptor tyrosine phosphorylation. *Carcinogenesis*, **14(2)**, 269-273 (1993).
8. Dittmann, K. H., et al., O-phospho-L-tyrosine protects TP53 wild-type cells against ionizing radiation. *Int. J. Cancer*, **96 Suppl**, 1-6 (2001).
9. Kataoka, H., et al., Analysis of free and bound O-phosphoamino acids in urine by gas chromatography with flame photometric detection. *Biomed. Chromatogr.*, **7(4)**, 184-188 (1993).
10. Martensen, T. M., and Levine, R. L., Base hydrolysis and amino acid analysis for phosphotyrosine in proteins. *Methods Enzymol.*, **99**, 402-405 (1983).
11. Yan, J. X., et al., Protein phosphorylation: technologies for the identification of phosphoamino acids. *J. Chromatogr. A.*, **808(1-2)**, 23-41 (1998).

KVG,GCY,RXR,MAM 07/17-1