

Product Information

β-Nicotinamide adenine dinucleotide phosphate hydrate

N5755

Product Description

CAS Registry Number: 53-59-8

Molecular Formula: C₂₁H₂₈N₇O₁₇P₃ • xH₂O

Formula Weight: 743.41 (anhydrous)

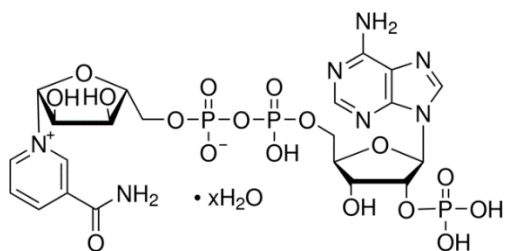
Synonyms: β-NADP, Coenzyme II, TPN, NADP, Triphosphopyridine nucleotide

 E^{mM} (260 nm) = 18.0 (0.1 M phosphate, pH 7.0)¹

Absorbance Ratios:

 A_{250}/A_{260} : 0.83 A_{280}/A_{260} : 0.21

Structure:



β-NADP is a coenzyme necessary for the alcoholic fermentation of glucose and the oxidative dehydrogenation of other substrates. It occurs widely in living tissue, especially the liver. Nicotinic acid can be converted to nicotinamide in the body and, in this form, is found as a component of two oxidation-reduction coenzymes:

- Nicotinamide adenine dinucleotide (NAD)
- Nicotinamide adenine dinucleotide phosphate (NADP)

The nicotinamide portion of the coenzyme transfers hydrogens by alternating between oxidized quaternary nitrogen and a reduced tertiary nitrogen.

Enzymes that contain NAD or NADP are usually called dehydrogenases. NADP is an essential coenzyme for glucose-6-phosphate dehydrogenase, which catalyzes the oxidation of glucose-6-phosphate to 6-phosphogluconic acid. This reaction initiates glucose metabolism by a pathway other than the citric acid cycle. This route is known as the hexose phosphate shunt or phosphogluconate pathway.²

Other enzymes that use NADP as a coenzyme include:

- Alcohol Dehydrogenase:NADP Dependent
- Aromatic ADH:NADP Dependent
- Ferredoxin-NADP Reductase
- L-Fucose Dehydrogenase
- Gabase
- Galactose-1-Phosphate Uridyl Transferase
- Glucose Dehydrogenase
- L-Glutamic Dehydrogenase
- Glycerol Dehydrogenase:NADP Specific
- Isocitric Dehydrogenase
- Malic Enzymes
- 5,10-Methylenetetrahydrofolate Dehydrogenase
- 6-Phosphogluconate Dehydrogenase
- Succinic Semialdehyde Dehydrogenase

β-Nicotinamide Adenine Dinucleotide Phosphate is prepared enzymatically by the phosphorylation of β-Nicotinamide Adenine Dinucleotide. Probable decomposition products are β-NAD and monophosphoadenosine diphosphoribose.

Several theses³⁻⁵ and dissertations⁶⁻¹¹ have cited use of product N5755 in their research.

Precautions and Disclaimer

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

β-NADP is soluble in water at 50 mg/mL. Aqueous β-NADP solutions stored as frozen aliquots are expected to be stable for at least one year. Repeated freeze-thaw cycles are **not** recommended.¹²

β-NADP is also soluble in methanol, but much less soluble in ethanol, and practically insoluble in ether and ethyl acetate.¹³

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Storage/Stability

Store this product at -20 °C.

References

1. *Specifications and Criteria for Biochemical Compounds*, 3rd edition. The National Academy of Sciences (Washington, DC), p. 88 (1972).
2. Berg, J.M., Tymoczko, J.L., and Stryer, L., *Biochemistry*, 5th edition. W.H. Freeman and Company (New York, NY), pp. 564, 568, 848 (2002).
3. Coneva, Viktoriya, "Transcript and Metabolite Signature of the Late-Flowering Maize Mutant *indeterminate1*: Implications for the Floral Transition in Day-Neutral Species". University of Guelph, M.Sc. thesis, p. 35 (2012).
4. Heit, Caitlin, "Hyperosmotic Stress and the Impact on Metabolite Formation and Redox Balance in *Saccharomyces cerevisiae* and *Saccharomyces bayanus* strains". Brock University, M.Sc. thesis, p. 97 (2013).
5. Schausberger, Christina, "Effects of accelerated ageing on the antioxidant system in *Brassica oleracea* seeds". Leopold-Franzens-Universität Innsbruck, M.Sc. thesis, p. 21 (2014).
6. Baier, Jürgen, "Lumineszenz-Untersuchungen zur Generierung und Relaxation von Singulett-Sauerstoff in zellulärer Umgebung" ("Luminescence studies on the generation and relaxation of singlet oxygen in a cellular environment"). Universität Regensburg, Dr. rer. nat. dissertation, p. 179 (2005).
7. Morieux, Pierre Philippe, "A Chemical Biology Approach to Discover the Biological Targets of the Antiepileptic Drug Lacosamide". University of North Carolina Chapel Hill, Ph.D. dissertation, p. 191 (2010).
8. Bhuva, Dilip Arvind, "Dynamins and myosin-II regulate the distinct modes of synaptic vesicle exocytosis in mature cerebrocortical nerve terminals and this involves calcium dependent phosphorylations". University of Central Lancashire, Ph.D. dissertation, p. 191 (2015).
9. Tseng, Hsiu-Yang, "Development of Printed-Circuit-Board Based Industry-Compatible Point-of-Care Biosensing and Bioprocessing Technology with Applications". Simon Fraser University, Ph.D. dissertation, p. 16 (2015).
10. de Rond, Tristan Paul Theodor, "Biotransformation discovery enabled by high-throughput mass-spectrometric enzyme activity screening and comparative genomics". University of California Berkeley, Ph.D. dissertation, p. 52 (2017).
11. Zarroug, Osman, "The Roles of Prostaglandin E₂, Prostaglandin F_{2α} and Aldo-Keto Reductase 1c Isoenzymes in Endometriosis and Breast Cancer". University of Manchester, Ph.D. dissertation, p. 95 (2017).
12. Schultz, M.B. *et al.*, *Methods Mol. Biol.*, **1813**, 77-90 (2018).
13. *The Merck Index*, 12th ed., Entry #6433, p. 1089 (1996).

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