Product Information

β-Nicotinamide adenine dinucleotide 2’-phosphate reduced tetrasodium salt hydrate

≥97% (HPLC)

N7505

Product Description

CAS Registry Number: 2646-71-1

Synonyms: β-NADPH, Coenzyme II reduced tetrasodium salt, 2’-NADPH hydrate, NADPH, TPNH, Triphosphopyridine nucleotide reduced tetrasodium salt, NADPH Na_4, $TPNH_2$ Na_4, Dihydronicotinamide adenine dinucleotide phosphate tetrasodium salt

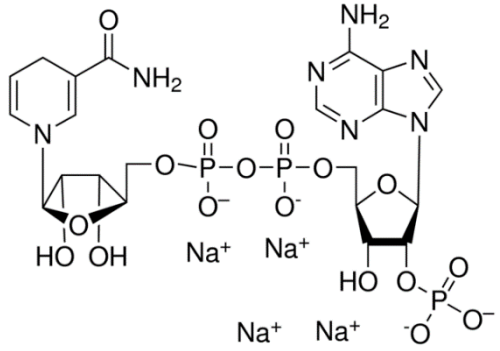
Molecular Formula: $C_{21}H_{26}N_7Na_4O_{17}P_3 \bullet xH_2O$

Formula Weight: 833.35 (anhydrous basis)

E^{mM} (340nm) = 6.22 (pH >10)

A_{260nm} / A_{340nm} = 2.32

Structure:



β-Nicotinamide adenine dinucleotide 2’-phosphate (β-NADPH) is a product of the pentose phosphate pathway, a multifunctional pathway whose primary purpose is to generate reducing power, in the form of β-NADPH. β-NADPH transfers H^+ and $2e^-$ to oxidized precursors in the reduction reactions of biosynthesis. Thus, β-NADPH cycles between catabolic and biosynthetic reactions, and serves as the carrier of reducing power in the same way that ATP serves as the carrier of energy.[1]

Enzymes that use β-NADPH as a coenzyme include glutathione reductase, diacetyl reductase, dihydrofolate reductase, glutamic dehydrogenase, *p*-hydroxybenzoate hydroxylase, NADPH-FMN oxidoreductase, nitrate reductase and thioredoxin reductase. β-NADPH is also involved with cytochrome P450 electron transport systems.[2]

This listing of β-Nicotinamide adenine dinucleotide phosphate reduced form, N7505, is prepared by the chemical reduction of β-Nicotinamide adenine dinucleotide phosphate. Several theses[3-5] and dissertations[6-14] have cited use of N7505 in their research protocols.

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.

Storage/Stability

It is recommended to store N7505 desiccated at −20 °C, protected from light. The normal impurities and/or decomposition products are β-NADP and Monophosphoadenosine 5'-diphosphoribose.

It is suggested to prepare β-NADPH solutions fresh and use promptly, unless you are sure that this is an unnecessary precaution for your work. However, it has been reported that a 0.5 mM solution in 0.02 M NaOH (pH 12.3) showed no loss of purity in a week at 4 °C or −85 °C, but a 13% loss at −20 °C.[15] One publication has investigated the solution stability of NADPH.[16]

Preparation Instructions

β-NADPH is tested for solubility in 0.01 M sodium hydroxide at 50 mg/mL.

References

1. Wood, W.B. *et al*., *Biochemistry: A Problems Approach*. W.A. Benjamin, Inc. (Menlo Park, CA), p. 195 (1974).
2. Berg, J.M. *et al*., *Biochemistry,* 5th edition. W.H. Freeman and Co. (New York, NY), p, 564 (2002).
3. Olsgard, Mandy Lee, "Toxicological evaluation of inhalation exposure to benzene and toluene in a raptorial bird, the American kestrel, *Falco sparverius*". University of Saskatchewan, M.Sc. thesis, pp. 112, 113 (2007).
4. Huang, Huang, "Biological Activities of Selected Dietary *Apiaceae*, *Lamiaceae*, and *Fabaceae*". Carleton University, M.Sc. thesis, p. 16 (2010).
5. Scott, Kirsten Lee, "The Potential Toxic Effects of Chronic Doxorubicin Treatment on the Rat Pancreas and the Role of Ghrelin in this Context". Stellenbosch University, M.Sc. thesis, p. 53 (2018).
6. Mohapatra, Sridev, "Understanding polyamine metabolism through transgenic manipulation in poplar suspension cultures". University of New Hampshire, Ph.D. dissertation, p. 96 (2008).
7. Chrysostomou, Constantine, "Addressing Intrinsic Challenges for Next Generation Sequencing of Immunoglobulin Repertoires". University of Texas at Austin, Ph.D. dissertation, p. 125 (2014).
8. Beyerle, Jolantha, "Assessment of mRNA, protein levels and activities of xenobiotic metabolizing enzymes in colon and rectal mucosa of colorectal cancer patients". Ruperto-Carola University (Heidelberg, Germany), Dr. rer. nat. dissertation, pp. 118, 119 (2016).
9. Gimpfl, Martina Christiane, "The role of fatty acid quality in a maternal obesogenic diet for adipose tissue development in offspring mice". Technischen Universität München, Dr. rer. nat. dissertation, p. 107 (2016).
10. Hord, Jeffrey Mack, "Triggering NOX2 / ROS signaling during disuse-induced skeletal muscle atrophy". Texas A&M University, Ph.D. dissertation, p. 92 (2016).
11. Kuehne, Jennifer, "Anti-inflammatory properties of New Zealand honey". University of Auckland, Ph.D. dissertation, pp. 27, 47 (2016).
12. Litten, Brett Andrew, "Biphasic droplet microfluidics in relation to pharmaceutical industrial biochemical screening". University of Manchester, Ph.D. dissertation, p. 81 (2016).
13. Vassallo, Joanne, "The bioavailability and biological effects of nanomaterials towards *Escherichia coli*: with reference to the soil environment". University of Plymouth, Ph.D. dissertation, p. 46 (2018).
14. Sharick, Joseph Thomas, "Development of Optical Metabolic Imaging for Pancreatic and Breast Cancer Precision Medicine". University of New Hampshire, Ph.D. dissertation, p. 49 (2019).
15. Passonneau, J.V., and Lowry, O.H., *Enzymatic Analysis. A Practical Guide*. Humana Press (Totowa, NJ), p. 15 (1993).
16. Wu, J.T. *et al*., *Clin. Chem.*, **32(2)**, 314-319 (1986).

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