

Product Information

β-NICOTINAMIDE ADENINE DINUCLEOTIDE PHOSPHATE, Free Acid Sigma Prod. No. N5755

CAS NUMBER: 53-59-8

SYNONYMS: Triphosphopyridine Nucleotide;
TPN; NADP; β-NADP; Coenzyme II

ANALOGS: 3-Acetylpyridine Adenine
Dinucleotide Phosphate (APADP); 3-
Aminopyridine Adenine Dinucleotide Phosphate
(AADP); 2':3'-Cyclic NADP; 3'-NADP; 1,N⁶-
Etheno NADP; Deamino NADP; Thio NADP; α-
NADP; β-NADP Periodate Oxidized; Nicotinic
Acid Adenine Dinucleotide Phosphate (NAADP);
Cyclic ADP Ribose Phosphate

PHYSICAL PROPERTIES:

Appearance: white powder, may have a yellow
cast

Molecular formula: C₂₁H₂₈N₇O₁₇P₃

Formula weight: 743.4 (Contains less than 0.04% sodium and potassium)

E^m_m(260nm) = 18.0 (0.1 M Phosphate, pH 7.0)¹

Ratios: 250nm/260nm: 0.83

280nm/260nm: 0.21

DESCRIPTION:

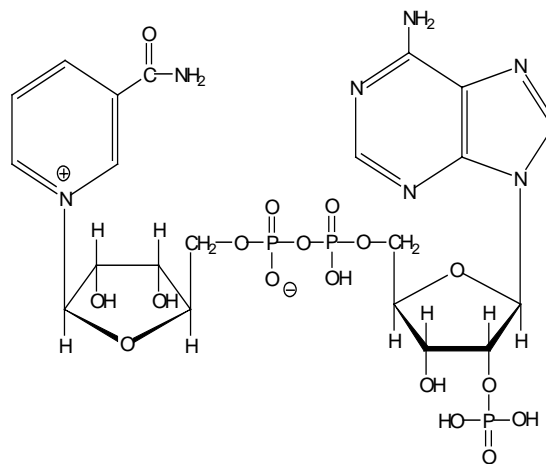
β-Nicotinamide Adenine Dinucleotide Phosphate is prepared enzymatically by the phosphorylation of β-Nicotinamide Adenine Dinucleotide. Probable decomposition products are β-NAD and Monophosphoadenosine Diphospho-Ribose.

STABILITY / STORAGE AS SUPPLIED:

The recommended storage condition for β-NADP as a solid is at -20°C. Material stored frozen has remained at 98% purity for ten years.²

SOLUBILITY / SOLUTION STORAGE:

β-NADP gives a clear, very faint yellow solution in water at 50 milligrams per milliliter.² It is also soluble in methanol, much less soluble in ethanol and practically insoluble in ether and ethyl acetate.³ Aqueous solutions stored as frozen aliquots are stable for at least one year.² Repeated freeze thaw cycles are not recommended.



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APPLICATIONS:

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) and 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 which 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 metabolism of glucose by a pathway other than the citric acid cycle. This route is known as the hexose phosphate shunt or phosphogluconate pathway.⁴

Other enzymes utilizing 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 and Succinic Semialdehyde Dehydrogenase.

REFERENCES:

1. Specifications and Criteria for Biochemical Compounds, 3rd. ed., p. 88, National Academy of Science, Washington, D.C. (1972).
2. Sigma data.
3. *Merck Index* 12th ed., p 1089 (1996).
4. Van Nostrand Reinhold Encyclopedia of Chemistry, 4th ed., Douglas M. Considine, Editor in Chief, Van Nostrand Reinhold, NY (1993).