

Product Information

Adenosine 5'-triphosphate disodium salt hydrate

Catalog Number **A3377**
Storage Temperature $-20\text{ }^{\circ}\text{C}$

CAS RN 34369-07-8
Synonym: ATP

Product Description

Molecular Formula: $\text{C}_{10}\text{H}_{14}\text{N}_5\text{Na}_2\text{O}_{13}\text{P}_3 \cdot x\text{H}_2\text{O}$
Molecular Weight: 551.14 (anhydrous basis)
 pK_a : 4.0 (amino group); 6.5 (secondary phosphate)
 λ_{max} : 259 nm
Extinction Coefficient: $E^{\text{mM}} = 15.4$ (259 nm in 100 mM phosphate buffer, pH 7.0).

Adenosine 5'-triphosphate (ATP) and its phosphate bonds are the basic components of energy exchange in many biological systems. The purification and crystallization of ATP from equine muscle led to the entry of the Sigma Chemical Company into the research biochemical field. Sigma became the first to offer stable, crystalline ATP with a purity approaching 100%. The initial products were isolated from muscle tissue and precipitated with ethanol.¹ Currently, this product is isolated from a microbial source and is produced via a fermentation process. No chemical phosphorylation is involved. Catalog Numbers A2383 and A3377 are very similar in their specifications. Catalog Number A2383 is purified further by ion exchange chromatography to remove any trace Fe and Ca ions.

This preparation of ATP is recommended for use as an ATP standard in bioluminescence assays. The recommended ATP products for standards in bioluminescence experiments are sodium salts of ATP: Catalog Number A3377 (packaged in bulk, to be weighed by the user) and Catalog Number FLAAS, preweighed vials equivalent to 1.0 mg of ATP (2 μmole).

ATP has intrinsic metal binding affinity. The binding constant for various metals are (given as per mole):² Mg^{2+} (9,554), Na^+ (13), Ca^{2+} (3,722), K^+ (8), Sr^{2+} (1,381), Li^+ (25).

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

ATP is soluble in water (50 mg/ml), yielding a clear, colorless solution. This solution is mildly acidic (pH \sim 3.5).

Storage/Stability

The product is routinely shipped at ambient temperature without degradation. It is recommended to store the product at $-20\text{ }^{\circ}\text{C}$ with desiccation. A very slow dismutation occurs in the powdered product with 2 ATP molecules forming ADP and adenosine 5'-tetrakisphosphate. A decomposition of less than 0.5% per year is observed. The product is stable for at least 2 years.

Aqueous solutions of ATP are stable for months when frozen at $-15\text{ }^{\circ}\text{C}$ and for approximately one week at $0\text{ }^{\circ}\text{C}$. ADP is the first hydrolysis product formed, with additional hydrolysis leading to the formation of AMP. However, ATP solutions are only stable for several hours at $0\text{ }^{\circ}\text{C}$ when dissolved in a trichloroacetic acid solution. In alkaline solution, it rapidly decomposes to inorganic pyrophosphate and adenosine 5'-phosphate even at $0\text{ }^{\circ}\text{C}$.³

References

1. Berger, L., *Biochim. Biophys. Acta*, **20**, 23 (1956).
2. Wilson, J.E., et al., Chelation of divalent cations by ATP, studied by titration calorimetry. *Anal. Biochem.*, **193**, 16 (1991).
3. Data for *Biochemical Research*, 3rd ed., Dawson, R.M.C., et al., Oxford University Press (New York, NY: 1986) p. 78.

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