Sodium orthovanadate

Cat. No.: HY-D0852

CAS No.: 13721-39-6

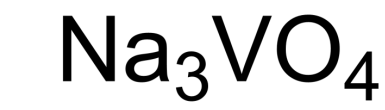
Molecular Formula: Na_3O_4V

Molecular Weight: 183.91

Target: Phosphatase

Pathway: Metabolic Enzyme/Protease

Storage: 4°C, sealed storage, away from moisture
* In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture)



SOLVENT & SOLUBILITY

In Vitro

H_2O : 8.33 mg/mL (45.29 mM; Need ultrasonic)
DMSO : < 1 mg/mL (ultrasonic;warming;heat to 80°C) (insoluble or slightly soluble)

Preparing Stock Solutions

Concentration \ Solvent \ Mass	1 mg	5 mg	10 mg
1 mM	5.4374 mL	27.1872 mL	54.3744 mL
5 mM	1.0875 mL	5.4374 mL	10.8749 mL
10 mM	0.5437 mL	2.7187 mL	5.4374 mL

Please refer to the solubility information to select the appropriate solvent.

In Vivo

1. Add each solvent one by one: PBS
Solubility: 16.67 mg/mL (90.64 mM); Clear solution; Need ultrasonic and warming and heat to 60°C

BIOLOGICAL ACTIVITY

Description

Sodium orthovanadate is an inhibitor of protein tyrosine phosphatases, alkaline phosphatases and a number of ATPases, most likely acting as a phosphate analogue.

IC_{50} & Target

PPTPase[1].

In Vitro

In the presence of oxidizing agents vanadium ions exist as the hydrated monomer of Sodium orthovanadate (vanadate: $HVO4^{2-}$ or H_2VO^{4-}) at micromolar concentations near neutral pH. Sodium orthovanadate (vanadate) also begins to polymerize at concentrations greater than 0.1 mM at neutral pH. The yellow-orange solutions of decavanadate can be converted to the colorless solutions of monomeric Sodium orthovanadate (vanadate) by dilution after a period of many hours. The process is hastened by boiling at pH 10, which encourages the kinetically sluggish depolymerization process[1]. Sodium orthovanadate could alter the phosphorylation status of ASK1 at serine 83 and threonine 845 induced by ischemia. Sodium orthovanadate could increase the tyrosine posphorylation of PTEN and further inhibit the activation of ASK1 via activating Akt during cerebral ischemia[2].

Sodium orthovanadate needs to be fully activated (depolymerized) to obtain maximum phosphatase inhibitory activity. The steps are as follows:
1. Dissolve sodium orthovanadate in water to prepare a 200mM solution. Weigh an appropriate amount of sodium orthovanadate powder and dissolve it in pure water.
2. Adjust pH to 10.0 with 1N NaOH or 1N HCl. At this time the solution appears yellow.
3. Heat and boil until the solution becomes colorless (boil for about 10 minutes), and all crystals must be fully dissolved.
4. Cool to room temperature.
5. Readjust the pH to 10.0 and repeat steps 3 and 4 until the solution remains colorless and the pH stabilizes at 10.0.
6. Divide the activated sodium orthovanadate solution into small portions (such as 1mL) and store at -20°C. The storage solution can be added directly to the cell or tissue lysis solution and diluted to a working solution such as 1 mM. Cell culture experiments need to be filtered and sterilized with a 0.2μm filter, and then diluted and added to the culture medium;
7. After taking out the aliquoted sample from -20℃ and melting it, the solution needs to be heated to about 90~100℃, vortex and mix well to fully dissolve the crystals.
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Science. 2024 Mar 22;383(6689):eadj4591.
- ACS Nano. 2021 Sep 10.
- Cell Rep. 2023 Nov 13;42(11):113430.
- Vet Microbiol. 2021 Sep 20;262:109241.
- Tissue Cell. 2023 May 18, 102109.

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REFERENCES

[1]. Gordon JA, et al. Use of vanadate as protein-phosphotyrosine phosphatase inhibitor. Methods Enzymol. 1991;201:477-82.

[2]. Wu DN, et al. Down-regulation of PTEN by sodium orthovanadate inhibits ASK1 activation via PI3-K/Akt during cerebral ischemia in rat hippocampus. Neurosci Lett. 2006 Aug 14;404(1-2):98-102.

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