

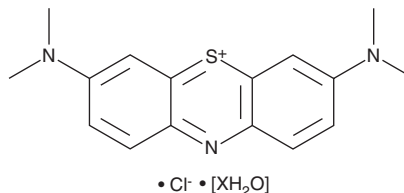
# PRODUCT INFORMATION



## Methylene Blue (hydrate)

Item No. 26095

**CAS Registry No.:** 122965-43-9  
**Formal Name:** 3,7-bis(dimethylamino)-phenothiazin-5-ium, monochloride, hydrate  
**Synonyms:** NSC 617593, Tetramethylthionine  
**MF:** C<sub>16</sub>H<sub>18</sub>N<sub>3</sub>S • Cl [XH<sub>2</sub>O]  
**FW:** 319.9  
**Purity:** ≥95%  
**Supplied as:** A crystalline solid  
**Storage:** -20°C  
**Stability:** ≥4 years



Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

### Laboratory Procedures

Methylene blue (hydrate) is supplied as a crystalline solid. A stock solution may be made by dissolving the methylene blue (hydrate) in the solvent of choice. Methylene blue (hydrate) is soluble in organic solvents such as ethanol, DMSO, and dimethyl formamide (DMF), which should be purged with an inert gas. The solubility of methylene blue (hydrate) in ethanol is approximately 3.3 mg/ml and approximately 2 mg/ml in DMSO and DMF.

Further dilutions of the stock solution into aqueous buffers or isotonic saline should be made prior to performing biological experiments. Ensure that the residual amount of organic solvent is insignificant, since organic solvents may have physiological effects at low concentrations. Organic solvent-free aqueous solutions of methylene blue (hydrate) can be prepared by directly dissolving the crystalline solid in aqueous buffers. The solubility of methylene blue (hydrate) in PBS, pH 7.2, is approximately 0.14 mg/ml. We do not recommend storing the aqueous solution for more than one day.

### Description

Methylene blue is a cationic thiazine dye that has diverse biological activities.<sup>1-3</sup> It inhibits the catalytic function of inducible and constitutive nitric oxide synthases *via* oxidation of enzyme-bound ferrous iron.<sup>1</sup> Methylene blue also inhibits monoamine oxidase (MAO) and increases the activity of mitochondrial cytochrome C oxidase (complex IV).<sup>2,3</sup> *In vivo*, methylene blue stabilizes systemic circulation without increasing peripheral resistance, decreases lipid peroxidation, and reduces anoxic tissue injury in brain and heart in a porcine model of global ischemia and reperfusion injury.<sup>1</sup> It inhibits MAO activity in brain and reduces the age-related decline in grip strength and spatial memory in old mice when administered in drinking water at a concentration of 250 μM.<sup>2</sup> Methylene blue (15, 30, and 60 mg/kg) also reduces immobility time in the forced swim test in mice, indicating antidepressant-like activity.<sup>3</sup> Methylene blue is commonly used to stain cells and tissues in research.<sup>4</sup>

### References

1. Wiklund, L., Basu, S., Miculescu, A., *et al.* *Ann. N.Y. Acad. Sci.* **1122(1)**, 231-244 (2007).
2. Gharib, A. and Atamna, H. *Neurodegeneration: Theory, disorders and treatments*. McNeill, A., editor, Nova Science Publishers, Inc. (2011).
3. Harvey, B.H., Duvenhage, I., Viljoen, F., *et al.* *Biochem. Pharmacol.* **80(10)**, 1580-1591 (2010).
4. Hu, X., Laguerre, V., Packert, D., *et al.* *Int. J. Cell Biol.* **813216**, (2015).

#### WARNING

THIS PRODUCT IS FOR RESEARCH ONLY - NOT FOR HUMAN OR VETERINARY DIAGNOSTIC OR THERAPEUTIC USE.

#### SAFETY DATA

This material should be considered hazardous until further information becomes available. Do not ingest, inhale, get in eyes, on skin, or on clothing. Wash thoroughly after handling. Before use, the user must review the complete Safety Data Sheet, which has been sent via email to your institution.

#### WARRANTY AND LIMITATION OF REMEDY

Buyer agrees to purchase the material subject to Cayman's Terms and Conditions. Complete Terms and Conditions including Warranty and Limitation of Liability information can be found on our website.

Copyright Cayman Chemical Company, 12/20/2022

#### CAYMAN CHEMICAL

1180 EAST ELLSWORTH RD  
ANN ARBOR, MI 48108 · USA

**PHONE:** [800] 364-9897  
[734] 971-3335

**FAX:** [734] 971-3640

CUSTSERV@CAYMANCHEM.COM  
WWW.CAYMANCHEM.COM