

Product Data Sheet

Product Name: TMB (BM blue)

Cat. No.: GC30213

Chemical Properties

Cas. No. 54827-17-7

SMILES NC1=C(C)C=C(C2=CC(C)=C(N)C(C)=C2)C=C1C

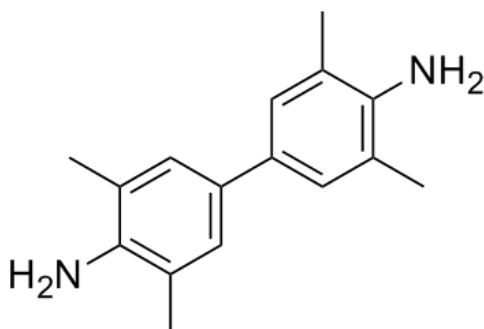
Formula $C_{16}H_{20}N_2$ M.Wt 240.34

Solubility DMSO : 100 mg/mL (416.08 mM) Storage Store at -20°C

General tips For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.

Structure



Protocol

Determination of Trace Potassium Permanganate in Tap Water by TMB Method

This protocol is adapted from research data and provided for reference only. Adjustments may be necessary based on specific experimental requirements.

(1) Reagent Preparation: Dissolve TMB in dimethyl sulfoxide (DMSO) to prepare a 0.10mol/L stock solution, which is further diluted to working concentration (e.g., 5mmol/L) before use; Prepare

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10mmol/L HCl solution; Prepare a series of KMnO_4 standard working solutions using deionized water.

(2) Solid Phase Extraction Column Preparation: Pack 50mg of 200-400 mesh polyamide 6 (PA-6) powder into a 2mL polypropylene empty column tube (inner diameter 9mm) using the dry method. Fix both ends of the column tube with polyethylene sieve plates to ensure the adsorbent surface is flat and compact. Before use, sequentially wash and activate the column tube with 1mL DMSO and 2mL deionized water.

(3) Sample Pretreatment: Tap water samples need to be vacuum filtered through a 0.15 μm polytetrafluoroethylene (PTFE) microporous membrane to remove particulate matter.

(4) Enrichment and Detection of Potassium Permanganate: Take 100mL water sample (pH=6-8) and vacuum filter it through the PA-6 solid phase extraction column at a flow rate of 30mL/min. Permanganate ions (MnO_4^-) are selectively adsorbed onto the adsorbent through hydrogen bonding. Wash the column tube with 2mL deionized water to remove unadsorbed substances. Add 1mL of mixed solution consisting of 10mmol/L HCl and 5mmol/L TMB working solution to the column. Push the solution into the column using a plunger to contact with the adsorbent, and let it react for 3 minutes. During this process, the adsorbed MnO_4^- oxidizes TMB to produce blue oxidation products (ox-TMB), while itself is reduced to Mn^{2+} . Push the blue reaction solution out of the column tube and measure its absorbance at 370nm wavelength using a spectrophotometer.

Precautions:

(1) This method shows good linearity in the concentration range of 0.01-1 $\mu\text{mol/L}$, with a detection limit for MnO_4^- in deionized water as low as 5.1nmol/L.

(2) The TMB oxidation product maintains good stability within 30 minutes, which is beneficial for detection.

(3) For your safety and health, please wear a lab coat and disposable gloves during operation.

References:

[1] Hao L, Qi Y, Wu Y, et al. Determination of trace potassium permanganate in tap water by solid phase extraction combined with spectrophotometry. Heliyon. 2023 Feb 8;9(3):e13587.

Background

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TMB (BM blue) is a novel, safe, non-toxic, and non-mutagenic colorless dye, TMB (BM blue) serves as a chromogenic agent for horseradish peroxidase (HRP)-based detection systems and is commonly used as a chromogenic substrate in immunohistochemical staining procedures and enzyme-linked immunosorbent assay (ELISA)^[1]. TMB can act as a photoacoustic probe for reactive oxygen and nitrogen species (ROS/RNS), reacting with hypochlorite, hydrogen peroxide, singlet oxygen, and nitrogen dioxide to produce blue oxidation products^[2].

References:

[1] Fanjul-Bolado P, González-García MB, Costa-García A. Amperometric detection in TMB/HRP-based assays. Anal Bioanal Chem. 2005 May;382(2):297-302.

[2] Jhaveri S, Carman L, Hahm JO. Visualizing anterogradely transported HRP by use of TMB histochemistry: comparison of the TMB-SNF and TMB-AHM methods. J Histochem Cytochem. 1988 Jan;36(1):103-5.

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