

PDA – Environment

PDA-E-0101

Environment –Determination of ethylene thiourea
in drinking water



Abstract

Using a diode array detector, with reference to HJ 849-2017, measure ethylene thiourea in drinking water at 10, 50, 250, 500, 1000 μ g/l. The application scheme of establishing standard series for detection at five concentration points of g/l.

Preface

Ethylenethiourea (ETU), with the chemical name of 1,2-ethylidene thiourea, is an impurity of mancozeb fungicides (i.e. ethylenedithiocarbamates, EBDCs for short; such as mancozeb), and is also its main environmental degradation product. Due to the characteristics of high efficiency and broad spectrum, Daisen fungicides are widely used in the process of crop pest control. About 240 tons of ethylene thiourea are discharged into the water environment with mancozeb wastewater every year. Ethylene thiourea has chronic toxicity and is listed as a class 2B carcinogen by the international agency for research on cancer (IARC).



China's food safety standards stipulate that the maximum allowable daily intake (ADI) of mancozeb is 0.03 mg / kg BW, and there is no clear regulation on ethylene thiourea. Due to the slow degradation of ethylene thiourea in water, it exists in surface water and groundwater for a long time, and will eventually affect human health through food chain enrichment. Therefore, it is necessary to detect ethylene thiourea in drinking water.

In this application scheme, referring to China's environmental protection standard HJ 849-2017 "water quality - Determination of ethylene thiourea - liquid chromatography", diode array detector is used to determine ethylene thiourea in drinking water at 10, 50, 250, 500, 1000 μ G/l five concentration points to establish a standard series for testing.

Preparation

- ✦ LC-100 binary high pressure pump
- ✦ PDA Detector
- ✦ Solvent Manager
- ✦ Arcus Autosampler
- ✦ Exformma C18 column

solvents and reagents:

Methanol, HPLC grade

high purity water

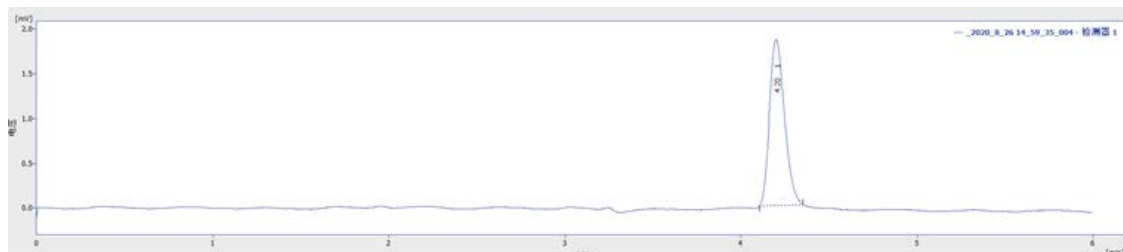


Standard: Ethylene thiourea: purity \geq 98.5%

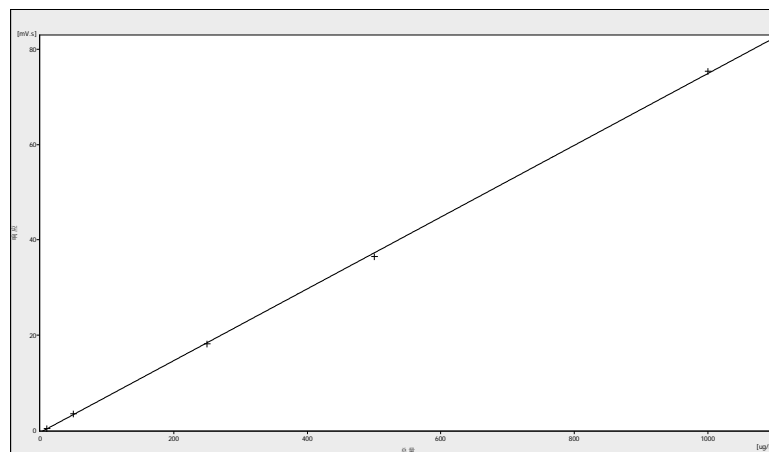
Method

PUMP	
Current Speed	1 mL/min
Stop time	6 min
mobile phase	Methanol: water = 10: 90
Sampler	
Injection volume	20 μ L
Column Over	
Temperature	room temperature
PDA	
Detection wavelength	233 nm
HPLC Column	
Model type	Exformma C18 4.6*250 mm, 5 μ m

Detection spectrum and results



乙撑硫脲标准色谱图



标准曲线 ($r=0.9999$)

Conclusion

With 10, 50, 250, 500, 1000 μ g/l The standard series is established at five concentration points of μ g/l, and the linear correlation coefficient of the working curve is 0.9999, which meets the detection limit requirements in the standard, and is suitable for the detection of ethylene thiourea in surface water and drinking water..