

Formaldehyde Content Assay Kit (MBTH, Colorimetric Method)

F1522033

Storage 2~8°C, Store in the dark (For detailed storage conditions, please refer to the Kit Components).

Shipping Shipped with ice packs, Avoid freezing, Please store under the specified storage conditions immediately upon receipt.

Product Introduction

Formaldehyde, also known as methanal, is an organic compound. It is normally a colorless gas with an irritating odor that stimulates human eyes, nose and other mucous membranes. Formaldehyde has a wide range of industrial applications. Boards, paints, carpets, wallpaper and other materials commonly used in interior decoration all contain formaldehyde; incomplete combustion of tobacco also releases formaldehyde. Medically, formaldehyde is widely used as a preservative and disinfectant. Excessive formaldehyde in textile printing and dyeing auxiliaries mainly originates from formaldehyde condensates of phenol and its derivatives, including dispersant MF, chelating agents containing methylenephosphoric acid, N-methylol acrylamide auxiliaries, leather tanning agents and polyamide fiber auxiliaries. With the successive issuance of domestic and international ecological textile standards, the ecological safety of domestic textiles has attracted widespread attention. In the textile auxiliary industry, formaldehyde is extensively adopted as a reactant to improve the durability of auxiliaries on textiles, such as resin finishing agents, color fixing agents and adhesives. At present, spectrophotometry and chromatography are the mainstream methods for formaldehyde detection. Spectrophotometry is relatively rapid, convenient and more widely applied in daily life, which can effectively quantify formaldehyde content in textiles.

After formaldehyde is absorbed by water, it reacts with phenol reagent (MBTH) to generate azine. Under acidic conditions, azine is oxidized by ferric ions to form a blue compound. A spectrophotometer is used to measure the absorbance at a wavelength of 630-645 nm. Within a specific concentration range, the absorbance of the blue compound shows a linear correlation with formaldehyde concentration, based on which the formaldehyde concentration in the sample can be calculated. This kit is mainly applied to detect formaldehyde released by indoor air, textiles and other substances. This kit adopts spectrophotometric detection.

When the sample volume is 5 mL, it exhibits favorable linearity within the concentration range of 0-3 µg.

Components

Component No.	Component Name	Appearance	50 T	Storage	Quantity Per Test
F1522033A	Formaldehyde solution (100 mg/L)	Liquid	3.0 mL	2-8 °C. Store in the dark	As need
F1522033B	MBTH powder	Powder	50.0 mL	2-8 °C. Store in the dark	1.0 mL
F1522033C	Iron chromogenic reagent	Liquid	20.0 mL	2-8 °C. Store in the dark	0.4 mL

Usage Protocol

1. Sample Preparation

- 1) Indoor air samples are directly tested after absorption with corresponding sampling instruments.
- 2) Weigh a certain mass of shredded textiles or crushed food samples, soak them in formaldehyde absorbing solution with shaking at 40 °C for 1 hour, then take the supernatant for direct detection. If the formaldehyde concentration is low, increase the sample dosage.

2. Preparation of Serial Formaldehyde Standards

- 1) Preparation of phenol reagent: Dissolve 0.1 g of MBTH powder completely in 100 mL distilled water, and store the prepared solution at 2-8°C. The fresh solution is generally colorless and transparent. After long-term storage, it will gradually turn red with deepening color. Solutions that turn light red within 3 months can still be used normally, yet the blank absorbance will rise accordingly. For this reason, it is recommended to prepare small-volume working solutions by weighing a small amount of powder each time.
- 2) Preparation of formaldehyde absorbing solution: Mix 5 mL phenol reagent with 95 mL distilled water. Prepare the absorbing solution right before use.

3. Preparation of Serial Formaldehyde Standards

Take an appropriate volume of Formaldehyde solution (100 mg/L), dilute it with formaldehyde absorbing solution to prepare formaldehyde standard working solution (1 µg/mL), then perform serial dilution sequentially according to the table below:

Reagent Volume (mL)	1	2	3	4	5	6	7
Formaldehyde Standard working solution (1 µg/mL)	0.1	0.5	1.0	1.5	2.0	2.5	3.0
Formaldehyde Absorbing Solution	4.9	4.5	4.0	3.5	3.0	2.5	2.0
Equivalent Formaldehyde Content (µg)	0.1	0.5	1.0	1.5	2.0	2.5	3.0

4. Sample Loading

Set blank tubes, standard tubes and test tubes as shown below. Add reagents in sequence and avoid bubble formation. If the formaldehyde content in the sample is excessively high, reduce the sample volume or dilute the sample before measurement. It is recommended to prepare 2 parallel tubes for each sample and calculate the average value.

Reagent Volume (mL)	Blank Tube	Standard Tube	Test Tube
Formaldehyde Absorbing Solution	5.0	-	-
Formaldehyde Standard (Tube 1-7)	-	5.0	-
Test Sample	-	-	5.0
Iron chromogenic reagent	0.4	0.4	0.4

5. Measurement

Mix thoroughly immediately, incubate at room temperature (20-28 °C) in the dark for 15 min to ensure complete oxidation. After color development, uncover and stand for 10 min to eliminate air bubbles and cool the solution to room temperature. Zero the spectrophotometer using the blank tube, with a 1 cm path-length cuvette. Measure the absorbance of standard series tubes and sample detection tubes at 645 nm.

Precautions

1. The color development reaction can be carried out at room temperature or in a water bath. If the reaction temperature is increased, the reaction time can be appropriately shortened. It is recommended to perform all measurements under consistent temperature conditions.
2. If reagents accidentally splash into eyes, mouth, skin or other body parts, rinse the affected area thoroughly with clean water immediately.
3. The color developed after reaction remains stable for 1-2 hours; it is generally recommended to complete the absorbance measurement as soon as possible.
4. Reducing substances such as phenols and aldehydes may cause false-positive results; the coexistence of sulfur dioxide leads to lower test values.
5. Wear a lab coat and disposable gloves during operation for your personal safety and health.