

Detergents (Anionic Surfactants, MBAS) – Methylene Blue Method

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Applications and Industries

Stormwater, glassware rinsate, drinking water, pharmaceutical cleaning validation.

References

APHA Standard Methods, 23rd ed., Method 5540 C - 2000
EPA Methods for Chemical Analysis of Water and Wastes,
Method 425.1 (1983)
ASTM D 2330-02, Methylene Blue Active Substances

Chemistry

Methylene blue active substances (MBAS) bring about the transfer of methylene blue, a cationic dye, from an aqueous solution into an immiscible organic solvent. This occurs through ion pair formation by the MBAS anion and the methylene blue cation. The intensity of the blue color in the organic solvent is directly related to the concentration of MBAS in the sample. Anionic surfactants commonly used in commercially available detergent formulations are prominent methylene blue active substances and are strongly responsive to this chemistry. Test results are expressed as ppm (mg/L) linear alkylbenzene sulfonate (LAS).

Available Analysis Systems

Visual colorimetric: CHEMetrics®

Instrumental colorimetric: Single Analyte "SAM" photometer

Storage Requirements

Products should be stored in the dark at room temperature.

Accuracy Statement

Statements of accuracy are based on laboratory tests performed under ideal testing conditions using standards of known concentration prepared in deionized water.

CHEMetrics® kit: ± 1 color standard increment

Instrumental refill with I-2017 SAM photometer:

- ≤ 0.13 ppm at 0 ppm
- ± 0.10 ppm at 0.25 ppm
- ± 0.19 ppm at 0.63 ppm
- ± 0.56 ppm at 1.88 ppm

Interference Information

- Elevated sample temperature will cause a haze to form in the chloroform layer of the Instrumental test, causing a false positive test result particularly at the low end of the test range. For best accuracy, sample temperature should be $<20^{\circ}\text{C}$.
- This test is designed for the measurement of anionic surfactants. Positive interferences result from all other MBAS species.
- The test does not measure cationic or non-ionic surfactants; however, cationic detergents and other cationic compounds (e.g. amines) may cause a negative interference by competing with methylene blue in the formation of ion pairs.
- Organic sulfonates, sulfates, carboxylates, phosphates, and phenols as well as inorganic cyanates and thiocyanates may interfere.
- Sulfides may interfere negatively.
- Nitrate interferes positively; 10 ppm $\text{NO}_3\text{-N}$ may read as approximately 0.2 ppm.
- Isopropanol at up to 0.1% does not interfere.
- Chloride at up to 100 ppm does not interfere significantly. Because higher chloride levels will interfere positively, this test is not recommended for the analysis of brine or seawater samples unless additional procedural steps are performed to prevent the chloride interference. Contact tech@aquaphoenixsci.com.
- Only the components contained in each kit should be used to perform these tests. The reaction tube contained in the visual colorimetric CHEMetrics kit is made of polypropylene and the dropper bottle contained in the Instrumental test kit is low-density polyethylene. Use of tubes or bottles made of various other polymers (including polystyrene) is discouraged, as the chloroform in the test reagents may react with these containers.

Safety Information

Safety Data Sheets (SDS) are available upon request and at www.sdsfetch.com. Read SDS before using these products. Breaking the tip of a CHEMetrics ampoule in air rather than water may cause the glass ampoule to shatter. Wear safety glasses and protective gloves.