

ICS 13.060
CCS Z 16

HJ

**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

HJ 897-2017

**Water quality. Determination of chlorophyll a.
Spectrophotometric method**

水质 叶绿素a 的测定 分光光度法

(English Translation)

Issued on: December 21, 2017

Implemented on: February 1, 2018

Issued by: Ministry of Ecology and Environment

Table of Contents

Foreword

1 Water quality chlorophyll a spectrophotometric method

2 Normative references

3 Method principle

4 Reagents and materials

25 Apparatus and equipment

48 Results Calculation and Presentation

Foreword

In order to implement the "Law of the People's Republic of China on Environmental Protection" and the "Law of the People's Republic of China on Prevention and Control of Water Pollution", protect the environment, Protection of human health, regulate water chlorophyll a determination method, the development of this standard.

This standard specifies the determination of chlorophyll a surface water spectrophotometry.

This standard is released for the first time.

This standard by the Environmental Protection Department of Environmental Monitoring Division and Science and Technology Standards Division to develop.

This standard was drafted. Liaoning Provincial Environmental Monitoring Laboratory.

This standard verification unit. Shanghai Environmental Monitoring Center, Dalian City Environmental Monitoring Center, Dandong City Environmental Monitoring Center Station, Liaoyang City Environmental Monitoring Station, Chaoyang City Environmental Monitoring Center Station and Liaoning North Environmental Testing Technology Co., Ltd.

This standard MEP approved on December 21, 2017.

This standard since February 1, 2018 implementation.

This standard is interpreted by the MEP.

1 Water quality chlorophyll a spectrophotometric method

Warning. acetone on human health have some hazards, the operation should be carried out in a fume hood, wear protective equipment, to avoid Touch skin and clothing.

1 scope of application this standard specifies the determination of chlorophyll a in water

spectrophotometry.

This standard applies to the determination of chlorophyll a in surface water.

This standard determination of acetone extract of chlorophyll a detection limit of 0.04 mg/L. When the sample volume is 200 ml, acetone when the volume of extract was 10 ml, the detection limit of this method was 2 µg/L and the lower limit of determination was 8 µg/L.

2 Normative references

This standard references the following documents or the terms. For undated references, the effective version applies to this book standard.

GB/T 14581 water quality lake and reservoir sampling technical guidance HJ 494 water sampling technical guidance HJ/T 91 Technical Specifications for Surface Water and Sewerage Monitoring

3 Method principle

A certain amount of sample is filtered through a filter to trap the algae, ground and broken algae cells, extracted with acetone solution chlorophyll, centrifuged After the separation, the absorbance of the extract was measured at the wavelengths of 750 nm, 664 nm, 647 nm and 630 nm, respectively, according to the formula Calculate the concentration of chlorophyll a in water.

4 Reagents and materials

Unless otherwise specified, the analysis of the use of analytical reagents in line with national standards, experimental water for the newly prepared deionized Water or distilled water.

4.1

Acetone (CH₃COCH₃).

4.2

Magnesium carbonate (MgCO₃).

4.3

acetone solution. 9 1.

Add 100 ml of experimental water to 900 ml of acetone (4.1).

4.4

Magnesium carbonate suspension.

Weigh 1.0 g of magnesium carbonate (4.2), add 100 ml of experimental water, stirred into a

suspension (shake well before use).

4.5

glass fiber filter. Diameter 47 mm, pore size 0.45 μm ~ 0.7 μm .

25 Apparatus and equipment

5.1 Sampling bottle. 1 L or 500 ml brown glass bottle with ground plug.

5.2 filter device. with vacuum pump and glass sand core filter device.

5.3 Grinding device. glass mortar or other tissue grinder.

5.4 Centrifuges. relative centrifugal force can reach 1000 x g (speed 3000 r/min ~ 4000 r/min).

5.5 Glass graduated centrifuge tube. 15 ml, capping material does not react with acetone.

5.6 visible spectrophotometer. with 10 mm quartz cuvette.

5.7 Needle Filter. 0.45 μm Teflon organic phase filter.

5.8 General laboratory equipment and equipment.

6 samples

6.1 Sample Collection the samples were collected according to the relevant provisions of GB/T 14581, HJ/T 91 and HJ 494. Sample collection in general Use a plexiglass collector or other suitable sampler to collect sub-surface 0.5 m samples, lakes and reservoirs as needed Stratified sampling or mixed sampling, volume of 1 L or 500 ml. If the sample contains settled solids (such as sediment, etc.) the sample should be shaken and poured into a 2 L graduated cylinder, protected from light for 30 min, taken 5 cm below the surface of the sample, and transferred to a sampling bottle (5.1).

Add 1 ml of magnesium carbonate suspension (4.4) per liter of sample to prevent acidification from causing pigment dissolution.

Note: If the water depth is less than 0.5 m, collect the sample at 1/2 water depth, but do not mix it with surface floats.

6.2 Sample Storage

Samples collected should be stored at 0 °C ~ 4 °C dark, transported within 24 h to the testing laboratory filtration (if the sample 24 h can not be sent to testing laboratories, should be on-site filtration, filter dark transport), sample filter at -20 °C light protection Save, within 14 d analysis is completed.

Note: After the sample is collected, the conditions should be analyzed as soon as possible.

6.3 Sample Preparation

6.3.1 Filtering

Install a glass fiber filter (4.5) on the filter unit (5.2). According to the nutritional status of water to determine the sampling volume, see

Table 1, the amount of the cylinder to take a certain volume of mixed samples, filtered, and finally with a small amount of distilled water rinse the filter wall. When filtering

Negative pressure does not exceed 50 kPa, the sample has just been completely filtered through the filter when the end of filtration, tweezers filter out, will have the sample Fold the filter paper dry with filter paper.

Note: Centrifugation can be used to concentrate samples only when samples of eutrophic water do not pass through the fiberglass filter, but should be preserved during transfer Card extraction efficiency, to avoid the loss of chlorophyll a and water on the concentration of acetone solution.

3 Table 1 refers to the filtered sample volume Nutritional status Nutritional nutrition
Nutritional nutrition Filter volume (ml) 100 ~.200 500 ~ 1000

6.3.2 Grind

The sample filter placed in the grinding device (5.3), add 3 ml ~ 4 ml of acetone solution (4.3), ground to a paste.

Additional 3 ml ~ 4 ml acetone solution (4.3), continue grinding, and repeated 1 or 2 times to ensure adequate grinding more than 5 min.

The completely broken cell extract was transferred to a glass graduated centrifuge tube (5.5), and the mortar was rinsed with an acetone solution (4.3) and grinding pestle, together into the centrifuge tube, set the volume to 10 ml.

Note: Chlorophyll sensitive to light and acidic substances, laboratory light should be as weak as possible, can be analyzed operation, all vessels can not use acid Soak or wash.

6.3.3 soak extraction the centrifugation tube in the grinding extract thoroughly mixed oscillation, wrapped with aluminum foil, placed in 4 °C dark soak extract 2 h Above, no more than 24 h. In the soaking process to shake up 2 to 3 times.

6.3.4 Centrifuge

The centrifuge tube into the centrifuge (5.4), the relative centrifugal force 1000 x g (speed 3000 r/min ~ 4000 r/min) from Heart 10 min. The supernatant was then filtered through a syringe filter (5.7) to obtain an acetone extract of Chlorophyll a (test sample) to be tested.

6.4 Preparation of blank samples the laboratory blank samples were prepared according to the same procedure as preparation of sample (6.3) with experimental water.

7 Analysis steps

7.1 Determination of the sample the sample was moved to the cuvette, acetone solution