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HJ

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

HJ 631-2011

**Soil. Determination of exchangeable acidity by barium chloride
extraction-titration method**

土壤 可交换酸度的测定 氯化钡提取-滴定法

(English Translation)

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Foreword

In order to implement the Environmental Protection Law of the People's Republic of China, protect the environment, protect human health, and regulate exchangeable soil.

This standard is established for the determination of acidity.

This standard specifies the cesium chloride extraction-titration method for determining the exchangeable acidity in soil.

This standard is the first release.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. Yangzhou Environmental Monitoring Center Station.

This standard is verified by. Nantong Environmental Monitoring Center Station, Zhenjiang Environmental Monitoring Center Station, Lianyungang Environmental Monitoring Central Station, Yancheng Environmental Monitoring Center Station and Yizheng City Environmental Monitoring Station.

This standard was approved by the Ministry of Environmental Protection on December 6, 2011.

This standard has been implemented since March 1, 2012.

This standard is explained by the Ministry of Environmental Protection.

Determination of exchangeable acidity of soils - Hydrazine chloride extraction - titration

1 Scope of application

This standard specifies the cesium chloride extraction-titration method for determining the exchangeable acidity in soil.

This standard applies to the determination of exchangeable acidity in acidic soils.

When the sample amount is 2.50g and the constant volume is extracted to 100ml, the detection limit of this method is 0.50mmol/kg.

The lower limit is 2.00 mmol/kg.

2 Normative references

The contents of this standard refer to the terms in the following documents. For undated references, the valid version applies.

In this standard.

HJ 613 Determination of dry matter and moisture in soils - Gravimetric method HJ/T 166
Technical Specifications for Soil Environmental Monitoring

3 Terms and definitions

Exchangeable acidity exchangeable acidity the soil is extracted with a neutral salt solution, and the hydrogen ions and aluminum ions adsorbed on the soil colloid are exchanged to make it dissolve.

The solution is then titrated with a sodium hydroxide standard solution and the result is referred to as exchangeable acidity.

4 Principle of the method

Soil samples were extracted with an appropriate amount of barium chloride solution to exchange exchangeable aluminum and exchangeable hydrogen in the soil colloid.

Change, forming trivalent aluminum ions and hydrogen ions into the solution. Take a part of the sample and titrate directly with sodium hydroxide standard solution.

The result obtained is exchangeable acidity. Another part of the sample is taken, and an appropriate amount of sodium fluoride solution is added to form fluoride ions and aluminum ions.

The complex, AlF_6^{3-} , is fully complexed and titrated with a sodium hydroxide standard solution, and the result is exchangeable hydrogen.

5 Reagents and materials

Analytically pure reagents in accordance with national standards were used for analysis, unless otherwise stated.

Carbon oxide water.

5.1 Carbon dioxide free water

The distilled water was boiled and evaporated in a beaker (evaporation amount of about 10%), and after cooling, it was used, and the electrical conductivity was ≤ 0.20 mS/m (25 °C).

Available when used.

5.2 Hydrochloric acid solution (HCl). 15.

5.3 Barium chloride solution. $c(\text{BaCl}_2 \cdot 2\text{H}_2\text{O}) = 0.10 \text{ mol/L}$

Weigh 24.43g of barium chloride ($\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$) dissolved in 1000 ml of water, mix and transfer to a polyethylene bottle for storage.

5.4 Sodium hydroxide standard solution. $c(\text{NaOH}) = 0.1 \text{ mol/L}$

Weigh 110g of sodium hydroxide in 100ml of water, shake it, pour it into a polyethylene container, and seal it to the solution.

bright. 5.4 ml of the supernatant was placed in a 1000 ml volumetric flask, diluted with water to the mark, shaken, and transferred to a polyethylene bottle.

save.

Calibration. Weigh the standard reagent potassium hydrogen phthalate dried to constant weight in a constant temperature drying oven at $105^\circ\text{C} \sim 110^\circ\text{C}$ 0.75g (accurate to 0.0001g), add 50ml of water to dissolve it, add 2 drops of phenolphthalein indicator (5.7), to be calibrated the sodium hydroxide standard solution was titrated to pink and kept for 30 s without fading. At the same time, use water as a blank test. Sodium hydroxide standard the concentration of the quasi-solution (mol/L) is calculated according to formula (1).

22.204) (

1000) NaOH (

Mc (1)

In the formula.

$c(\text{NaOH})$ -- concentration of sodium hydroxide standard solution, mol/L;

M-- the mass of potassium hydrogen phthalate, g;

V1-- The volume of sodium hydroxide standard solution consumed when calibrating the potassium hydrogen phthalate standard solution, ml;

V2-- The volume of the sodium hydroxide standard solution consumed when the blank solution is calibrated, ml;

204.22-- molar mass of potassium hydrogen phthalate, g/mol.

Note: The sodium hydroxide standard solution should be calibrated before each batch of samples.

5.5 Sodium hydroxide standard solution. $c(\text{NaOH}) = 0.0020 \text{ mol/L}$

Accurately measure 10.00 ml of sodium hydroxide standard solution (5.4) into a 500 ml volumetric flask and dilute to the mark with water. Storage Store in a polyethylene bottle.