GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

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National food safety standard - Food additive - Calcium hydroxide

食品安全国家标准 食品添加剂 氢氧化钙

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State Administration for Market Regulation.

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National food safety standard - Food additive - Calcium hydroxide

1 Scope

This standard applies to the food additive calcium hydroxide, which is made by digesting calcium oxide as raw material, OR the food additive calcium hydroxide, which is made by calcining limestone or oyster as raw material into calcium oxide and then digesting it.

2 Chemical name, molecular formula, relative molecular mass

2.1 Chemical name

Calcium hydroxide

2.2 Molecular formula

$Ca(OH)_2$

2.3 Relative molecular mass

74.09 (according to 2018 international relative atomic mass)

3 Technical requirements

3.1 Sensory requirements

Sensory requirements shall comply with the provisions of Table 1.

3.2 Physical and chemical indicators

The physical and chemical indicators shall comply with the provisions of Table 2.

Appendix A

Testing method

A.1 Warning

Some reagents used in the test methods of this standard are toxic or corrosive and shall be handled with caution. If necessary, it shall be carried out in a fume hood. If it splashes on the skin or eyes, rinse immediately with plenty of water. In serious cases, seek immediate treatment.

A.2 General provisions

The reagents and water used in this standard, unless other requirements are noted, refer to analytically pure reagents and grade three water specified in GB/T 6682. The standard titration solutions, standard solutions for impurity determination, preparations and products used in the test shall be prepared, in accordance with the provisions of GB/T 601, GB/T 602, GB/T 603, unless other requirements are specified. The solutions used refer to aqueous solutions unless the solvent used to prepare them is specified.

A.3 Identification test

A.3.1 Reagents and materials

A.3.1.1 Hydrochloric acid.

A.3.1.2 Acetic acid solution: 1 + 1.

A.3.1.3 Ammonium oxalate solution: 40 g/L; weigh 4 g of ammonium oxalate ($C_2H_8N_2O_4 \cdot H_2O$) and dissolve it in 100 mL of water.

A.3.1.4 Red litmus paper.

A.3.2 Identification method

A.3.2.1 Identification of hydroxyl radicals

Weigh about 5.0 g of the specimen. Place it in a beaker. Add 20 mL of water and mix. The specimen will form a thick paste. The clear liquid on the upper layer of the thick paste will turn the red litmus paper blue.

A.3.2.2 Identification of calcium ions

Weigh about 1 g of the specimen. Place it in a beaker. Add 20 mL of water to mix. Add enough acetic acid solution to dissolve the specimen. Then add ammonium oxalate solution to generate insoluble oxalate precipitate. This precipitate is insoluble in acetic acid but soluble in hydrochloric acid.

absolute difference between two independent determination results, as obtained under repeatability conditions, is not greater than 0.03%.

A.6 Determination of acid-insoluble matter

A.6.1 Reagents and materials

A.6.1.1 Hydrochloric acid solution: 1 + 3.

A.6.1.2 Silver nitrate solution: 17 g/L.

A.6.2 Instruments and equipment

A.6.2.1 Glass sand crucible: Pore size 5 μm ~ 15 μm.

A.6.2.2 Electric constant temperature drying oven: The temperature control range is 105 °C ± 2 °C.

A.6.3 Analytical procedures

Weigh about 4 g of the specimen, accurate to 0.0002 g. Place it in a beaker. Add a small amount of water to moisten it. Add 60 mL of hydrochloric acid solution. Heat and boil after the specimen is dissolved. Transfer while hot to a glass sand crucible that has been dried at 105 °C ± 2 °C to a constant mass. Carry out suction filter. Use hot water to wash the filtrate, until there is no chloride ion (check with silver nitrate solution). Place the glass sand crucible together with the acid-insoluble matter in an electric constant temperature drying oven. Dry it at 105 °C ± 2 °C for 1.5 hours. Take it out. Place it in a desiccator. Weigh it after 30 minutes. Then place it in an electric constant temperature drying oven, to dry for 30 minutes. Repeat the above operation, until the difference between the last two weighing results is no more than 0.0003 g.

A.6.4 Result calculation

The mass fraction w_3 of acid-insoluble matter is calculated according to formula (A.3).

$$w_3 = \frac{m_4 - m_5}{m_6} \times 100\% \qquad \cdots\cdots (A.3)$$

Where:

m_4 - The mass of the glass sand crucible and acid-insoluble matter after drying, in grams (g);

m_5 - The mass of the glass sand crucible, in grams (g);

m_6 - The mass of the specimen, in grams (g).

The test results are based on the arithmetic mean of parallel measurement results. The

absolute difference between two independent determination results, as obtained under repeatability conditions, is not greater than 0.03%.

A.7 Determination of carbonate

A.7.1 Reagents and materials

Hydrochloric acid solution: 1 + 3.

A.7.2 Analytical procedures

Weigh about 2 g of specimen, accurate to 0.01 g. Place it in a beaker. Add 50 mL of water. Mix well. Add 40 mL of hydrochloric acid solution. Only slight bubbles shall be generated during the dissolution process.

A.8 Determination of magnesium and alkali metals

A.8.1 Reagents and materials

A.8.1.1 Sulfuric acid.

A.8.1.2 Hydrochloric acid solution: 1 + 3.

A.8.1.3 Ammonia solution: 1 + 1.

A.8.1.4 Oxalic acid solution: 63 g/L. Weigh 6.3 g of oxalic acid ($C_2H_2O_4 \cdot 2H_2O$) and dissolve it in 100 mL water.

A.8.1.5 Methyl red indicator solution: 1 g/L.

A.8.2 Instruments and equipment

High temperature furnace: Temperature control range is 800 °C ± 25 °C.

A.8.3 Analytical procedures

Weigh about 0.5 g of the specimen, accurate to 0.0002 g. Place it in a beaker. Add 10 mL of water and about 6 mL of hydrochloric acid solution. Stir until the specimen is completely dissolved. Boil for 1 min. Quickly add 40 mL of oxalic acid solution and stir. Add 2 drops of methyl red indicator solution. Add ammonia solution dropwise, until the solution turns yellow. After cooling, transfer the mixture to a 100 mL volumetric flask. Use water to dilute it to the mark. Shake well. Let it stand for 4 hours or overnight. Use medium-speed filter paper to make dry filtration. Discard 10 mL of the initial solution. Use a pipette to transfer 50 mL of the filtrate into a crucible, that has been preheated at 800 °C ± 25 °C to a constant mass. Add 0.5 mL of sulfuric acid. Evaporate to near dryness in a water bath (or evaporate to near dryness on an electric furnace at low temperature). Then carefully evaporate to dryness on the electric stove. Continue heating to completely decompose and volatilize the ammonium salt. Take it

A.9.2 Analytical procedures

A.9.2.1 Preparation of standard turbidity solution

Pipette 3.00 mL of barium standard solution. Place it in a 50 mL colorimetric tube. Add water to 25 mL. Add 15 mL of acetic acid-sodium acetate buffer solution (pH≈4.5), 0.5 mL of potassium chromate solution. Use water to dilute it to the mark. Shake well. Place for 15 minutes.

A.9.2.2 Test

Weigh 2.00 g ± 0.01 g of specimen. Place it in a beaker. Add 10 mL of water to moisten it. Add 20 mL of hydrochloric acid solution to dissolve the specimen. Use slow filter paper to make filtration. Place the filtrate in a 50 mL volumetric flask. Use water to dilute to the mark. Shake well. Use a pipette to remove 25 mL of filtrate. Place it in a 50 mL colorimetric tube. Add 15 mL of acetic acid-sodium acetate buffer solution (pH ≈4.5) and 0.5 mL of potassium chromate solution. Use water to dilute to the mark. Shake well. Let it stand for 15 minutes. Compare the turbidity with the standard turbidity solution processed at the same time. The turbidity of the specimen is not deeper than that of the standard turbidity solution, that is, the barium content is not more than 0.03%.

A.10 Determination of lead (Pb)

Measure according to the method specified in GB 5009.75 or GB 5009.12. The water used in the test is grade 2 water specified in GB/T 6682.

A.11 Determination of total arsenic (calculated as As)

Measure according to the method specified in GB 5009.76 or GB 5009.11. The water used in the test is grade 2 water specified in GB/T 6682.

A.12 Determination of sieve residue

A.12.1 Instruments and equipment

A.12.1.1 Test sieve: Sieve frame size ϕ200 mm × 50 mm; basic mesh size 0.045 mm; metal wire (austenitic stainless steel) diameter 0.032 mm.

A.12.1.2 Glass sand crucible: Pore size 5 μm ~ 15 μm.

A.12.1.3 Soft brush.

A.12.1.4 Electric constant temperature drying oven: The temperature control range is 105 °C ± 2 °C.

A.12.2 Analytical procedures

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