

HG

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

HG/T 5049-2016

Urea containing alginic acid

含海藻酸尿素

(English Translation)

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1 Scope

This standard specifies the terms and definitions, requirements, test methods, inspection rules, marks and packaging, transport and storage of the urea containing alginic acid.

This standard is applicable to urea containing alginic acid prepared by adding alginic acid synergistic liquid extracted from seaweed as the main raw material during the urea production process, and then granulating by using a urea granulation technology.

2 Normative references

The following referenced documents are indispensable for the application of this document.

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 2440 Urea

GB/T 2441.1 Determination of urea-Part 1: Total nitrogen content

GB/T 2441.2 Determination of urea-Part 2: Biuret content-Spectrophotometric method

GB/T 2441.3 Determination of urea-Part 3: Water content-Karl Fischer method

GB/T 2441.7 Determination of urea-Part 7: Particle size-Sieve method

GB/T 2441.9 Determination of urea-Part 9: Methylenediurea content-Spectrophotometric method

GB/T 6679 General rules for sampling of solid chemical products

GB/T 6682 Water for Analytical Laboratory Use- Specifications and test methods

GB/T 8170 Rules of rounding off for numerical values & expression and judgment of limiting values

GB/T 8569 Packaging of solid chemical fertilizers

GB 18382 Fertilizer Marking-Presentation and declaration

HG/T 2843 Chemical Fertilizer Products-Standard volumetric, standard, reagent and indicator solutions for chemical analysis

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 alginic Acid

Pipette 10.00 mL of the sodium alginate stock solution into a 100 mL volumetric flask, and dilute to a constant volume with water.

5.3.2.6 A carbazole ethanol solution

2 g/L.

Weigh 0.20 g of carbazole, dissolve with the anhydrous ethanol and dilute to a constant volume of 100 mL.

5.3.3 Instrument

Spectrophotometer: an absorption cell with an optical path of 1 cm and conduct a measurement at 520 nm.

5.3.4.1 Plotting of standard curve of alginic acid

Pipette 0.00 mL, 0.20 mL, 0.40 mL, 0.60 mL, 0.80 mL, 1.00 mL and 1.20 mL of the sodium alginate standard solution to 50 mL colorimetric tubes, respectively, add 3.00 mL, 2.80 mL, 2.60 mL,

2.40 mL, 2.20 mL, 2.00 mL and 1.80 mL of water to make the volume 3.00 mL. Then transfer the colorimetric tubes containing the solutions to an ice-water bath, slowly add 10.00 mL of the sulfuric acid while shaking, starting with one drop per second, increasing to two drops per second after half of the addition, and heating in a boiling water bath for 20 minutes after the addition. Take the colorimetric tubes containing the solutions out and cool to 80°C, then add 0.30 mL carbazole ethanol solution, shake well and place at room temperature for 45 min.

Use a 1 cm absorption cell for colorimetry at a wavelength of 520 nm, use a reagent blank is used as a reference, measure an absorbance, use mass (mg) of sodium alginate contained in a standard colorimetric solution of a total color development volume as an x-coordinate, use the measured absorbance as a y-coordinate, and plot a standard curve or solve a linear regression equation.

5.3.4.2 Determination of Alginic Acid Content

Weigh 15-20 g (accurate to 0.0002 g) of a sample, add 25 mL of water to dissolve, transfer the dissolved sample to a 50 mL volumetric flask, dilute it to a constant volume, and shake it to even. Accurately pipette 3.00 mL of a sample solution into a 50 mL colorimetric tube.

The following steps are the same as the plotting of the standard curve. At the same time, urea is used as a control.

5.3.5.1 Determination of Alginic Acid Content

Consult the mass of the alginic acid from the corresponding absorbance from the standard curve or calculate the mass of the alginic acid from the regression equation.

Use formula (1) to calculate the content of the alginic acid X in the sample or control urea in a mass fraction whose value is expressed in %:

5.3.5.2 Alginic Acid Content in Products

Use formula (2) to calculate the content of the alginic acid H in the products in a mass fraction whose value is expressed in %:

The calculation results are expressed to three decimal places and an arithmetic average of the parallel determination results is used as the determination results.

5.3.5.3 Allowable Tolerance

The relative difference of the parallel determination results is less than or equal to 10%;

5.4.1 Principle

Urea containing alginic acid is hydrolyzed into ammonium nitrogen under the action of urease.

In the presence of magnesium oxide, the ammonium nitrogen produced by a hydrolysis of amide nitrogen in the urea containing alginic acid will be converted into ammonia to release out, a boric acid solution absorbs the released ammonia, then a certain concentration of a sulfuric acid solution is used to titrate the released ammonia, urea is used as a control, and the ammonia volatilization inhibition rate is calculated on a basis of a volume of the consumed sulfuric acid standard solution.

5.4.2.1

Magnesium Oxide.

5.4.2.2

Urea.

5.4.2.3 A sulfuric acid standard volumetric solution

= 0.01 mol/L.

5.4.2.4 A urease solution.

Weigh 0.100 g of urease (activity about 1 U/mg), add 0.5 mL of water, grind the urease with a mortar to a paste, transfer all the ground urease to a 250 mL volumetric flask, shake the urease solution well, and store the urease solution in a refrigerator at 4°C for a standby application.

5.4.2.5 A boric acid solution

2%. °C 5.4.2.6 An alkaline glue solution.

Add 40 g arabic gum and 50 mL water into a beaker, heat to 70°C~80°C, stir to dissolve, after cooling to room temperature, add 20 mL glycerin and 20 mL saturated potassium carbonate aqueous solution and stir the materials well; centrifuge to remove foam and insoluble matters and store clear liquid in a glass bottle for a standby application.

5.4.2.7 A mixed indicator.

Dissolve 0.099 g of bromocresol green and 0.066 g of methyl red in 100 mL of ethanol (95%).

5.4.3.1

Common laboratory devices.

5.4.3.2

Conway dish.

5.4.3.3

Incubator.

5.4.4.1 Incubation

Weigh 1.000 g of the sample in an outer chamber of the Conway dish, add 10 mL of water, shake the Conway dish horizontally to make the sample evenly dissolved, then weigh 0.10 g of magnesium oxide, add the magnesium oxide to the outer chamber, and shake a mixture carefully to disperse the magnesium oxide in the sample solution. Pipette 2 mL of