



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

GB 1886.300-2018

**National food safety standard - Food additives - AMBERLITE
XAD-16**

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1 Scope

This standard applies to food additive ion exchange resins.

2 Definitions

Ion exchange resin is a synthetic resin, which has cross-linked structure containing ionic functional groups, that can exchange with the same-sex charges in the solution. It consists of two parts: the polymer skeleton and the functional group.

3.1 Sensory requirements

Sensory requirements shall meet the requirements in Table 1.

3.2 Physical-chemical indicators

The physical-chemical indicators shall meet the requirements in Table 2.

Appendix A Testing method

A.1 General provisions The reagents used in this standard refer to analytical reagents, unless otherwise specified. The experimental water is treated according to the requirements for dilution water in GB/T 5750.7, which is prepared by reverse osmosis, deionization or distillation;

then filtered by activated carbon; finally must not contain free chlorine. The conductivity at 25 °C is less than 0.2 uS/cm; the total organic carbon (TOC) is less than

0.5 mg/L. The solution used in the test refers to the aqueous solution, when the solvent used for the preparation is not indicated.

A.2 Identification test A.2.1 Method summary A.2.2 Reagents and materials A.2.2.5 Sodium hydroxide solution. About 1 mol/L.

A.2.2.6 Diluted nitric acid solution. Take 105 mL of 70% nitric acid solution. Use water to

dilute it to 1000 mL.

A.2.2.7 Silver nitrate solution. Weigh 1.7 g of silver nitrate and dissolve it in water. Use water to dilute it to 100 mL.

A.2.3 Instruments and equipment Glass chromatography tubes.

A.2.4 Identification method A.2.4.1 Identification test of cation exchange resin Take 5 mL of the specimen. Put it into a glass chromatography tube, which has an inner diameter of about 1 cm. Put it together with water, to make a resin column. Add 25 mL of 10% hydrochloric acid.

A.2.4.2 Identification test of anion exchange resin Take 5 mL of the specimen. Put it into a glass chromatography tube, which has an inner diameter of about 1 cm. It can be contained together with water, to make a resin column.

Add 25 mL of 10% hydrochloric acid.

A.3 Determination of total organic carbon (TOC) increase A.3.1 Method summary After the resin is soaked in experimental water for 24 hours, it is rinsed by experimental water. The collected eluents of different fractions are determined, by a total organic carbon analyzer.

A.3.2 Reagents and materials A.3.2.1 Hydrochloric acid solution. 1 + 1.

A.3.2.2 Nitric acid solution. 1 + 1.

A.3.3 Instruments and equipment A.3.4 Analytical procedures A.3.4.1 Pre-test controls

Before starting the test, use experimental water, to flush the test equipment, until the flow rate is stable at 500 mL/h $\pm$ 25 mL/h and the total organic carbon (TOC) of the water at the outlet of the exchange column is less than 0.5 mg/L.

A.3.4.2 Adding specimen Add 100 mL of experimental water to the exchange column.

Slowly add the ion exchange resin. After the resin sinks, tap the wall of the exchange column, to vibrate the exchange column, so that the stacked volume of the ion exchange resin in the exchange column is constant. Repeat the above operation, until the final volume of the ion exchange resin is 100 mL.

A.3.4.5 Analysis According to the method of GB/T 5750.7, test the total organic carbon (TOC) of each fraction of the collected liquid.

The 5 fractions are analyzed in this way; the test results shall gradually decrease from 1 to 5.

A.3.4.6 Calculation of results The increase w of total organic carbon (TOC) is calculated, in milligrams per liter (mg/L), according to formula (A.1).

A.4 Determination of total exchange capacity A.4.1 Determination of total exchange capacity of cation exchange resin A.4.1.1 Reagents and materials A.4.1.1.1 Sodium

hydroxide solution. 0.2 mol/L.

A.4.1.1.2 Sulfuric acid solution [$c(1/2H_2SO_4)$]. 0.1 mol/L.

A.4.1.2.2 Test The standard sample is fully impregnated with experimental water. Then the attached water is absorbed by filter paper for later use.

First weigh 10 g of the standard sample. Dry it to constant weight, at 105 °C +/- 3 °C.

Measure the solid content G1(%).

Accurately weigh about 5 g of the standard sample. Immerse in 500 mL of sodium hydroxide solution. Shake and mix frequently. After standing for 12 h, take 10 mL of the upper clear solution. Use sulfuric acid solution to titrate it (using 3 drops of methyl orange test solution as indicator). Conduct a blank test at the same time.

A.4.2 Determination of total exchange capacity of anion exchange resin A.4.2.1 Reagents and materials A.4.2.1.1 Hydrochloric acid solution. 0.2 mol/L.

A.4.2.1.2 Sodium hydroxide solution. 0.1 mol/L.

A.4.2.1.3 Phenolphthalein test solution. Dissolve 1 g of phenolphthalein in 100 mL of ethanol. Then use water to titrate it to 100 mL.

A.4.2.2 Analytical procedures A.4.2.2.3 Calculation results The total exchange capacity C2 of the anion exchange resin, in units of millimoles per gram (mmol/g), is calculated according to formula (A.3).

A.5 Determination of lead (Pb) and arsenic (calculated as As)

Weigh 10 g of the standard sample. Transfer it into an exchange column, which has an inner diameter of about 28 mm. Use 1000 mL deionized water, to rinse the extraction resin. Carefully bake the extract, at 110 °C for 3 h.