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

GB/T 17481-2025

Replacing GB/T 17481-2008

Determination of choline chloride in feed additive premix

添加剂预混合饲料中氯化胆碱的测定

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. This document replaces GB/T 17481-2008 "Determination of Choline Chloride in Premixes". Compared with GB/T 17481-2008, except for the structure... Aside from adjustments and editorial changes, the main technical changes are as follows:

- a) The detection limit for ion chromatography has been increased, and the quantitation limit for Reichstag salt spectrophotometry has been changed (see Chapter 1,.2008 edition, p. 1). chapter);
- b) A standard series of solutions has been added (see 4.2.8);
- c) The preparation of the sample solution has been modified (see 4.5.1, 3.5.1 in the.2008 version);
- d) The ion chromatography reference conditions have been changed (see 4.5.2, 3.5.2.1 of the.2008 version);
- e) Qualitative and quantitative requirements have been added (see 4.5.3.2 and 4.5.3.3);

- f) The experimental data processing was changed (see 4.6 in the 2008 edition);
- g) Increased the shelf life of Reichelt salt methanol solution (see 5.2.5);
- h) The preparation of the standard series solutions has been modified (see 5.5.3,

1 Scope

GB/T 17481-2025 is the Chinese national standard on determination of choline chloride in feed additive premix, in the field of agriculture. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 29 August 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 March 2026.

Classification: ICS 65.120, CCS B46. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes the ion chromatography and Reichskewer salt spectrophotometric methods for the determination of choline chloride in additive premixed feeds. This document applies to the determination of choline chloride in vitamin premixed feeds and compound premixed feeds. The detection limit for ion chromatography in this document is 20 mg/kg, and the quantitation limit is 50 mg/kg; the quantitation limit for Reichs's salt spectrophotometry is... 5000mg/kg.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 6682 Specifications and test methods for water used in analytical laboratories

GB/T 20195 Preparation of animal feed samples

3 Terms and Definitions

This document does not contain any terms or definitions that need to be defined.

4 Ion Chromatography

4.1 Principle Choline chloride in the sample was extracted with water or chloroform-methanol solution, detected by cation exchange chromatography-conductivity detector, and analyzed by external standard method. Quantitative.

4.2 Reagents or Materials Unless otherwise specified, use only analytical grade reagents.

4.2.1 Water. GB/T 6682, Grade I.

4.2.2 Disodium ethylenediaminetetraacetate (EDTA disodium).

4.2.3 Methanol. chromatographic grade.

4.2.4 Chloroform-methanol solution. Measure 90 mL of chloroform and 900 mL of methanol and mix well.

4.2.5 Methanesulfonic acid solution (24 mmol/L). Weigh

2.304 g of methanesulfonic acid into a 1000 mL beaker, add 800 mL of water, dissolve, and transfer to Dilute to volume with water in a 1000mL volumetric flask and mix well.

4.2.6 Standard stock solution (2 mg/mL). Weigh.200 mg (accurate to

0.1 mg) of choline chloride standard (CAS No.. 67-48-1, pure) Dissolve (with a purity of not less than 99.5%) in a 100 mL volumetric flask, dilute to volume with water, and mix well. Store at 2°C~8°C, shelf life 3 months.

4.2.7 Standard Intermediate Solution (100 µg/mL). Accurately transfer 5 mL of the standard stock solution (4.2.6) into a 100 mL volumetric flask, and dilute with water. Prepare and mix thoroughly. Prepare immediately before use.

4.2.8 Standard series solutions. Accurately transfer appropriate amounts of the standard intermediate solution (4.2.7), dilute and bring to volume with water, mix well, and prepare solutions of the desired mass concentration. The standard series solutions were 1 µg/mL, 2 µg/mL, 5 µg/mL, 10 µg/mL, 20 µg/mL, 50 µg/mL, and 100 µg/mL, respectively. Prepare fresh before use.

4.2.9 Purification column. Polyvinylbenzene polymer reversed-phase packing, 1 mL.

4.2.10 Microporous filter membrane. 0.45µm, aqueous system.

4.2.11 Filter paper. Qualitative, rapid.

4.3 Instruments and Equipment

4.3.1 Ion chromatograph. equipped with a conductivity detector.

4.3.2 Analytical balance. accuracy

0.1 mg.

4.3.3 Water bath.

4.3.4 Ultrasonic cleaner.

4.3.5 Vortex mixer.

4.3.6 Nitrogen blowing device.

4.4 Samples Prepare samples according to GB/T 20195, at least 200g, crush them so that they all pass through a test sieve with a 0.425mm aperture, mix thoroughly, and load into... Store in a sealed container, away from light.

4.5.1 Sample Solution Preparation

4.5.1.1 Vitamin premixed feed Perform two parallel tests. Weigh 1-2g of the sample (containing 0.01-0.2g of choline chloride, accurate to 0.1mg) and place it in a 100mL container. Add approximately 60 mL of water to a volumetric flask, shake well, place in a 70°C water bath for 20 minutes, sonicate for 10 minutes, remove, cool to room temperature, and dilute to volume with water. (V) Shake well and filter. Take 8 mL of the filtrate and pass it through a purification column (4.2.9) pre-activated with 5 mL methanol (4.2.3) and 15 mL water. Discard the unfiltered solution. Collect 3 mL of filtrate, filter the purified solution through a microporous membrane (4.2.10), and test.

4.5.1.2 Compound premixed feed Perform two parallel tests. Weigh 1-2 g (accurate to

0.1 mg) of the sample and place it in a 100 mL volumetric flask. Add 1-2 g of ED- Disodium TA, 60 mL chloroform-methanol solution (4.2.4), shake well, sonicate for 30 min, shaking once every 10 min, remove and cool to... At room temperature, dilute to volume (V) with chloroform-methanol solution (4.2.4), shake well, and filter. Accurately transfer 8 mL of the filtrate into a centrifuge tube and incubate at 40°C under nitrogen. Blow until nearly dry, accurately add 8 mL of water, vortex to mix, and pass through a purification column pre-activated with 5 mL of methanol (4.2.3) and 15 mL of water. (4.2.9) Discard the first 3 mL of filtrate, collect the purified liquid, filter it through a microporous membrane (4.2.10), and then test it.

4.5.2 Reference conditions for ion chromatography The reference conditions for ion chromatography are as follows:

- a) Chromatographic column. Weak acid cation exchange column, 250 mm in length, 4 mm in inner diameter, 8.5 µm in particle size, or equivalent;
- b) Guard column. Weak acid cation exchange column, 50 mm in length, 4 mm in inner diameter, 8.5 µm in particle size, or equivalent;
- c) Column temperature. 30°C;