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

GB/T 13082-2021

Replacing GB/T 13082-1991

Determination of cadmium in feeds

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Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020 "Directives for standardization - Part

1.Rules for the structure and drafting of standardizing documents". This document replaces GB/T 13082-1991 "Determination of cadmium in feeds". Compared with GB/T 13082-1991, except for structural adjustment and editorial changes, the main technical changes are as follows:

- a) CHANGE the scope of application of the method, adding the detection limit and quantification limit of graphite furnace atomic absorption spectrometry and flame atomic absorption spectrometry (see Chapter 1; Chapter 1 of the 1991 edition);
- b) CHANGE the principle of the method (see Chapter 4; Chapter 2 of the 1991 edition);
- c) ADD the preparation method of the sample solution (see 8.1.2 and 8.1.3);
- d) CHANGE the test data processing of atomic absorption spectrometry (see 9.1, 9.2; 7.1 of the 1991 edition);

e) CHANGE the expression of precision (see 10.1, 10.2;

7.3 of the 1991 edition). Please note that some content of this document may be patented. The issuing agency of this document assumes no responsibility for identifying patents. This document was proposed by AND shall be under the jurisdiction of the National Standardization Technical Committee of Feed Industry (SAC/TC 76). Drafting organizations of this document. Institute of Agricultural Quality Standards and Testing Technology, Chinese Academy of Agricultural Sciences. The main drafters of this document. Jia Zheng, Xu Siyuan, Tian Jing, Fan Xia, Xiao Zhiming, Lu Mei, Zhang Xiao, Li Yang, Li Lan, Liu Xiaolu. This standard replaces the standard previously issued as follows: - It was first released in 1991 as GB/T 13082-1991; - This is the first revision. Determination of cadmium in feeds

1 Scope

GB/T 13082-2021 is the Chinese national standard on determination of cadmium in feeds, 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 26 November 2021 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 June 2022. 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 flame atomic absorption spectrometry and graphite furnace atomic absorption spectrometry, for the determination of cadmium in feed. This document applies to the determination of cadmium, in compound feeds, concentrated feeds, concentrate supplements, additive premixed feeds, feed additives, feed ingredients. In this document, when the sampling amount is 5 g and the constant volume is 50 mL, the detection limit of flame atomic absorption spectrometry is

0.08 mg/kg AND the quantification limit is

0.20 mg/kg. When the sampling amount is

0.5 g and the constant volume is 25 mL, the detection limit of graphite furnace atomic absorption spectrometry is

0.002 mg/kg AND the quantification limit is

0.05 mg/kg.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, for dated references, only the version corresponding to the date applies to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 6682 Water for analytical laboratory use - Specification and test methods

GB 6819-2004 Dissolved acetylene

GB/T 20195 Animal feeding stuffs - Preparation of test samples

3 Terms and definitions

There are no terms and definitions, that need to be defined in this document.

4 Principles

After dry ashing or wet digestion (microwave digestion), or hydrochloric acid dissolution, the specimen is introduced into the flame or graphite furnace atomizer of atomic absorption spectrophotometer, to measure the absorbance value at a wavelength of 228.8 nm.

5 Reagents or materials

Warning. When using various strong acids, it shall be carried out in a fume hood; when using perchloric acid for digestion, be careful not to burn it dry, to prevent explosion.

5.1 Water. GB/T 6682, grade 1.

5.2 Nitric acid. Excellent grade pure.

5.3 Hydrochloric acid. Excellent grade pure.

5.8 Palladium nitrate solution (2 mg/mL). Weigh

0.20 g of palladium nitrate. Use water to dissolve it. Dilute it to 100 mL. Mix well.

5.9 Ammonium dihydrogen phosphate solution (10 mg/mL). Weigh

1.00 g of ammonium dihydrogen phosphate. Use water to dissolve it. Dilute it to 100 mL. Mix well.

5.10 Cadmium standard stock solution (1 mg/mL). Accurately weigh 1.0000 g of metal cadmium (certified reference material, purity 99.99%), into a 250 mL conical flask. Add 10 mL of nitric acid solution (5.7). Heat on an electric hot plate, to dissolve all.

5.11 Cadmium standard intermediate solution I (10 µg/mL). Accurately pipette 1 mL of cadmium standard stock solution (5.10), into a 100 mL volumetric flask. Use nitric acid solution (5.6), to dilute it to the mark. Mix well. The valid period is 1 month.

5.14 Cadmium standard series solution II.

6 Instruments and equipment

6.1 Atomic absorption spectrophotometer. It is equipped with flame/graphite furnace atomizer and cadmium hollow cathode lamp.

6.2 Analytical balance. Sensitivity is 0.0001 g and 0.01 g.

6.6 Adjustable electric heating plate or adjustable electric furnace. The temperature range is 100 °C ~ 400 °C; the accuracy is ± 5 °C.

6.7 Microwave digester. It is equipped with PTFE digestion tank.

7 Samples

Prepare samples according to GB/T 20195, at least 200 g. Pulverize them, so that they all pass through an analytical sieve, which has an aperture of 0.425 mm.

8.1 Preparation of specimen solution

8.1.1 Dry ashing method It is suitable for compound feed, concentrated feed, concentrate supplement, pre-mixed feed containing organic matter additives, feed additives, feed raw materials.

8.1.2 Wet digestion method It is suitable for additive premixed feed which contain more organic matter, feed additives, feed raw materials.

8.1.3 Microwave digestion It is suitable for compound feed, concentrated feed, concentrate supplement, pre-mixed feeds which contain organic matter additives, feed additives, feed raw materials.

8.1.4 Hydrochloric acid dissolution method It is suitable for mineral feed ingredients and mineral element feed additives. Do two tests in parallel. Weigh

0.5 g ~ 2 g of specimen (accurate to 0.0001 g), into a 150 mL conical flask. Add 2 mL of water to wet the specimen. Take 10 mL of hydrochloric acid solution (5.5). Add it dropwise to the conical flask.

8.3 Determination

8.3.1 Flame atomic absorption spectroscopy Set the instrument to the background deduction mode. Adjust it to the best working state. Set the zero point, by water or the zero point of the curve. Measure the absorbance value of the blank solution, the cadmium