NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB 5009.210-2023

National food safety standard - Determination of pantothenic acid in foods

Issued on: September 6, 2023 **Implemented on: September 6, 2024**

Issued by: NHC; SAMR

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Foreword

This Standard replaces GB 5009.210-2016 "Determination of pantothenic acid in foods".

Compared with GB 5009.210-2016, the main changes in this Standard are as follows.

- Add liquid chromatography-tandem mass spectrometry;

- Modify the pretreatment method for microbial method specimens. Add the determination method for microplates.

National food safety standards -- Determination of pantothenic acid in food

1 Scope

This Standard specifies the method for the determination of pantothenic acid in food.

Method One of this Standard is applicable to the determination of pantothenic acid in infant formula foods (except infant formula foods for special medical purposes), infant supplementary foods, dairy products, beverages, and nutritional supplements.

Method Two and Method Three of this Standard are applicable to the determination of pantothenic acid in food.

Method One -- Liquid chromatography

2 Principle

After the specimen is extracted with hot water, it is separated by a C18 reversed-phase chromatography column, qualitatively determined by retention time, and quantitatively by the external standard method.

3 Reagents and materials

Unless otherwise stated, the reagents used in this method are analytically pure, and the water is grade one water specified in GB/T 6682.

3.2.1 Hydrochloric acid (0.1 mol/L). Pipette 8.3 mL of hydrochloric acid into 800 mL

of water. Add water to dilute to 1000 mL. Mix well.

3.2.3 Zinc sulfate solution (0.5 mol/L). Weigh 14.4 g of zinc sulfate heptahydrate. Add

water to dissolve and dilute to 100 mL.

3.2.4 Potassium dihydrogen phosphate solution (0.02 mol/L). Weigh 2.722 g of

potassium dihydrogen phosphate. Add 500 mL water to dissolve. Use phosphoric acid to adjust pH to 3.0+/-0.1.

3.3 Standard product

D-calcium pantothenate standard product (C18H32CaN2O10, CAS number. 137-08-6). purity >=99%, or standard product certified by the country and awarded a reference material certificate.

3.4.1 Pantothenic acid standard stock solution (500 μg/mL). Accurately weigh 136 mg

of D-calcium pantothenate standard (accurate to 0.1 mg). Add water to dissolve and transfer to a 250 mL volumetric flask. Dilute to volume. Mix well. The standard stock solution shall be stored in the dark at -18°C and below. It can be kept for 3 months.

4.5 Centrifuge. rotation speed >=8000 r/min.

4.6 0.45 μm filter.

5.1 Specimen preparation

The solid specimen is crushed and mixed evenly. Carbonated drinks require ultrasonic removal of carbon dioxide, and other liquid specimens need to be shaken well.

5.2.1 Beverages, nutrient supplements

Accurately weigh or measure an appropriate amount of specimen to the nearest 0.001 g. Generally, the solid specimen is 0.2 g~2 g. The liquid specimen is 10 g~20 g. Place in a 50 mL Erlenmeyer flask. Add about 30 mL of 40 degrees C~50 degrees C warm water and conduct

ultrasonic extraction for 20 min.

5.2.2 Infant formula food (except infant formula food for special medical

purposes), infant supplementary food, dairy products

Accurately weigh an appropriate amount of specimen to the nearest 0.001 g. Generally, the solid specimen is about 5 g.

5.3 Reference chromatographic conditions for liquid phase

The reference chromatographic conditions for the liquid phase are as follows.

5.4.1 Determination of standard curve

Carry out chromatographic analysis of the pantothenic acid standard working solution in sequence (see Figure A.1 in Annex A for the standard chromatogram). Draw a standard curve with the concentration of the standard working solution as the abscissa and the peak area as the ordinate.

5.4.2 Determination of specimen solution

The specimen measurement liquid is subjected to chromatographic analysis. Find the corresponding pantothenic acid concentration from the standard curve based on the sample peak area.

6 Expression of analysis results

The content of pantothenic acid in the specimen is calculated according to formula (1).

7 Precision

The absolute difference between two independent determination results obtained under repeatability conditions shall not exceed 10% of the arithmetic mean.

8.1 For solid specimens, when the sampling volume is 5 g and the volume is adjusted

to 50 mL, the detection limit is 0.025 mg/100 g and the quantitation limit is 0.08 mg/100 g.

8.2 For liquid specimens, when the sampling volume is 20 g and the volume is adjusted

to 50 mL, the detection limit is 0.0063 mg/100g and the quantification limit is 0.02 mg/100g.

9 Principle

After enzymatic hydrolysis, extraction, centrifugation, and filtration, the specimen is separated by a C18 reversed-phase chromatography column. Use tandem mass spectrometry multiple ion reaction monitoring method to test.