# NATIONAL STANDARD OF THE

# PEOPLE'S REPUBLIC OF CHINA



# GB 5009.140-2023

## National food safety standard - Determination of acesulfame K in food

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## Foreword

This Standard replaces GB 5009.140-2003 "National food safety standard - Determination of acesulfame potassium in food".

Compared with GB 5009.140-2003, the main changes in this Standard are as follows.

- MODIFY the name of the standard TO "National food safety standard - Determination of acesulfame potassium in food";
- EXPAND the scope of the method;
- MODIFY the sample pretreatment method and instrument reference conditions;
- ADD the detection limit and quantification limit of the method;
- DELETE the content related to the determination of saccharin sodium.

National food safety standard - Determination of acesulfame potassium in food

## 1 Scope

This Standard specifies the method for the determination of acesulfame potassium in food.

This Standard applies to the determination of acesulfame potassium in milk and dairy

products, frozen drinks, fruit products, vegetable products, edible fungi and algae, legume products, nuts and seeds, candy, grain products, baked goods, condiments, beverages, alcoholic beverages and jelly.

## 2 Principle

The acesulfame potassium in the sample is extracted with water, subjected to protein precipitation using potassium ferrocyanide/zinc acetate solution or purified with a neutral alumina solid-phase extraction column depending on the sample type, diluted to the mark with water, filtered through a microporous membrane, separated by liquid chromatography, detected with a UV detector or a diode array detector, subjected to qualitative identification based on the retention time, and quantified by external standard method.



## 3 Reagents and materials

Unless otherwise stated, the reagents used in this method are of analytical regent, and the water is Grade 1 water specified in GB/T 6682.

### 3.2.1 Potassium ferrocyanide solution (92 g/L). Weigh 106 g of potassium ferrocyanide,

add water to dissolve, and dilute to 1000 mL.

### 3.2.2 Zinc acetate solution (183 g/L). Weigh 219 g of zinc acetate, dissolve in a small

amount of water, add 32 mL of glacial acetic acid, and dilute to 1000 mL with water.

### 3.3 Reference material

Acesulfame potassium reference material (C4H4KNO4S, CAS number. 55589-62-3), purity > 99.0 %, or a reference material certified by the country and awarded a reference material certificate.

## 100 mg of acesulfame potassium reference material (accurate to 0.1 mg), dissolve in

water and dilute to 100 mL, and mix well. Store at 0 degrees C ~ 4 degrees C, the validity

period is 6

months.

**3.5.1 Neutral alumina solid-phase extraction column (6 mL, 500 mg), activated with 10**

mL of acetonitrile before use, and then balanced with 10 mL of water.

**4.1 High-performance liquid chromatograph. equipped with a UV detector or a diode**

array detector.

**5.1 Preparation of samples**

Homogeneous liquid samples are mixed directly, and gas-containing samples are transferred to a beaker before use and degassed in a 50 °C water bath for 10 minutes or ultrasonic for 5 minutes; non-homogeneous liquid and semi-solid samples are homogenized with a homogenizer; solid samples are ground thoroughly with a food grinder and mix well.

**5.2.1 Beverages (except protein drinks), fruit products, vegetable products**

Weigh about 5 g (accurate to 0.001 g) of the sample in a 50 mL centrifuge tube, add 20 mL of water, vortex to mix well, sonicate for 20 minutes, centrifuge at 10000 r/min for

**5.2.2 Other samples**

Weigh 5 g (accurate to 0.001 g) of the sample in a 50 mL centrifuge tube, add 20 mL of water, vortex to mix well, and sonicate for 20 minutes.

**5.4 Plotting of standard curve**

Time Phase A Phase B

Inject the standard series working solutions into the high-performance liquid chromatograph in order from low to high concentration, measure the corresponding peak area, and plot the standard curve with the concentration of acesulfame potassium in the standard working solutions as the abscissa and the peak area as the ordinate. For the liquid chromatogram of acesulfame potassium standard solutions, see Figure A.1 in

Annex A.

### 5.5 Determination of sample solution

Inject the sample solution into the high-performance liquid chromatograph, make qualitative identification based on the retention time, measure the peak area, and obtain the concentration of acesulfame potassium in the sample solution according to the standard curve.

## 6 Expression of analysis results

The content of acesulfame potassium in the sample 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 Others

When the sampling volume is 5 g and the constant volume is 50 mL, the detection limit of acesulfame potassium is 0.0006 g/kg, and the quantification limit is 0.002 g/kg.

Annex A

Liquid chromatogram of acesulfame potassium standard solutions

The liquid chromatogram of acesulfame potassium standard solutions is shown in A.1.

Figure A.1 -- Liquid chromatogram of acesulfame potassium standard solutions (10.0 mg/L)

Acesulfame potassium

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