



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

GB 5009.7-2016

**National food safety standard - Determination of reducing sugar
in foods**

(English Translation)

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Foreword

This Standard replaces GB/T 5009.7-2008 "Determination of reducing sugar in foods", GB/T 5513-2008 "Inspection of grain and oils - Determination of reduced sugar and non-reduced sugar in grain" and NY/T 1751-2009 "Determination of reducing sugar in sugar beet root".

Compared with GB/T 5009.7-2008, the main modifications of this Standard are as follows.

- MODIFY the standard name to "National food safety standard - Determination of reducing sugar in foods";
- MERGE the portion about the reducing sugar in GB/T 5009.7-2008 and GB/T 5513-2008.

National food safety standard -

Determination of reducing sugar in foods

1 Scope

This Standard specifies the determination of reducing sugar content in foods.

Method I and method II of this Standard apply to the determination of reducing sugar content in foods.

Method III of this Standard applies to the determination of reducing sugar content in wheat flour.

Method IV of this Standard applies to the determination of reducing sugar content in sugar beet root.

Method I Direct titration

2 Principle

After the protein in the sample is removed, use methylene blue as indicator, titrate the calibrated alkaline copper tartrate solution (calibrated with the reducing sugar standard solution) under heating conditions, and calculate the content of reduced sugar according to the volume of the sample solution consumed.

3 Reagents and materials

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

3.2.1 Hydrochloric acid solution (1 + 1, volume ratio). WEIGH 50 mL of hydrochloric

acid; ADD 50 mL of water; MIX well.

3.2.2 Alkaline copper tartrate solution A. WEIGH 15 g of copper sulfate and 0.05 g of

methylene blue; DISSOLVE in water; DILUTE to 1000 mL.

3.2.3 Alkaline copper tartrate solution B. WEIGH 50 g of potassium tartrate and 75 g

of sodium hydroxide; DISSOLVE in water; ADD 4 g of potassium ferrocyanide; after completely dissolved, DILUTE with water to 1000 mL; STORE in a glass bottle with rubber stopper.

3.3.1 Glucose (C₆H₁₂O₆)

CAS. 50-99-7, purity $\geq$ 99 %.

3.3.2 Fructose (C₆H₁₂O₆)

CAS. 57-48-7, purity $\geq$ 99 %.

3.3.3 Lactose (containing water) (C₆H₁₂O₆ · H₂O)

CAS. 5989-81-1, purity $\geq$ 99 %.

3.3.4 Sucrose (C₁₂H₂₂O₁₁)

CAS. 57-50-1, purity $\geq$ 99 %.

3.4.1 Glucose standard solution (1.0 mg/mL). accurately WEIGH 1 g of glucose that

has been dried in the oven at 98 °C ~ 100 °C for 2 h; ADD water to dissolve; ADD 5 mL of hydrochloric acid solution; DILUTE with water to 1000 mL. This solution is

equivalent to 1.0 mg of glucose per milliliter.

5.1.1 Starch-containing foods. WEIGH 10 g ~ 20 g (accurate to 0.001 g) of crushed or

mixed sample; PLACE in a 250-mL volumetric flask; ADD 200 mL of water; HEAT in

5.1.2 Alcoholic beverages. WEIGH 100 g (accurate to 0.01 g) of mixed sample; PLACE

in an evaporative dish; NEUTRALIZE with sodium hydroxide solution to neutral; EVAPORATE in the water bath to 1/4 of the original volume; TRANSFER to a 250-mL volumetric flask; slowly ADD 5 mL of zinc acetate solution and 5 mL of potassium ferrocyanide solution; ADD water to the scale;

5.2 Calibration of alkaline copper tartrate solution

PIPETTE 5.0 mL of alkaline copper tartrate solution A and 5.0 mL of alkaline copper tartrate solution B; PLACE in a 150-mL Erlenmeyer flask; ADD 10 mL of water; ADD 2 ~ 4 glass beads. ADD dropwise about 9 mL of glucose (3.4.1) [or other reducing sugar standard solution (3.4.2, or 3.4.3, or 3.4.4)] from the burette;

5.3 Prediction of sample solution

PIPETTE 5.0 mL of alkaline copper tartrate solution A and 5.0 mL of alkaline copper tartrate solution B; PLACE in a 150-mL Erlenmeyer flask; ADD 10 mL of water; ADD 2 ~ 4 glass beads. HEAT to boil in 2 min; KEEP boiling and ADD dropwise the sample solution from the burette at a speed of from fast to slow, and keep boiling state, until the solution color becomes lighter. TITRATE at a rate of 1 drop/2 s until the blue of the solution fades, that is the end point. RECORD the volume of the sample solution consumed.

5.4 Determination of sample solution

PIPETTE 5 mL of alkaline copper tartrate solution A and 5.0 mL of alkaline copper tartrate solution B; PLACE in a 150-mL Erlenmeyer flask; ADD 10 mL of water; ADD 2 ~ 4 glass beads; ADD dropwise the sample solution 1 mL less than the predict volume