



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

GB 5413.5-2010

**National food safety standard - Determination of lactose and
sucrose in foods for infants and young children, milk and milk
products**

婴幼儿食品和乳品中乳糖、蔗糖的测定

(English Translation)

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Foreword

This Standard replaces GB/T 5413.5-1997 "Milk powder and formula foods for infant and young children - Determination of lactose, sucrose and total sugars contents".

As compared with GB/T 5413.5-1997, the main changes of this Standard are as follows.

- ADD evaporative light-scattering detector.

The previous editions of the standard replaced by this Standard were released as follows.

- GB 5413-1985, GB/T 5413.5-1997.

National food safety standard -

Determination of lactose and sucrose in foods for

infants and young children, milk and milk products

1 Scope

This Standard specifies the method for determination of lactose and sucrose in foods for infants and young children, milk and milk products.

This Standard applies to the determination of lactose and sucrose in foods for infants and young children, milk and milk products.

2 Normative references

The documents referenced in this Standard are indispensable for the application of this Standard. For the dated references, only the editions with the dates indicated are applicable to this Standard. For the undated references, the latest edition (including all the amendments) are applicable to this Standard.

3 Principles

After the lactose and sucrose in the sample are extracted, USE high performance liquid chromatographic column to separate;

4 Reagents and materials

Unless otherwise specified, the reagents used in this method are analytically pure; and the water is Grade 1 water specified in GB/T 6682.

4.3.1 Lactose standard stock solution (20 mg/mL). WEIGH 2 g (accurate to 0.1

mg) of the lactose standard sample dried in an oven at $94\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}$ for 2 h;

DISSOLVE in water; USE water to dilute to a 100 mL volumetric flask. PLACE

4.3.4 Sucrose standard working solutions. separately PIPETTE 0 mL, 1 mL, 2

mL, 3 mL, 4 mL, 5 mL of sucrose standard solution (4.3.3) in 10 mL volumetric flasks; USE acetonitrile (4.1) to dilute to mark. The series of sucrose standard working solutions are prepared, at concentrations of 0 mg/mL, 1 mg/mL, 2 mg/mL, 3 mg/mL, 4 mg/mL, 5 mg/mL respectively.

6.1 Sample processing

WEIGH 1 g of solid sample or 2.5 g (accurate to 0.1 mg) of liquid sample into a

50 mL volumetric flask; ADD 15 mL of water at 50 °C~60 °C to dissolve; oscillate

in an ultrasonic oscillator for 10 min;

6.2.1 Reference chromatographic conditions

Chromatographic column. Amino column 4.6 mmx250 mm, 5 µm, or column with equivalent performance;

6.2.2 Making of standard curve

The series of standard working solutions is separately injected into the high performance liquid chromatograph. The corresponding peak area or peak height is determined.

7 Analysis results expression

The content of sugar in the sample is calculated according to formula (1).

8 Precision

The absolute difference between the two independent determination results, obtained under repeated conditions, shall not exceed 5% of the arithmetic mean.

9 Principles

Lactose. After removing the protein from the sample, under the heating condition, USE the methylene blue as an indicator; the calibrated Fehling's solution is directly titrated. According to the volume consumed by the sample solution, the lactose content is calculated.

10 Reagents and materials

Unless otherwise specified, the reagents used in this method are analytically pure; and the water is Grade 3 water specified in GB/T 6682.

10.12 Lead acetate solution (200 g/L). WEIGH 200 g of lead acetate;

DISSOLVE in water and dilute to 1000 mL.

10.13 Potassium oxalate-disodium hydrogen phosphate solution. WEIGH 30 g

of potassium oxalate, 70 g of disodium hydrogen phosphate; DISSOLVE in water and dilute to 1000 mL.

10.14 Hydrochloric acid (1+1). 1 volume of hydrochloric acid is mixed with 1

volume of water.

10.17 Phenolphthalein solution (5 g/L). WEIGH 0.5 g of phenolphthalein in 100

mL of ethanol with a volume fraction of 95%.

10.18 Methylene blue solution (10 g/L). WEIGH 1 g of methylene blue in 100

mL of water.

12.1.1.1 WEIGH about 0.75 g (accurate to 0.1 mg) of the lactose standard

sample pre-dried in an oven at $94\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}$ for 2 h; USE water to dissolve and dilute to 250 mL. Inject the lactose solution into a 50 mL burette for titration.

12.2.1.1 WEIGH 2 g of infant food or skim powder, 2.5 g of whole sugared

powder or whole powder, 1 g of whey powder, accurate to 0.1 mg. USE 100 mL of water to dissolve several times and WASH into a 250 mL volumetric flask.

13.1 Lactose

The content X of lactose in the sample shall be calculated according to formula (6)

13.3 If the ratio of sucrose to lactose in the sample exceeds 3.1, when

calculating the lactose, the corrected value in Table 2 shall be added to the titration volume and then Table 1 is referred.