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

GB/T 20883-2017

Maltose

麦芽糖

(English Translation)

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1 Scope

This Standard specifies the classification, requirements, test methods, inspection rules, marking, packaging, transportation and storage of maltose products.

This Standard applies to the production, inspection and sales of maltose products which are made through liquefaction, saccharification and refining by using starch or starchiness as raw material.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies to this document. For undated references, the latest edition (including any amendment) applies to this document.

GB/T 191, Packaging - Pictorial marking for handling of goods

GB/T 601, Chemical reagent - Preparations of reference titration solutions

GB/T 602, Chemical reagent - Preparations of standard solutions for impurity

GB/T 603, Chemical reagent - Preparations of reagent solutions for use in test methods

GB5009.3-2016, National Food Safety Standard - Determination of Moisture

Content in Foods

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

GB 7718, National Food Safety Standard - Standard for nutrition labeling of prepackaged foods

GB 15203, Food safety national standard - Starch sugar

3 Product classification

3.1

According to the product form, it is divided into maltose syrup, maltose powder and crystallized maltose.

Products for food processing shall comply with the provisions of GB 15203.

5.1 General provisions

The water used in this method shall meet the specifications for water in GB/T 6682 unless other requirements are specified; the reagents used shall be analytical reagents (AR) when no other specifications are specified. The standard titration solution, the standard solutions, preparations and products for impurity determination, which are used in the analysis, shall be all prepared in accordance with the provisions of GB/T

601, GB/T 602, and GB/T 603, when no other requirements are specified.

5.2.1 State, color

Take an appropriate amount of sample; under natural light, observe the state and color of the sample, to see whether there is any impurity; make a record.

5.2.2.1 Maltose syrup

Use boiled distilled water to prepare 100 mL of 4% (dry matter) maltose solution; smell it; rinse the mouth with water, and taste the solution.

5.2.2.2 Maltose powder, crystallized maltose

Take 20 g of the sample; put it in a 100 mL ground bottle; add 50 mL of water at 50 °C; cover it; shake it for 30 s; pour out the supernatant; smell it. After rinsing the mouth with water, take a small amount of sample and put it into the mouth; taste it carefully.

5.3.1 Method principle

The components entering the chromatographic column at the same time, due to the different effects such as distribution between the mobile phase and the stationary phase, size exclusion or coordination exchange, move at different speeds in the chromatographic column; they are separated from each other after passing through the chromatographic column of a certain length, and enter the detector in a certain order to generate response signals. The signals are collected by computer software and the data is processed, to obtain the chromatogram and the retention values and peak areas or peak heights of the components contained in the sample. According to the retention time, perform qualitative

determination; according to the peak area or peak height, perform quantitative calculation of the content of each component.

5.3.2 Reagents and solutions

5.3.2.1

Water

Grade-I water in accordance with GB/T 6682.

5.3.2.2

Acetonitrile

Chromatographic pure.

5.3.2.3 Maltose series standard solutions: Accurately weigh (accurate to 0.000 1 g, on

a dry basis) an appropriate amount of standard maltose, and prepare 5 standard solutions of different concentrations within the range of 0.1 mg/mL ~ 10 mg/mL.

5.3.3.1 High performance liquid chromatography (equipped with differential refraction

detector and column constant temperature system).

5.3.3.2 Mobile phase vacuum filtration degassing device and 0.45 µm microporous

membrane.

5.3.3.3 Analytical balance: accuracy 0.1mg.

5.3.3.4 Micro-injector: 20 µL.

5.3.4 Reference chromatographic conditions

5.3.4.1

Amino-bonded column chromatography conditions are as follows:

- a) Chromatographic column: Waters SpHerisor 5 µm NH₂ , φ4.6 mm x 250 mm, or a chromatographic column of equivalent analytical effect;
- b) Mobile phase: acetonitrile:water = 75:25;
- c) Detector temperature: 40 °C;
- d) Column temperature: 45 °C;
- e) Flow velocity: 1.0 mL/min;

f) Injection volume: 20 μ L;

5.3.4.2

The calcium-type cation exchange resin column chromatographic conditions are as follows:

- a) Chromatographic column: SCR101C, ϕ 7.8 mm x 300 mm, or a chromatographic column of equivalent analytical effect;
- b) Mobile phase: ultrapure water;
- c) Detector temperature: 40 $^{\circ}$ C;
- d) Column temperature: 75 $^{\circ}$ C;

The absolute difference between two independent determination results which are obtained under repeatability conditions shall not exceed 1% of the arithmetic mean.

5.4.1 Instruments and apparatuses

5.4.1.1

Abbe refractometer

Accuracy 0.000 1 units.

5.4.1.2

Glass rod

Bent and flattened at end.

5.4.2 Instrument calibration

At 20 $^{\circ}$ C, the refractive index of the refractometer corrected with grade-II water is 1.333

0, which is equivalent to zero dry matter (solid matter). The instrument shall be calibrated at least once a day.

5.4.3 Analysis steps

Place the refractometer in a well-lit position; adjust the temperature of the prisms of the refractometer to 20 $^{\circ}$ C; separate the two prisms; use a glass rod to add a small amount of sample (1 drop ~ 2 drops) on the surface of the fixed prisms (the glass rod must not touch the surface of the prisms, and the coating time shall be less than 2 s); immediately close the prisms and stay for a few minutes, so that the sample reaches the temperature of the prisms. Adjust the spiral of the prism until the field of view is divided into two parts: light and shade; turn the compensator turn-knob to eliminate the iridescence and make the dividing line between light and shade clear; continue to adjust the spiral so that the dividing line between light and shade is aligned with the cross line; read the content from the ruler; reread it again immediately; take the average value as a measurement value. Clean and dry