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

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Trehalose

海藻糖

(English Translation)

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Foreword

This Standard was proposed by China Light Industry Council.

This Standard shall be under the jurisdiction of the Sub Technical Committee on Industrial Fermentation of National Technical Committee on Food Industry Standardization.

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Introduction

Trehalose was first-time extracted from *claviceps purpurea* of rye by Wigger's in 1832; and then put into mass production through fermentation yeast, extracting from maitake cells or enzymatic conversion of starch. China started industrial production in 2000.

The sweetness of trehalose is equivalent to about 45% of that of sucrose. It has the characteristics of mild sweetness, refreshing sense of taste and no aftertaste after eating, as well as stability towards heat and acid. Because trehalose is non-reducing sugar, when existing with amino acids and protein, it does not produce browning (Maillard reaction) even being heated. The hygroscopicity of trehalose is low, so it remains dry even if the relative humidity reaches 95%. In addition, trehalose also has unique functions such as preventing starch from aging, preventing protein from

denaturation and inhibiting lipid form oxidation. As a kind of excellent food ingredient, it can be directly consumed or used as food ingredient. Because of its special characteristics as non-reducing sugar formed by disaccharide molecules, a special protective film is formed under the harsh conditions such as high temperature, extreme cold and dehydration out of dry, which can effectively protect the bio-molecular structure from being destroyed, so it can be widely used in biologics, pharmaceuticals, cosmetics, agriculture and other industries.

Trehalose

1 Scope

This Standard specifies the product classifications, requirements, test methods, inspection rules, marks, packaging, transportation and storage of trehalose.

This Standard applies to the production, inspection and sales of the trehalose obtained through enzymatic conversion.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 191 Packaging - Pictorial marking for handling of goods (GB/T 191-2008, ISO 780. 1997, MOD)

GB 7718 General standard for the labeling of prepackaged foods

3 Terms and definitions

For the purposes of this Standard, the following terms and definitions apply.

3.1

Trehalose (alpha-D-glucopyranosyl-alpha-D-glucopyranoside)

The non-reducing disaccharide formed by two glucopyranose that are connected by a 1,1 glycosidic bond.

4 Chemical name, molecular formula, structural formula and

relative molecular mass

Residue on ignition/% ≤ 0.02 0.02 0.05

Loss on drying/% ≤ 1.0 1.0 1.5

Chromaticity ≤ 0.100 0.100

Turbidity ≤ 0.05 0.05

6.3 Hygiene requirements

It shall comply with the relevant provisions of the State.

7.1 Sensory test

TAKE an appropriate amount of samples; under the natural light, OBSERVE the color and shape of the sample visually; inspect whether there are impurities; TAKE a small amount of samples; TASTE them carefully (before tasting the second sample, it shall gargle with water); MAKE a record.

7.2.1 Principle

Each component that comes into the chromatographic column at the same time - due to the difference of dissolution, adsorption, permeation and ion exchange between mobile phases and stationary phases - is allocated repeatedly for several times between two phases of the chromatographic column along with the mobile phases. Due to the moving speeds of each component in the chromatographic column are different, after passing through the chromatographic column of a certain length, the components are separated from each other, flow out the chromatographic column sequentially, and flow into the signal detector. INDICATE the spectral peak values of each component on the recorder or on the data processing device. QUANTIFY by normalization method or external standard method according to retention time.

7.2.3.3 Trehalose standard products. purity $\geq$ 99.5%.

Note: If it takes crystalline trehalose as standard products, then the purity of anhydrous trehalose shall be multiplied by a conversion factor ($342.30 / 378.33 = 0.90$).

7.2.4.1 Standard product preparation

The standard products need to be dried in a 60°C electro-thermal constant-temperature oven for 5h for weighing. WEIGH about 0.5g of trehalose standard products (7.2.3.3), accurate to 0.0001g; DISSOLVE with water (7.2.3.1) and dilute to 50mL; SHAKE well. FILTER with 0.45μm microporous membrane (7.2.2.2); COLLECT the filtrate for determination.

7.2.4.2 Sample preparation

The samples need to be dried in a 60°C electro-thermal constant-temperature oven for 5h for weighing. WEIGH about 0.5g of trehalose samples (7.2.3.3), accurate to 0.0001g; DISSOLVE with water (7.2.3.1) and dilute to 50mL; SHAKE well. FILTER with 0.45μm microporous membrane (7.2.2.2); COLLECT the filtrate for determination.

7.2.4.3 Determination of samples

The mobile phase is acetonitrile . water = 70 . 30. TURN on the differential detector before the day of determination, PREHEAT till stable, FIT on the column, INLET the mobile phase with a flow rate of 0.1mL / min, BALANCE overnight. Before formal injection analysis, INLET the mobile phase used TO the reference cell for more than 20min, RESTORE normal flow path, to make the mobile phase flow through the sample cell, ADJUST the flow rate to 1.0mL / min, ADJUST the baseline until the baseline is stable, INLET 10L of the standard solution (7.2.4.1) and the prepared sample (7.2.4.2) respectively. According to the retention time of standard products, determine the chemical composition of the sugar components in the sample. According to the peak area of the sample, calculate the percentage content of sugar components by external standard method.