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**General rule for the quality of preserved fruits**

蜜饯质量通则

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# General rule for the quality of preserved fruits

## 1 Scope

This document stipulates the terms and definitions of preserved fruits, product classification, raw and auxiliary materials, technical requirements, inspection methods, inspection rules, labels and signs, packaging, storage, transportation, sales and other quality requirements.

This document applies to all types of preserved fruit products.

## 2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, for dated reference documents, only the version corresponding to the date applies to this document; for undated reference documents, the latest version (including all amendments) applies to this document.

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

GB 5009.3 National food safety standard - Determination of moisture content in foods

GB 5009.44 National food safety standard - Determination of chloride in foods

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

JJF 1070 Rules of metrological testing for net quantity of products in prepackages with fixed content

## 3 Terms and definitions

The following terms and definitions apply to this document.

### 3.1

#### **Preserved fruit**

Products that use fruits and vegetables as the main raw materials, add (or not add) food additives and other auxiliary materials, are pickled (or not pickled) with sugar, honey or salt.

## **4 Product categories**

### **4.1 Preserved fruits**

Wet (or semi-dry with icing sugar) products made from raw materials soaked in sugar (or honey) and/or salted, dried (or not dried), etc.

### **4.2 Candied fruits**

Products made from raw materials through sugaring, drying and other processes, which are slightly transparent and have no (or slight) frosting sugar precipitation on the surface.

### **4.3 Cool fruits**

Semi-dry products made from raw materials that are salted, candied, dried, etc.

### **4.4 Preserved plum**

Dry products made from raw materials through salting, sugaring (or not sugaring), drying and other processes, which are divided into two categories: un-sugared and sugared.

### **4.5 Fruit cakes**

The products made from raw materials, by processing them into paste or powder, through shaping, drying (or not drying) and other processes; they are divided into cakes, strips (fruit peel), slices, pills.

### **4.6 Other types**

Preserved products other than those listed above.

## **5 Raw materials**

It shall comply with relevant national standards or industry standards.

## **6 Technical requirements**

### **6.1 Sensory requirements**

It must have the form, color, texture, taste, smell that the variety shall have, without peculiar smell, mildew, or impurities, allowing sugar and salt crystallization.

### **6.2 Physical and chemical indicators**

It shall comply with the requirements of Table 1.

### 7.4.1 Principle

The original sugar in the sample and the sugar produced after hydrolysis have reducing properties, which can reduce Fehling's reagent to generate red cuprous oxide.

### 7.4.2 Reagents and materials

Unless otherwise stated, the reagents used in this method are of analytical grade; the water is grade three water specified in GB/T 6682.

**7.4.2.1** Hydrochloric acid (mass fraction: 36.0% ~ 38.0%; density at 20 °C: 1.18 g/cm<sup>3</sup>).

**7.4.2.2** Sodium hydroxide solution (30 g/L): Weigh 3 g of sodium hydroxide; add water to dissolve; let cool; add water to make the volume reach to 100 mL.

**7.4.2.3** Methyl red indicator (1 g/L): Weigh 0.1 g of methyl red. Dissolve it in 95% (volume fraction) ethanol. Add water to make the volume reach to 100 mL.

**7.4.2.4** Fehling's reagent solution A: Weigh 15 g of copper sulfate and 0.05 g of methylene blue. Use water to dissolve it and make the volume reach to 1000 mL.

**7.4.2.5** Fehling's Reagent B Solution: Weigh 50 g of sodium potassium tartrate, 75 g of sodium hydroxide, 4 g of potassium ferrocyanide. Use water to dissolve and make the volume reach to 1000 mL. Store it in a glass bottle with a rubber stopper.

### 7.4.3 Standard products

**7.4.3.1** Glucose (CAS number: 50-99-7) standard: Purity  $\geq$  99%.

**7.4.3.2** Glucose standard solution (1.0 mg/mL): Accurately weigh 0.25 g (accurate to 0.0001 g) of glucose that has been dried to constant weight at 98 °C ~ 100 °C. Add water to dissolve it. Add 5 mL of hydrochloric acid. Use water to make the volume reach to 250 mL. Each milliliter of this solution is equivalent to 1.0 mg of glucose.

### 7.4.4 Instruments

**7.4.4.1** Balance: The sensitivity is 0.1 mg.

**7.4.4.2** Constant temperature water bath.

**7.4.4.3** Adjustable temperature electric furnace.

**7.4.4.4** High-speed tissue masher.

**7.4.4.5** Acid burette: 25 mL.

### 7.4.5 Analytical procedures

#### 7.4.5.1 Specimen treatment

Weigh 10 g of the processed sample (7.1) (accurate to 0.001 g). Add water to soak for 1 h ~ 2 h. Put it into a high-speed tissue masher. Add a small amount of water and mash it. Then transfer it all into a 250 mL volumetric flask. Use water to make the volume reach to the mark. Shake well and filter it. Use the filtrate as treated specimen liquid for later use.

#### 7.4.5.2 Acid hydrolysis

Accurately pipette 10.00 mL treated specimen liquid (7.4.5.1) into a 250 mL Erlenmeyer flask. Add 30 mL of water and 5 mL of hydrochloric acid. Heat in a 68 °C ~ 70 °C water bath for 10 minutes. Then cool to room temperature with running water. Transfer it all into a 250 mL volumetric flask. Add 2 drops of 1 g/L methyl red indicator. Use 30 g/L sodium hydroxide solution to make it reach to neutrality. Use water to dilute it to the mark. Shake well. Use it as specimen solution for later use.

#### 7.4.5.3 Calibration of Fehling's reagent

Accurately pipette 5.00 mL of Fehling's reagent A and Fehling's reagent B into a 150 mL Erlenmeyer flask. Add 10 mL of water. Add a few glass beads. Add about 9 mL of glucose standard solution dropwise from the burette. Heat to boil it within 2 minutes. While boiling, add glucose standard solution dropwise at a rate of 1 drop every 2 seconds. Titrate until the blue color fades, which is taken as the end point. Record the total volume of glucose standard solution consumed. At the same time, perform three parallel operations. Take the average value. Calculate the mass of glucose, which is equivalent to each 10.00 mL of Fehling's reagent mixture (5.00 mL of Fehling's reagent A and 5.00 mL of Fehling's reagent B). The calculation method is shown in formula (1):

$$M = \frac{m_0 \times V_0}{250} \dots\dots\dots (1)$$

Where:

M - The mass of glucose equivalent to 10 mL of Fehling's reagent mixture, in grams (g);

$m_0$  - The mass of glucose, in grams (g);

$V_0$  - The volume of glucose standard solution consumed during titration, in milliliters (mL);

250 - The total volume of glucose standard solution, in milliliters (mL).

#### 7.4.5.4 Predictive titration of specimen solution

Accurately pipette 5.00 mL each of Fehling's reagent A and Fehling's reagent B into a 150 mL Erlenmeyer flask. Add 10 mL of water. Add a few glass beads. Heat to boiling on the electric stove. Drip the specimen solution from the burette, until the blue color

under repeatability conditions -- shall not exceed 5% of the arithmetic mean.

### **7.5 Sodium chloride**

When measured according to the method specified in GB 5009.44, the conversion multiplication factor between the sodium chloride content (calculated as NaCl) and the chloride content (calculated as Cl<sup>-</sup>) in the product is 1.65.

### **7.6 Net content**

Follow the relevant provisions in JJF 1070.

## **8 Inspection rules**

### **8.1 Group-batching**

Products of the same variety and produced with the same batch of materials are one inspection batch.

### **8.2 Sampling method and sampling quantity**

Randomly select from the production line or finished product warehouse; the sampling quantity shall meet the requirements for inspection and sample retention.

### **8.3 Exit-factory inspection**

**8.3.1** Each batch of products shall be inspected by the inspection department of the manufacturer in accordance with the provisions of this document. The products shall be qualified before leaving the factory.

**8.3.2** The items for exit-factory inspection include sensory requirements, net content, total sugar, sodium chloride.

### **8.4 Type inspection**

**8.4.1** Type inspection shall be carried out on products once every six months. Type inspection shall be carried out if one of the following situations occurs:

- a) During trial production and appraisal of new products;
- b) After formal production, if there are major changes in raw materials and processes, which may affect product quality;
- c) When production is resumed after a long-term suspension;
- d) When the exit-factory inspection results are significantly different from the last type inspection results;

e) When the relevant national regulatory agencies require type inspection.

**8.4.2** Type inspection items include all items specified in this document.

## **8.5 Determination rules**

**8.5.1** Determination rules for exit-factory inspection: If all exit-factory inspection items are in compliance with this document, the batch will be judged to be in compliance with this document. If any of the exit-factory inspection items are unqualified, it shall take double sampling of the original batch of products for reinspection. If the products are still unqualified after re-inspection, it is determined that the batch does not comply with this document.

**8.5.2** Type inspection judgment rules: If all type inspection items are in compliance with this document, the type inspection is judged to be in compliance with this document. If there are any unqualified items in the type inspection, it shall take double sampling of the original batch of products for reinspection. If the products are still unqualified after re-inspection, it is determined that the batch does not comply with this document.

## **9 Labels and signs**

**9.1** The label of the product shall indicate the product category, such as: preserved fruits, candied fruits, cooled fruits, preserved palm (without or with added sugar), fruit cakes [cakes or strips (fruit peel) or slices or pills], other types.

**9.2** The trade name of preserved fruit products can use traditional names, but brackets shall be added after the trade name to indicate the true attributes of the product.

**9.3** Storage and transportation pictorial signs shall comply with the provisions of GB/T 191.

## **10 Packages**

**10.1** Packaging materials and packaging containers shall comply with relevant national standards or industry standards.

**10.2** The packaging shall be complete, tight, and undamaged.

## **11 Storage and transportation**

**11.1** Products shall be stored under suitable temperature and humidity conditions. When necessary, the warehouse shall be equipped with temperature and humidity control devices.



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