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

GB 1987-2007

**Food additive -- Citric acid
(English Translation)**

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Foreword

Physiochemical indices in this standard are not equivalent to those specified in "Compendium of Food Additive Specifications, Volume 1, Joint FAO/WHO Expert Committee on Food Additive (JBCFA)". They refer to those specified in "British Pharmacopeia" BP-2003 and "United States Pharmacopeia" USP-27. In which, oxalate and sulfated ash indices are stricter than those specified in BP-2003; and arsenic indices are stricter than those specified in USP-27.

Test methods in this standard refer to those specified in BP-2003, USP-27 and "Pharmacopoeia of the People's Republic of China" (2000 edition).

This standard replaces GB 1987-1986 "Food Additive - Citric Acid".

Compared with GB 1987-1986, the main changes of this standard are as follows.

- ADD the physiochemical indices of anhydrous citric acid;
- ADJUST the citric acid monohydrate content range;
- DELETE the barium salt indices;
- ADD the indices for moisture content, light transmittance and water insoluble;
- Test methods are increased or decreased and modified correspondingly with the change of indices.

This standard was proposed by China National Light Industry Council.

This standard shall be under the jurisdiction of Food Additives of the National

Standardization Technical Committee.

1 Scope

This standard specifies classification, requirements, analysis methods, inspection rules, and marking, packaging, transportation, and storage of citric acid for food processing.

This standard is applicable to citric acid products made of starchy materials or sugar-containing materials, and such citric acid is mainly used as sour agent, anti-oxidation synergist and flavouring agent for food processing.

2 Normative References

The following standards contain provisions which, through reference in this standard, constitute provisions of this standard. For dated references, subsequent amendments (excluding corrigendum) or revisions of these publications do not apply. However, all parties who have entered into an agreement based on this standard are encouraged to investigate whether the most recent editions of these standards apply. For undated references, the latest editions of the normative documents referred to apply.

GB/T 191 Packaging - Pictorial Marking for Handling of Goods (GB/T 191-2000, eqv ISO 780. 1997) GB/T 601 Chemical Reagent - Preparations of Standard Volumetric 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 (GB/T 603-2002, ISO 6353-1. 1982, NEQ) GB/T 606 Chemical Reagent - General Method for the Determination of Water - Karl Fischer Method (GB/T 606-2003, ISO 6353-1.

1982, NEQ)

GB/T

5009.11-2003

Determination of Total Arsenic and Abio-arsenic in Food GB/T 5009.12 Determination of Lead in Foods GB/T 6682 Water for Analytical Laboratory Use - Specification and Test

6.6.2.5 Hydrogen peroxide solution (3%). pipette 10mL of 30% hydrogen peroxide and dilute with water to 100mL.

6.6.2.6 Sodium hydroxide solution (300g/L). weigh 30g of sodium hydroxides, dissolve with water and dilute with water to 100mL.

6.6.2.7 Starch indicating solution (10g/L). prepare according to GB/T 603.

6.6.2.8 Ferric chloride.

6.6.2.9 Cobalt chloride.

6.6.2.10 Yellow stock solution

Weigh 46g of ferric trichloride (6.6.2.8); dissolve in about 900mL of hydrochloric acid solution (6.6.2.1); dilute with such hydrochloric acid solution to 1000mL. In calibration, adjust the yellow stock solution with hydrochloric acid solution (6.6.2.1), so as to make that 1mL of such yellow stock solution contains 46mg of $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$. Solution shall be protected from light and calibrated for immediate use.

Calibration. pipette 10mL of the newly-prepared ferric trichloride solution; add 15mL of water, 4g of potassium iodide (6.6.2.2), and 5mL of hydrochloric acid solution (6.6.2.1); plug the bottle cap immediately and stand still from light for 15min; add 100mL of water; titrate the iodine precipitated out with standard volumetric solution of sodium thiosulfate (6.6.2.4) until to pale yellow; add 0.5mL of starch indicating solution (6.6.2.7); titrate continuously until to endpoint.

Note: 1mL of 0.1mol/L standard volumetric solution of sodium thiosulfate is equivalent to 27.03mg of $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$.

6.6.2.11 Red stock solution

Weigh 60g of cobalt chloride (6.6.2.9); dissolve in about 900mL of hydrochloric acid solution (6.6.2.1); dilute with such hydrochloric acid solution to 1000mL. In calibration, adjust the red stock solution with hydrochloric acid solution (6.6.2.1), so as to make that 1mL of such red stock solution contains 59.5mg of $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$. Solution shall be protected from light and calibrated for immediate use.

Calibration. pipette 5.0mL of the newly-prepared cobalt chloride solution; add 5mL of hydrogen peroxide solution (6.6.2.5) and 10mL of sodium hydroxide solution (6.6.2.6);

boil slowly for 10min and cool down. Add 2g of potassium iodide (6.6.2.2) additionally, and 60mL of sulfuric acid solution (6.6.2.3); plug the bottle cap immediately. Shake gently to dissolve precipitates; titrate the iodine precipitated out with standard volumetric solution of sodium thiosulfate (6.6.2.4) until to be pale yellow; add 0.5mL of starch indicating solution (6.6.2.7); titrate continuously until the solution appears in pink.

Take two 50mL colorimetric tubes with stopper; add 1 mL of barium chloride solution (6.9.2.2) respectively; add 1mL of sulfate standard solution; shake and stand still for 1min. Pipette 15mL of sample solution into one of the colorimetric tube; pipette 10mL of sulfate standard solution and 5 mL of water (standard tube) into the other colorimetric tube; then respectively add 1 mL of hydrochloric acid solution (6.9.2.1) and 0.5 mL of acetic acid solution (6.9.2.4); shake them up; after 5min, the milk scale of sample tube shall not be darker than that of standard tube.

For anhydrous citric acid. It shall use sulfate standard solution II (6.9.2.6). for citric acid monohydrate, it shall use sulfate standard solution III (6.9.2.7).

6.10.1 Apparatuses

6.10.1.1

Colorimetric tube with stopper. 25mL.

6.10.1.2

Test tube. 15mmx180mm.

6.10.2 Reagents and solutions

6.10.2.1

Hydrochloric acid.

6.10.2.2 Phenylhydrazine hydrochloride solution (10g/L). prepare according to GB/T

603.

6.10.2.3 Potassium ferricyanide solution (50g/L). weigh 5g of potassium

ferricyanide; dissolve it with water to 100mL.

6.10.2.4 Zinc granule.

6.10.2.5 Oxalate standard solution I (0.25 g/L). weigh 0.175 g of oxalate

(C₂H₂O₄·2H₂O); dissolve it with water to 500 mL.

6.10.2.6 Oxalate standard solution II (0.01g/L). pipette 4 mL of oxalate standard

solution I (6.10.2.5); dilute with water to 100 mL.

6.10.3 Procedures

Weigh 0.4 g of sample (accurate to 0.01g) to a test tube; add 4ml of water, 3ml of hydrochloric acid, and 1g of zinc granule; boil for 1min and place for 2min. Transfer it to a test tube that has contained 0.25mL of phenylhydrazine hydrochloride solution (6.10.2.2); heat to boil; rapidly cool down; pour it to a 25 mL colorimetric tube with stopper; add 0.25mL of isochoric hydrochloric acid and 0.25mL of potassium ferricyanide solution (6.10.2.3). Shake it and place for 30min. Make a visual colorimetric determination with standard tube prepared by the following methods; the pink seen from the sample tube shall not be darker than that seen from the standard tube.

requirements of this standard.