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

GB 14751-2010

Replacing GB 14751-1993

**National food safety standards of food additives vitamin B1
(thiamine hydrochloride)
(English Translation)**

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Table of Contents

Foreword

1 Scope

2 Normative references

3 Chemical name, molecular formula, molecular mass and structural formula

3.1 Chemical Name

3.3 Formula

3.4 Relative molecular mass

4 Technical Requirements

Foreword

This standard replaces GB 14751-1993 "Food additive vitamin B1 (thiamine hydrochloride)." this standard compared with GB 14751-1993, the main changes are as follows.

- Added arsenic indicators;
- Cancel the heavy metal indicator, an increase of lead indicators $\leq 2\text{mg/kg}$.

Appendix A of this standard is a normative appendix.

The standard replaces the previous editions.

--GB 14751-1993.

National Food Safety Standard Food additive vitamin B1 (thiamine hydrochloride)

1 Scope

This standard applies to by chemical synthesis of food additives, vitamin B1 (thiamine hydrochloride).

2 Normative references

The standard file referenced in the application of this standard is essential. For cited documents with dates, only the date of Version applies to this standard. For undated references, the latest edition (including any amendments) applies to this standard.

3.1 Chemical Name

Chloride, 4- methyl-3 - [(2-methyl-4-amino-5-pyrimidinyl) methyl] -5- (2-hydroxyethyl) - thiazole hydrochloride
QUANTUM CHEMICAL STUDY Formula 3.2 C₁₂H₁₇CIN₄OS · HCl

3.3 Formula

S OHH₃C NH₂

CH₃

Cl-, HCl

3.4 Relative molecular mass

337.27 (according to 2007 international relative atomic mass)

4 Technical Requirements

4.1

Sensory requirements. comply with Table 1.

Table 1 Sensory requirements

Project requires test methods Color White take appropriate sample is placed in a clean, dry white porcelain dish, in natural light, observe its color and texture, Smell the odor.

Faint odor usually has a special smell Organization state crystal or crystalline powder
Melting point of about 248 °C melting and decomposition

4.2

Physical indicators. to comply with Table 2.

Table 2. Physical and chemical indicators

Item Index Test Method Vitamin B1 (to C₁₂H₁₇CIN₄OS - HCl meter, dry basis), w /% 98.5 ~ 101.5 Appendix A A.4 pH (25 g/L solution) 2.7 ~ 3.4 in Appendix A A.5 Color of the solution through the test A.6 in Appendix A Nitrate (20 g/L solution) by testing in A.7 in Appendix A Loss on drying, w /% ≤ 5.0 Appendix A A.8 Residue on ignition, w /% ≤ 0.1 A.9 in Appendix A Lead (Pb)/(mg/kg) ≤ 2 GB 5009.12 Arsenic (As)/(mg/kg) ≤ 2 Appendix A A.10 Appendix A (Normative) Testing method A.1 Safety Tips Reagents The standard test methods used for toxic or corrosive, according to the relevant provisions of the operation, the operation need to be careful.

If splashed on the skin should immediately wash with water, severe cases should be treated immediately. When using a volatile acid, to be carried out in a fume hood.

A.2 General Provisions the reagents used in this standard, unless otherwise noted, only in

the analysis confirmed analytically pure reagents and GB/T 6682-2008 in Regulation Given three water.

Standard Solution, Test Method for preparation and products required, did not indicate when the other requirements, according to GB/T 601, GB/T 603 Provisions prepared.

A.3 Identification Test A.3.1 Reagents and materials A.3.1.1 n-butanol.

A.3.1.2 manganese dioxide.

A.3.1.3 sulfuric acid.

A.3.1.4 sodium hydroxide solution. 40 g/L.

A.3.1.5 ferricyanide solution. 100 g/L.

A.3.1.6 starch indicator solution. 5 g/L.

A.3.1.7 potassium iodide starch paper. Take the filter paper dipped in starch indicator solution containing 0.5 g of potassium iodide in 100 mL of fresh, wet after Remove dried, that is.

A.3.2 Identification method Color identification A.3.2.1 sulfide A.3.2.1.1 principle of the method Vitamin B1 (thiamine) in an alkaline solution, easily oxidized to ferricyanide sulfur dye, sulfur dye soluble in n-butanol, it was strong blue fluorescence.

A.3.2.1.2 analysis step Weigh about 5 mg laboratory samples, add 2.5 mL of sodium hydroxide solution dissolved, add 0.5 mL of potassium ferricyanide solution and 5 mL n Butanol, shake vigorously 2min, placed so hierarchical, top layer of alcohol was strong blue fluorescence; adding acid into the acid, the fluorescence disappears;

Coupled with a base made basic, and fluorescence show.

A.3.2.2 Identification of chlorides Weigh about 0.5 g laboratory samples, home dry test tube, add 0.5 g of manganese dioxide, mixing, wet sulfuric acid heated slowly, namely Produce chlorine, potassium iodide starch paper to make moist blue color.

A.4 Determination of vitamin B1 A.4.1 principle of the method Primary amines and quaternary ammonium groups of vitamin B1 (thiamine) has become the molecule contains a basic salt in a non-aqueous solution (kept in mercuric acetate Below) can be used with perchloric acid effect. Vitamin B1 content is calculated according to the amount consumed perchloric acid.

A.4.2 Reagents and materials A.4.2.1 glacial acetic acid.

A.4.2.2 mercuric acetate solution. 50 g/L of glacial acetic acid solution.

A.4.2.3 perchloric acid standard titration solution. $c(\text{HClO}_4) = 0.1 \text{ mol/L}$.

A.4.2.4 QUINALDINIC red - methylene blue mixed indicator solution. 0.3 g QUINALDINIC

red, 0.1 g methylene blue, add methanol to 100 mL.

A.4.3 Analysis step

Take about 150 mg laboratory samples, accurate to 0.000 1 g, add 20 mL of glacial acetic acid, in the micro hot water bath sonication, coolish, 5 mL of mercuric acetate solution, 2 drops QUINALDINIC red - methylene blue mixed indicator solution, titration with perchloric acid standard solution titration to sky blue, strong Strong shaking, 30s does not fade as the end point. The results and titration with blank test correction.

A.4.4 Calculation Results Vitamin B1 (thiamine hydrochloride, to $C_{12}H_{17}ClN_4OS \cdot HCl$ meter) mass fraction 1w, expressed in%, according to formula (A.1) Calculated.

() 100%

(1) 1000

VV c Mw

- $x \cdot x = xx - x$ (A.1) where.

V - Numerical sample consumption perchloric acid standard titration solution volume in milliliters (mL);

0V - Numerical blank test perchloric acid standard titration solution consumption volume in milliliters (mL);

c - the value of the actual concentration of perchloric acid standard titration solution, expressed in moles per liter (mol/L);

m - mass of the laboratory sample values in grams (g);

2w --A.8 measured value loss on drying,%;

M - value of vitamin B1 ($\frac{1}{2}C_{12}H_{17}ClN_4OS \cdot HCl$) molar mass of the units of grams per mole (g/mol) (M = 168.6).

Take the arithmetic mean of the parallel determination results of the measurement results, the two parallel determination results allow absolute difference less than 0.3%.

A.5 pH measurement

Weigh about 0.50 g laboratory samples, accurate to 0.01 g, add 20 mL of water dissolved, with acidimeter pH.

A.6 Determination of color of the solution A.6.1 Reagents and materials Potassium dichromate solution. take 4.90 g of potassium dichromate, add water to dissolve into a 1000 mL, shake, that was.

A.6.2 Analysis step