

ICS 67.220.20
CCS C 54;X40



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

GB 26406-2011

**National food safety standards of food additives sodium copper
chlorophyllin**

食品添加剂 叶绿素铜钠盐

(English Translation)

Issued on: March 15, 2011

Implemented on: May 15, 2011

Issued by: Ministry of Health of the People's Republic of China

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1 Scope

This standard applies to the mulberry leaf, silkworm sand as raw material, the saponification, copper and other steps in the processing of powdered food additives chlorophyll copper salt.

2.1 Molecular formula

Copper tartrate. $C_{34}H_{31}O_6N_4CuNa_3$ Copper chlorophyll disodium. $C_{34}H_{30}O_5N_4CuNa_2$

2.2 Relative molecular mass

Copper tromate trisodium. 724.17 (according to 2007 International relative atomic mass)
Copper chlorophyll disodium. 684.16 (according to the 2007 international relative atomic mass)

3 Technical requirements

3.1

sensory requirements. should be consistent with the provisions of Table 1.

Table 1 sensory requirements

The project requires a test method Color ink green to black Tissue state powder Take appropriate sample in a clean, dry white porcelain dish Natural light, observe the color and state

3.2

Physical and chemical indicators. should be consistent with the provisions of Table 2.

Table 2 Physical and chemical indicators

Item Index Test Method pH 9.5 to 11.0 Appendix A, A.3 Absorbance $[E_{1\text{ m}}(405\text{ nm} \pm 3\text{ nm})] \geq 568$ Appendix A, A.4 Absorbance ratio 3.2 to 4.0 Appendix A, A.4 Total copper

(Cu), w /% ≤ 8.0 Appendix A A.5 Free copper (Cu), w /% ≤ 0.025 Appendix A A.6 Dry reduction, w /% ≤ 5.0 GB 5009.3 direct drying method a Total arsenic (in As)/(mg/kg) ≤ 2 GB/T 5009.11 Lead (Pb)/(mg/kg) ≤ 5 GB 5009.12 a Drying temperature and time are 105 °C and 2h respectively.

Appendix A

Testing method

A.1 General provisions the reagents and water used in this standard, when not specified in other requirements, refer to the analysis of pure reagents and GB/T 6682-2008 in the provisions of the three Water level. Standard titration solution used in the test, the standard solution for the determination of impurities, preparations and products, without any other requirements, GB/T 601, GB/T 602, GB/T 603. The solution used in the test refers to water when it is not specified with the formulation of the solvent Solution.

A.2 Identification test A.2.1 Physical properties Soluble in water, almost insoluble in low alcohol, insoluble in chloroform. The aqueous solution is clear and free from precipitation. In acidic cases (pH 6.5 or less) or calcium when ions are present, there is precipitation.

A.2.2 Determination of absorption peak Take A.4.3.1 absorbance determination of the sample solution, the sample solution in the 405nm ± 3nm and 630nm ± 3nm two wavelength range Have the largest absorption peak.

A.2.3 Copper and sodium ion test A sample of 1 g was weighed and placed in a crucible which had been burned to constant weight at 800 ° C ± 25 ° C and slowly heated until the sample was completely carbonized. Will be carbon the sample was cooled and the residue was rinsed with 0.5 mL to 1 mL of sulfuric acid and heated to sulfuric acid vapor and heated at 800 ° C; 0 & gt; C Burning residue in the furnace to constant weight. 10 mL of hydrochloric acid solution (1 3) was added to the residue, dissolved by heating on a water bath, and the water was added to the residue 10 mL, as the test solution, the following test.

- a) Take the test solution as a flame test. Began to be green, after the yellow.
- b) Take 5 mL of test solution, add 0.5 mL of 0.1% sodium diethyldithiocarbamate solution (1 g dissolved in 1000 mL Water), resulting in brown red precipitate.

A.3 Determination of pH A 1% sample solution (1 g of the sample was dissolved in 100 mL of water) was prepared and the pH was measured with an acidity meter.

A.4 Determination of absorbance and absorbance ratio A.4.1 Reagents and materials

A.4.1.1 0.15mol/L disodium hydrogen phosphate solution. Weigh 53.7g disodium hydrogen phosphate ($\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$), add water to dissolve, dilute and set to 1000mL.

A.4.1.2 0.15mol/L potassium dihydrogen phosphate solution. Weigh 20.4g potassium dihydrogen phosphate (KH_2PO_4), add water to dissolve, dilute and set to 1000mL.

A.4.1.3 Phosphate buffer (pH 7.5). 21 parts of 0.15 mol/L disodium hydrogen phosphate

solution was mixed with 4 parts of 0.15 mol/L of dihydrogen phosphate Potassium solution.

A.4.2 Instruments and equipment Spectrophotometer.

A.4.3 Analysis steps A.4.3.1 Preparation of sample solution Accurately weighed 0.1g sample, accurate to 0.0002g, dissolved in water, into the 100mL volumetric flask to add water to the scale shake. take 1 mL of the above aqueous solution was diluted with phosphate buffer (pH 7.5) and set to 100 mL as a sample solution.

A.4.3.2 Determination the sample solution was placed in a 1 cm cuvette with a phosphate buffer (pH 7.5) as a blank control, using a spectrophotometer at 405 nm $\pm$ 3nm and 630nm $\pm$ 3nm in the two wavelength range of the maximum absorption wavelength measured absorbance (absorbance should be controlled at 0.3 to 0.7 , Otherwise the sample solution should be adjusted concentration, and then re-measured absorbance).

A.4.4 Calculation of results A.4.4.1 Concentration of sample solution is 1%, with 1cm cuvette, absorbance at the maximum absorption wavelength in the range of 405nm $\pm$ 3nm Degrees according to formula (A.1), calculated as $E_{1\text{ m}}(405\text{ nm} \pm 3\text{ nm}) = A_{1\text{ c}} \times (A.1)$ where.

A1 --- actually measure the absorbance of the sample solution;

c1 --- the concentration of the test solution concentration (calculated according to the dry weight loss value of the measured sample, converted to the dry basis of the concentration), the unit is G per milliliter (g/mL).

A.4.4.2 The absorbance ratio is calculated as w1 according to the formula (A.2) $w_1 = E_{1\text{ m}}(405\text{ nm} \pm 3\text{ nm}) / E_{1\text{ m}}(630\text{ nm} \pm 3\text{ nm})$ (A.2) where.

$E_{1\text{ m}}(405\text{ nm} \pm 3\text{ nm})$ --- sample concentration of 1%, with 1cm cuvette, in the range of 405nm $\pm$ 3nm maximum suction the absorbance measured at the wavelength gain;

$E_{1\text{ m}}(630\text{ nm} \pm 3\text{ nm})$ --- sample concentration of 1%, with 1cm cuvette, in the range of 630nm $\pm$ 3nm maximum suction the measured absorbance was measured with $E_{1\text{ m}}(405\text{ nm} \pm 3\text{ nm})$.

A.4.4.3 The experimental results are based on the arithmetic mean of the parallel determination results. Two independent determinations obtained under repeatability conditions the absolute difference shall not exceed 2% of the arithmetic mean.

A.5 Total copper content A.5.1 Sample handling Accurately weighed 0.1g sample, accurate to 0.0002g, placed in the silicon dish, not more than 500 °C to the burning to carbon, with 1 drop ~ 2 drops Sulfuric acid moist, again ashes. The ash was dissolved in 3 portions (5 mL each) with a hydrochloric acid solution with a mass fraction of 10% and filtered 100mL volumetric flask, after cooling the water volume to the mark, this is the sample solution.

A.5.2 Determination

In addition to the sample treatment, the other steps according to GB/T 5009.13 method of determination.

A.6 Free copper content A.6.1 Sample handling Accurately weighed 0.1g sample, add about 50mL of water dissolved, with 1mol/L hydrochloric acid to adjust the pH to 4.0, constant volume to 100mL, over Filter, this is the sample solution.

A.6.2 Determination

In addition to the sample treatment, the other steps according to GB/T 5009.13 method of determination.