



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

GB 1903.4-2015

**National food safety standard -- Food Nutrition Enhancer -- Zinc
oxide**

食品安全国家标准 食品营养强化剂 氧化锌

(English Translation)

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1 Scope

This standard applies to food fortifier zinc oxide.

2 Molecular formula and relative molecular mass

Formula 2.1

ZnO

2.2 Relative molecular mass

81.41 (according to 2007 international relative atomic mass)

3.1 Sensory requirements

Sensory requirements shall comply with the requirements of Table 1.

Table 1 Sensory requirements

Project requires test methods White to light yellow color State fine powder Odour odorless
Take the right amount of sample is placed in a clean, dry white disk, self However, its color
and light to observe state and smell the odor

3.2 Physical and Chemical Indicators

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

Table 2. Physical and chemical indicators

Item Index Test Method by alkalinity test A.4 in Appendix A Carbonate and acid insoluble
matter by test A.5 in Appendix A Loss on ignition, w /% <= 1.0 A.6 in Appendix A Ferric
experimentally Appendix A A.7 Lead salt by testing in Appendix A A.8 Arsenic salt by
experiment A.9 in Appendix A Appendix A Testing method A.1 General Provisions this

standard reagents and water, did not indicate when the other requirements, refer to the three water analytical reagent and GB/T 6682 regulations. test Test used in the standard titration solution, impurity standard solution, preparations and products, did not indicate when the other requirements, according to GB/T 601, GB/T 602, the provisions of the preparation of GB/T 603's. Solution was used in the tests did not indicate what is formulated with solvent, it refers to an aqueous solution.

A.2 Identification Test A.2.1 Sample the enhanced heat that turns yellow; let cool, yellow disappears.

A.2.2 in the sample solution was added a solution of potassium ferrocyanide, which generated white precipitate; separating the precipitate insoluble in dilute hydrochloric acid.

A.2.3 sample was dissolved in a neutral or alkaline solution, was added a solution of sodium sulfide, i.e., a white precipitate.

A.3 Determination of zinc oxide content A.3.1 Reagents and materials A.3.1.1 hydrochloric acid solution. 9.5% to 10.5%. Take hydrochloric acid 8.4mL, add water to dilute to 100mL.

A.3.1.2 ammonia - ammonium chloride buffer. pH10.0. Take ammonium chloride 5.4g, add water 20mL dissolved, add concentrated ammonia solution 35mL, add water Diluted to 100mL, that is, too.

A.3.1.3 disodium edetate standard titration solution. $c(\text{EDTA-2Na}) = 0.05\text{mol/L}$. Take disodium ethylenediaminetetraacetate 19g, plus the right amount of water to dissolve into 1000mL, shake.

A.3.1.4 ammonia solution. Take concentrated ammonia solution 400mL, add water to make into 1000mL, ie.

A.3.1.5 chrome black T indicator. Take chrome black T 0.1g, plus sodium chloride 10g, grinding uniform, that is, too.

A.3.2 Analysis step

Accurately weighed sample 0.1g, hydrochloric acid solution 2mL dissolve, add water, 25mL, plus 0.025% ethanol solution of methyl red 1 drop, drop Add ammonia solution to microscopic yellow solution, add water, 25mL, ammonia - ammonium chloride buffer (pH10.0) 10mL with chrome black T indicator little, with ethyl Diamine tetra acetic acid disodium standard titration solution (0.05mol/L) titrated to a solution change from purple to pure blue. 1mL ethylenediaminetetraacetic acid disodium Sodium titration solution (0.05mol/L) is equivalent to 4.069mg of ZnO.

A.4 Determination of alkalinity A.4.1 Reagents and materials A.4.1.1 hydrochloric acid standard titration solution. $c(\text{HCl}) = 0.1\text{mol/L}$. Take hydrochloric acid 9.0mL, add water to make into 1000mL, shake.

A.4.1.2 phenolphthalein indicator solution. Take phenolphthalein 1g, plus ethanol 100mL

dissolve, that is, too.

A.4.2 Analysis step

Weigh the sample 1.0g, accurate to 0.01g, add boiling hot water 10mL, shaking 5min, allowed to cool, filtered and the filtrate add phenolphthalein indicator solution 2 drops, as was pink, add hydrochloric acid standard titration solution (0.1mol/L) 0.10mL, pink should disappear.

A.5 Determination of carbonate and acid-insoluble matter A.5.1 Reagents and materials

Sulfuric acid solution. 9.5% to 10.5%.

A.5.2 Analysis step

Weigh the sample 2.0g, accurate to 0.01g, add water, 10mL after mixing, add sulfuric acid solution 30mL, heated on a water bath, gas should not occur Bubble; After stirring, the solution should be clarified.

A.6 Determination of weight loss on ignition A.6.1 Instruments and Equipment High temperature furnace.

A.6.2 Analysis step

Weigh the sample 1.0g, accurate to 0.01g, burning at $800\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ to constant mass, less weight loss should not exceed 1.0%.

Determination A.7 iron salt A.7.1 Reagents and materials A.7.1.1 hydrochloric acid solution. 9.5% to 10.5%.

A.7.1.2 ammonium persulfate.

A.7.1.3 iron standard solution. the equivalent of 10 μg per 1mL of Fe.

Weigh ammonium ferric sulfate $[\text{FeNH}_4(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}]$ 0.863g, set 1000mL volumetric flask, add water, dissolved in sulfuric acid 2.5mL, diluted with water to the mark, shake, as the stock solution.

Before use, the exact amount of stock solution 10mL, set 100mL flask, diluted with water to the mark, shake, that was.

A.7.1.4 ammonium thiocyanate solution. 30%.

A.7.2 Instruments and Equipment General laboratory instruments and Nessler colorimetric tube.

A.7.3 Analysis step

A.7.3.1 Preparation of sample solution Weigh the sample 0.40g, add dilute hydrochloric acid 8mL, 15mL water and 2 drops of nitric acid, boil 5min dissolve, let cool, add water to 50mL, After mixing, take 25mL, add water, 10mL.

A.7.3.2 Determination Take a sample dissolved in water to 25mL, 50mL displacement Nessler colorimetric tube, add 4mL dilute hydrochloric acid and ammonium persulfate 50mg, diluted with water After release into 35mL, plus a 30% ammonium thiocyanate solution 3mL, then diluted with water to 50mL, shake; such as color, immediately with an amount of standard iron Control solution made solution (taking the breed standard iron solution under subparagraph amount set 50mL Nessler colorimetric tube, add water, 25mL, add dilute Hydrochloric acid and ammonium persulfate 4mL 50mg, diluted with water to 35mL, plus a 30% ammonium thiocyanate solution 3mL, then diluted with water to 50mL, Shake), not deeper (0.005%).

As for when the tube and the control tube tone is inconsistent, it can be moved separately separating funnel, add each of n-butanol 20mL extraction, to be layered, will N-butanol layer displacement 50mL Nessler colorimetric tube, n-butanol and then diluted to 25mL, shall not be deeper (0.005%).

A.8 Determination of lead salts A.8.1 Reagents and materials A.8.1.1 glacial acetic acid.

A.8.1.2 potassium chromate indicator solution.

A.8.2 Analysis step

Weigh the sample 2.0g, accurate to 0.01g, add water 20mL, stir, ice acetic acid 5mL, on a water bath heated to dissolve, let cool, too Filtered, and the filtrate was added potassium chromate indicator solution 5 drops, turbidity may not occur.

A.9 Determination of Arsenic salt A.9.1 Reagents and materials A.9.1.1 hydrochloric acid.

A.9.1.2 zinc tablets. diameter 0.5mm ~ 1mm.

A.9.1.3 potassium iodide solution.

A.9.1.4 stannous chloride solution.

A.9.1.5 arsenic standard solution. Each 1mL equivalent to 1μg of As.

Arsenic trioxide was weighed 0.132g, set 1000mL volumetric flask, add 20% sodium hydroxide solution 5mL dissolved, with the amount of sulfur Acid solution and, coupled with the sulfuric acid solution 10mL, diluted with water to the mark, shake, as the stock solution.

Before use, the precise amount of stock solution 10mL, set 1000mL volumetric flask, add sulfuric acid solution 10mL, diluted with water to the mark, shake, that is, too.

A.9.1.6 lead acetate cotton.

A.9.1.7 mercuric bromide paper.

A.9.2 Instruments and Equipment General laboratory instruments and fixed arsenic (see Figure A.1).

Millimeters