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

GB 1903.11-2015

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

(English Translation)

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1 Scope

This standard applies to lactic acid produced by fermentation and zinc oxide as the main raw material, chemical reaction, processing, purification and prepared foods business Yang enhancer zinc lactate.

2.1 Chemical Name

Zinc 2-hydroxy-propyl Formula 2.2 $C_6H_{10}O_6Zn \cdot nH_2O$ ($n = 2$ or 3)

2.4 Relative molecular mass

279.55 (dihydrate) (according to 2012 international relative atomic mass) 297.57 (trihydrate) (according to 2012 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 Color White State powder Take the right amount of sample is placed in a clean, dry transparent containers, observe its color in natural light, status

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

project

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L- lactic acid zinc zinc lactate Testing method Total zinc lactate ($C_6H_{10}O_6Zn$) content (dry basis), w /% ≥ 98.0 Appendix A A.3 the percentage of the total zinc L- lactic acid zinc content /% ≥ 96.0 - Appendix A A.4 Loss on drying, w /% Dihydrate ≤ 14 Trihydrate ≤ 18.5 Appendix A A.5 pH (1% aqueous solution) 5.0 ~ 7.0 GB/T 9724 Lead (Pb)/(mg/kg) ≤ 3.0 GB 5009.12 Total arsenic (As)/(mg/kg) ≤ 2.0 GB 5009.11 Cadmium (Cd)/(mg/kg) ≤ 2.0 GB 5009.15 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 stipulated.

Standard solutions used in the tests, the determination of impurities standard solution preparation and its 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 Reagents and materials A.2.1.1 ethanol.

A.2.1.2 hydrochloric acid solution. 14.

A.2.1.3 sulfuric acid solution. 119.

A.2.1.4 potassium permanganate solution. 0.1mol/L.

A.2.1.5 morpholino solution. 14.

A.2.1.6 sodium nitroprusside solution. 50g/L.

A.2.1.7 potassium ferrocyanide solution. 100g/L, prepared just before use.

A.2.2 Identification method A.2.2.1 solubility Room temperature soluble in water, slightly soluble in ethanol.

A.2.2.2 Identification of zinc salt Weigh about 0.2g sample was dissolved in 10mL water, 2mL potassium ferrocyanide solution was added freshly prepared, i.e., the white precipitate. Shen separation Lake, hydrochloric acid solution was added to the precipitate, the insoluble precipitate.

A.2.2.3 Identification of lactate Weigh about 0.5g sample was dissolved in 10mL water, mix a solution of sulfuric acid was added 2mL, plus 2mL potassium permanganate solution, heated, that is made the smell of acetaldehyde. A mixture of morpholino solution and sodium nitroprusside solution identification acetaldehyde gas using an equal volume of moistened filter Paper, filter paper in contact with the gas phase was blue.

A.3 Determination of total zinc lactate ($C_6H_{10}O_6Zn$) content (dry basis) of A.3.1 Reagents and materials A.3.1.1 ammonia - ammonium chloride buffer solution (pH~10).

A.3.1.2 disodium EDTA standard titration solution. c (EDTA) = 0.05mol/L.

A.3.1.3 chrome black T indicator.

A.3.2 Analysis step

Weigh about 0.3g dried A (A.5.1), accurate to 0.0001g, dissolved in 30mL of water (necessary, to add heat), put to room temperature, 10mL ammonia - ammonium chloride buffer solution with a little chrome black T indicator, using standard titration Disodium EDTA titration solution to the solution from purple Pure red to blue as the end point. At the same time a blank test.

A.3.3 Calculation Results Total zinc lactate ($C_6H_{10}O_6Zn$) content (dry basis) of the mass fraction w_1 , according to equation (A.1) Calculated.

$V - V_0$

$1000 \times c \times M$

100% (A.1)

Where.

V --- sample consumption volume of disodium EDTA standard titration solution, in milliliters (mL);

Blank consumption volume V_0 --- disodium EDTA standard titration solution, in milliliters (mL);

1000 --- conversion factor;

Concentration c --- disodium edetate standard titration solution, expressed in moles per liter (mol/L);

--- The M zinc lactate molar mass in grams per mole (g/mol), [$M(C_6H_{10}O_6Zn) = 243$];

m_1 --- sample mass, in grams (g).

Parallel determination results take twice the arithmetic mean prevail. Two parallel determination results is not more than 0.3% absolute difference.

The percentage content of zinc lactate determination of total zinc lactate A.4 L-A.4.1 Method summary by high performance liquid chromatography, under the selected operating conditions, the sample solution through the column L- zinc lactate and zinc lactate component sub-D-Away with a UV detector and area normalization with quantitative calculation of the total percentage of L- lactic acid zinc zinc content.

A.4.2 Reagents and materials A.4.2.1 copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$).

A.4.2.2 Water. GB/T 6682 specified in a water.

A.4.2.3 copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$) solution. 0.001mol/L. Weigh 0.25g copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$), Dissolved in water and dilute to 1L, shake

spare.

A.4.3 Instruments and Equipment High performance liquid chromatograph. equipped with UV detector.

A.4.4 reference chromatographic conditions A.4.4.1 Column. with an optically active ligand exchange-type stationary phase coated on octadecylsilane bonded silica filler chiral Column, 150mm x 4.6mm, particle size 5 μ m; or other equivalent column.

A.4.4.2 Mobile phase. 0.001mol/L of copper sulfate pentahydrate (CuSO₄ · 5H₂O) solution.

A.4.4.3 mobile phase flow rate. 1.0mL/min.

A.4.4.4 detection wavelength. 254nm.

A.4.4.5 Injection volume. 5 μ L.

A.4.4.6 Column temperature. 35 °C.

A.4.5 Analysis step

A.4.5.1 Preparation of sample solution Weigh about 0.15g sample, accurate to 0.0001g, after dissolved by mobile phase, transferred to a 100mL volumetric flask, add the mobile phase to volume Scale, shake spare. L- lactic acid zinc reference chromatogram of the sample solution in Appendix B.

A.4.5.2 Determination in reference chromatographic conditions (A.4.4.), The sample solution was subjected to chromatographic analysis to determine a sample solution chromatogram D- and L- lactate, zinc lactate Zinc corresponding peak (retention time as L- zinc lactate 20.8min, D- zinc lactate retention time 27.4min). Record color sample solution Spectrum L- and D- lactic acid zinc component of the zinc component of peak area AL and AD, by area normalized quantitative calculation of the total zinc lactate L-the percentage content of zinc lactate.

A.4.6 Calculation Results L- zinc lactate percentage of total zinc lactate concentration w₂, according to equation (A.2) Calculated.

AL AD x

100% (A.2)

Where.

AL --- sample solution chromatogram peak area L- lactic acid zinc component;

AD --- sample solution chromatogram peak area D- lactic acid zinc component.

Parallel determination results take twice the arithmetic mean prevail. Two parallel determination results is not more than 0.3% absolute difference.

A.5 Determination of loss on drying A.5.1 Analysis step Weigh about 1.5g sample, accurate