GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB 1903.9-2015

National food safety standard -

Food nutrition enhancer - Sodium selenite

食品安全国家标准

食品营养强化剂 亚硒酸钠

Issued on: November 13, 2015 **Implemented on: May 13, 2016**

Issued by: National Health and Family Planning Commission of the PRC

Table of Contents

National food safety standard - Food nutrition enhancer - Sodium selenite

1 Scope

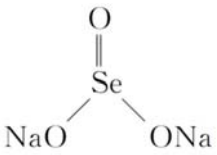
This standard applies to the food nutrition enhancer sodium selenite which is manufactured using the raw materials of selenous acid and sodium hydroxide.

2 Chemical formula, structural formula and relative molecular mass

2.1 Chemical formula

Na_2SeO_3

2.2 Structure



2.3 Relative molecular sass

172.94 (in accordance with international relative atomic mass in 2011)

3 Technical requirements

3.1 Sensory requirements

Sensory requirements shall meet the requirements of Table 1.

Table 1 -- Sensory requirements

Item	Requirements	Inspection methods
Color, texture	White or slightly red crystalline or crystalline powder	Take an appropriate amount of specimen, place it in a clean, dry white porcelain dish, observe its color and texture in natural light
Solution clarity and color	The solution shall be clear and colorless; if turbid, it shall be ≤ 2 turbidity standard	A.4 in Appendix A

A.3.2.2 Selenite ion identification (select one method)

A.3.2.2.1 TAKE about 0.1 g of specimen, DISSOLVE it in 5 mL of water, ADD 1 mL of ammonium thiocyanate solution, then ADD a few drops of concentrated hydrochloric acid to make it acidic, that is, it produces red turbidity.

A.3.2.2.2 TAKE about 0.1 g of specimen, DISSOLVE it in 5 mL of water, ADD 1 mL of copper sulfate solution, which produces a blue-green precipitate, the precipitate is dissolved in acetic acid solution.

A.3.2.2.3 TAKE about 0.05 g of specimen, ADD 5 mL of hydrochloric acid solution, SHAKE to dissolve it, ADD 2 mL of sodium thiosulfate solution, HEAT it, the solution is in orange red.

A.4 Determination of solution clarity and color

A.4.1 Determination of solution color

A.4.1.1 Reagents and materials

A.4.1.1.1 Hydrochloric acid solution: 1 + 40.

A.4.1.1.2 Sodium thiosulfate standard titration solution: c ($Na_2S_2O_3$) = 0.1 mol/L.

A.4.1.1.3 Starch indicator solution: WEIGH 0.5 g of soluble starch, ADD 5 mL of water, SHAKE it uniformly, slowly POUR it into 100 mL of boiling water, STIR it, CONTINUE boiling for 2 min, COOL it down, TAKE the supernatant, PREPARE it before use.

A.4.1.1.4 Ammonia test solution: MEASURE 400 mL of concentrated ammonia, ADD water to dilute it to 1000 mL.

A.4.1.1.5 Acetic acid - sodium acetate buffer (pH6.0): WEIGH 54.6 g of sodium acetate, ADD 20 mL of 1 mol/L acetic acid solution to dissolve it, ADD water to dilute it to 500 mL.

A.4.1.1.6 Xylenol orange indicator solution: WEIGH 0.2 g of xylenol orange, DISSOLVE it in 100 mL of water.

A.4.1.1.7 Disodium ethylenediaminetetraacetic acid titrant: c(Na_2EDTA) = 0.05 mol/L.

A.4.1.2 Analytical procedures

A.4.1.2.1 Preparation of standard stock solutions of various colors

A.4.1.2.1.1 Potassium dichromate solution: Accurately WEIGH 400 mg of potassium dichromate which has been dried to constant weight at 120 °C, USE water to dilute it to 500 mL (1 mL of solution contains 0.800 mg of $K_2Cr_2O_7$).

Water / mL	97.50	95.0	90.0	70.0	50.0

A.4.2.2.4 Determination

WEIGH 1.0 g of specimen, PLACE it in a 10 mL Nessler colorimetric tube, USE 10 mL of newly boiled cold water to dissolve it, the solution shall be clear. If there is turbidity, if it is compared with the orange red No.2 turbidity standard solution of the same volume, it shall not be deeper.

A.5 Determination of sodium selenite content (dry basis)

A.5.1 Reagents and materials

A.5.1.1 Potassium iodide solution: WEIGH 16.5 g of potassium iodide, ADD water to 100 mL, PREPARE it before use.

A.5.1.2 Starch indicator solution: WEIGH 0.5 g of soluble starch, ADD 5 mL of water, SHAKE it uniformly, slowly POUR in 100 mL of boiling water, whilst STIR it, CONTINUE boiling for 2 min, COOL it down, ABSORB the supernatant, PREPARE it before use.

A.5.1.3 Hydrochloric acid solution: PIPETTE 234 mL of concentrated hydrochloric acid, USE water to make the volume reach to 1000 mL.

A.5.1.4 Sodium thiosulfate standard titration solution: c ($Na_2S_2O_3$) = 0.01 mol/L.

A.5.2 Analytical procedures

WEIGH 2.0 g of specimen which has been dried to constant weight, accurate to 0.0001 g, PLACE it in a 100 mL volumetric flask, ADD water and SHAKE to dissolve it, DILUTE it to the mark, SHAKE it uniformly, FILTER it, PIPETTE 1 mL of filtrate into a 100 mL volumetric flask, ADD water to dilute it to the mark. PIPETTE 50 mL of this solution into the iodine volumetric flask, ADD 3 mL hydrochloric acid solution and 5 mL of potassium iodide solution, then ADD 2 mL of starch indicator solution, USE sodium thiosulfate standard titration solution to titrate it until the blue disappears. At the same time MAKE a blank test.

A.5.3 Result calculation

Sodium selenite content (dry basis) w_1, calculated in accordance with formula (A.1):

$$w_1 = \frac{(V - V_0) \times (c/0.01) \times 0.432\ 4}{m \times (1/100) \times (50/100) \times 1\ 000} \times 100\% \quad \cdots\cdots (A.1)$$

Where:

A.9.1.1 Potassium sulfate standard solution: WEIGH 0.181 g of potassium sulfate, USE water to make its volume to 1000 mL (equivalent to 100 μg/mL SO_4).

A.9.1.2 Hydrochloric acid solution: PIPETTE 234 mL of hydrochloric acid, USE water to make its volume to 1000 mL.

A.9.1.3 Cesium chloride solution (25%): WEIGH 25 g of cesium chloride, USE water to make its volume to 1000 mL.

A.9.2 Analytical procedures

WEIGH 0.5 g of specimen, PLACE it in a 50 mL Nessler colorimetric tube, USE 40 mL of water to dissolve it (if the solution is alkaline, it may drop nitric acid solution to make the pH neutral), ADD another 2 mL of hydrochloric acid solution, SHAKE it uniformly. ADD 5 mL of cesium chloride solution, USE water to dilute it to 50 mL, slowly SHAKE it uniformly, LET it be standing for 10 min.

TAKE 10 mL of potassium sulfate standard solution, which is treated same as the test solution.

On the same black background, LOOK down from the top of the colorimetric tube to compare the resulting turbidity. The turbidity of the specimen solution must not be deeper than the control solution.

A.10 Determination of water insoluble

A.10.1 Instruments and equipment

A.10.1.1 No.4 glass sand core crucible: The pore size of the filter plate is 5 μm ~ 15 μm.

A.10.1.2 Electric thermostatic oven: The temperature can be controlled at 105 °C ± 2 °C.

A.10.2 Analytical procedures

WEIGH 5.0 g of specimen, accurate to 0.0001 g, PLACE it in a 250 mL beaker, ADD 100 mL of boiling water to dissolve it, COVER the watch glass, MAINTAINE the temperature in boiling water bath for 1 h, TAKE it out, COOL it to room temperature, USE the glass sand core crucible which has been dried to the constant mass at 105 °C ± 2 °C to filter it, USE hot water to wash it to neutral, PLACE it into an electric constant temperature drying oven, DRY it to constant mass at a temperature of 105 °C ± 2 °C.

A.10.3 Result calculation

The water insoluble matter content w_3 is calculated in accordance with formula

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 3 websites:

1. https://www.ChineseStandard.us

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. https://www.ChineseStandard.net

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - https://www.ChineseStandard.us).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

3. https://www.google.com/search?tbm=bks&q=ChineseStandard.net

- SEARCH the standard ID, such as GB 4943.1-2022.
- Google Books -- Select your currency.
- Processed by Google (delivery, tax invoice etc.). Delivered in 9 seconds by Google.
- Tips: Download an unprotected True-PDF (text-editable) from Google-Books:
  1. https://play.google.com/books → 2. Sign in → Google account
  3. Find the BOOK you bought → 4. Click "3-dots" → Export
  5. Save as "*.pdf" (Save True-PDF to your local computer for offline reading/printing)

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

Accountable person and shareholder: Wayne Zheng

About Us (Goodwill, Policies, Fair Trading…): https://www.chinesestandard.net/AboutUs.aspx

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: https://www.linkedin.com/in/waynezhengwenrui/

------ The End ------