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

GB 14883.3-2016

Replacing GB 14883.3-1994

**National Food Safety Standard -- Determination of radioactive
strontium - 89 and strontium - 90 in foods**

食品安全国家标准 食品中放射性物质锶-89和锶-90的测定

(English Translation)

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Table of Contents

Foreword
1 Scope
3 Reagents and materials
3.1 Reagents
3.2 Reagent preparation
3.3 Standard
3.4 Standard Solution
4 Instruments and equipment
5 Step, Analysis
5.1 Sampling and pretreatment
5.2 Sample preparation and measurement
5.3 Supervision standard source calibration source
6 Expression analysis
7 Other
9 Reagents and materials
9.1 Reagents
9.2 Reagent preparation
9.3 Standard
9.4 Standard Solution
10 Instruments and equipment
11 Analysis steps
11.1 Sampling and pretreatment
11.2 Sample preparation and measurement

Foreword

This standard replaces GB 14883.3-1994 "Examination of radioactive materials in food strontium-89 and Sr-90 determination." this standard compared with GB 14883.3-1994, the main changes are as follows.

--- Standard name amended to "national food safety standards in food radioactive material Strontium-89 and Sr-90 determination";

--- The determination of strontium-90 in two - (2-ethylhexyl) phosphoric acid extraction

method is adjusted to the first method, the adjustment for the second ion exchange method, Fuming nitric acid method is adjusted to the third method.

National Food Safety Standard Determination of radioactive substances strontium-89 and strontium-90

1 Scope

This standard applies to the determination of various foods strontium -89 (89Sr) and strontium -90 (90Sr) of.

Determination of strontium-90 in the first Act II - (2-ethylhexyl) phosphoric acid extraction Principle 2 Nitrate leaching ash food, di - (2-ethylhexyl) phosphoric acid (abbreviated HDEHP) Extraction of yttrium and other rare earth impurities. After the aqueous phase 14d Re-extracted with HDEHP generated 90Y, to 6mol/L nitric acid were back extracted yttrium oxalate precipitation. Measured in the low background beta measuring instrument 90Y amount of radioactivity is calculated 90Sr activity concentration. In the affirmative food gray 90Sr-90Y 91Y has reached equilibrium and there is no pollution, can be directly with the first extract of 90Y via 6mol/L nitric acid was back extracted and after further purification, the same sample preparation 90Y radioactivity measurements, rapid measurement Given 90Sr activity concentration.

3 Reagents and materials

Unless otherwise indicated, the methods used were of analytical grade reagents and water as a water GB/T 6682 regulations.

3.1 Reagents

3.1.1

two - (2-ethylhexyl) phosphoric acid (C₁₆H₃₅O₄P). also known as double iso-octyl phosphate, chemically pure.

3.1.2

n-heptane (C₇H₁₆).

3.1.3

toluene (C₇H₈).

3.1.4

Ammonium chloride, trialkylsilyl {[CH₃ (CH₂)₆ ~ 10CH₂] 3CH₃NCI}. Acronym N263, before use with an equal volume of 6mol/L nitrate Solution (if HDEHP- extracted with toluene, then 3mol/L solution of nitric acid) extracted washed once.

3.1.5

sodium hydroxide (NaOH).

3.1.6

sodium carbonate (Na₂CO₃).

3.1.7

nitric acid (HNO₃).

3.1.8

Ammonia (NH₃ · H₂O).

3.1.9

Hydrogen peroxide (H₂O₂).

3.1.10

oxalic acid (H₂C₂O₄).

3.1.11

ethanol (C₂H₆O).

3.1.12

hydrochloric acid (HCl).

3.1.13

insulin (C₂₅₇H₃₈₃N₆₅O₇₇S₆).

3.2.1 Sodium hydroxide (NaOH) solution

3.2.1.1 50% solution. Weigh 50.00g sodium hydroxide solution to a little hot water (about 50 °C, 50mL), cooled to room temperature.

3.2.1.2 6mol/L solution. Weigh 24.00g of sodium hydroxide, diluted with water to 100mL.

3.2.2 Sodium carbonate (as Na₂CO₃) solution

3.2.2.1

saturated solution. Weigh 45.50g sodium carbonate, dissolved in 100mL of water, cooled to room temperature and boiling capped with a rubber stopper with a test Bottle for use.

3.2.2.2 1% solution. Weigh 1.00 sodium carbonate, dissolved in an appropriate amount of water, diluted with water to 100mL.

3.2.3 Nitric acid (HNO₃) solution

3.2.3.1 6mol/L solution. amount of 41.0mL nitric acid, diluted with water to 100mL.

3.2.3.2 3mol/L solution. amount of 21.0mL nitric acid, diluted with water to 100mL.

3.2.3.3 1% solution. 1.5mL amount of nitric acid, diluted with water to 100mL.

3.2.4 hydrochloric acid (HCl) solution of 3.2.4.1 6mol/L solution. amount of 50.0mL hydrochloric acid, diluted with water to 100mL.

3.2.4.2 3mol/L solution. amount of 25.0mL hydrochloric acid, diluted with water to 100mL.

3.2.5 insulin solution. 20 units/mL.

3.2.6 1% collodion solution.

3.3 Standard

90Sr-90Y standard solution. approximately 1×10^3 containing 90Sr decay/(min · mL), strontium, yttrium, each carrier is about 5μg/mL of 0.1mol/L nitric acid (certified reference material).

3.4 Standard Solution

3.4.1

strontium carrier solution (50mgSr₂/mL). Weigh 150g strontium chloride (SrCl₂ · 2H₂O), with 1% nitric acid solution to dissolve, dilute with water Diluted to 1L.

Calibration. 2.00mL strontium carrier solution is placed in a conical flask, was added 25mL of water, made basic with aqueous ammonia, was added 10mL of saturated carbonate Ammonium solution, heated to boiling, cooling 30min. The precipitate was filtered to constant weight over No. 4 sand core glass crucible, washed with water, ethanol each 10mL successively washed twice, 105 °C drying 0.5h, referred to constant weight.

3.4.2

yttrium carrier solution (10mgY₃/mL). Weigh 43.1g of yttrium nitrate [Y (NO₃)₃ · 6H₂O], was dissolved in 50mL heating Nitric acid solution 6mol/L in water and diluted to 1L.

Calibration. 2.00mL yttrium conical flask was placed in a carrier, was added 30mL of water and 2mL saturated oxalic acid solution, with ammonia or a 2mol/L Solution of nitric acid solution pH is adjusted to 1.5, heating condensation and cooling. The yttrium oxalate precipitate is filtered on a removable funnel constant weight of filter paper with Water, ethanol 10mL each successively washed 2 times, set 45 °C ~ 50 °C oven dried, referred to constant weight. At this temperature, yttrium oxalate Shen Starch composition Y₂ (C₂O₄)₃ · 9H₂O.