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

GB 14883.6-2016

Replacing GB 14883.6-1994

**National Food Safety Standard -- Determination of radioactive
substances radium - 226 and radium - 228 in food**

食品安全国家标准 食品中放射性物质镭-226和镭-228的测定

(English Translation)

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Foreword

This standard replaces GB 14883.6-1994 "Food Examination of radioactive materials radium-226 and radium -228 determination." this standard compared with GB 14883.6-1994, the main changes are as follows.

--- Standard name was changed to "national food safety standards in food radioactive material radium-226 and radium -228 determination";

--- National food safety standards in accordance with the format of the text has been adjusted;

--- Sort out and changed the order of some of the terms and formulas;

--- Fixed Appendix A for errors.

National Food Safety Standard Determination of radioactive materials radium-226 and radium - 228

1 Scope

This standard applies to (226Ra) and radium -228 (228Ra) Determination of radium-226 in various foods.

Determination of radium-226 Principle 2 Food ash by alkali fusion, with hydrochloric acid to dissolve the flooding after the insolubles to lead, barium carrier, barium -133 (133Ba) as a tracer, sulfuric acid Concentrated radium salt precipitation, with disodium edetate (EDTA-2Na) was dissolved alkaline storage in the diffuser to emanation method measuring sub Radon -222 (222Rn), calculated 226Ra radioactivity 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

anhydrous sodium carbonate (Na_2CO_3).

3.1.2

sulfuric acid (H_2SO_4).

3.1.3

hydrochloric acid (HCl).

3.1.4

Sodium peroxide (Na_2O_2).

3.1.5

sodium hydroxide (NaOH).

3.1.6

disodium edetate ($\text{C}_{10}\text{H}_{14}\text{N}_2\text{Na}_2\text{O}_8 \cdot 2\text{H}_2\text{O}$). Also known as EDTA-2Na.

3.2 Reagent preparation

0.2mol/LEDTA-2Na alkaline solution. dissolve 74g disodium ethylenediaminetetraacetate and 15g of sodium hydroxide in water and dilute to 1L.

3.3 Standard

^{133}Ba tracer. $^{133}\text{Ba}(\text{NO}_3)_2$, radioactivity concentration of about 104 counts/(min · mL).

3.4 Standard Solution

3.4.1 6mgBa²⁺/mL barium carrier solution. Weigh 10.7g of barium chloride ($\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$), dissolved in 1% nitric acid and diluted to 1L.

3.4.2 50mgPb²⁺/mL lead carrier solution. Weigh 80.0g of lead nitrate [$\text{Pb}(\text{NO}_3)_2$], dissolved in 1% nitric acid and diluted to 1L.

3.4.3 ^{226}Ra standard solution. liquid ^{226}Ra standard solution or a standard radium powder accurately formulated as a 1% nitric acid. Radioactive concentration 0.1Bq ^{226}Ra /mL ~ 1Bq ^{226}Ra /mL.

4 Instruments and equipment

4.1

radon thorium Analyzer. FD-125-type or other types, with appropriate scaling and flicker chamber that the background count rate should be no more than 2 meters Number/min.

4.2

gamma radioactivity measuring devices. Universal gamma probe connector scaler. Part of the probe shielded with lead room.

Flashing 4.3 Room. volume 500mL.

4.4

Glass diffuser. the volume of 100mL. Designed specifically fired [see Figure 1a)] or 100mL large tube Replacement [see Figure 1b)].

FIG. 1 glass diffuser

4.5

iron or nickel crucible or high-alumina crucible. 50mL.

4.6

vacuum suction pump.

5.1 Instrument commissioning

Radon and gamma radioactive thorium analyzer measurement devices should choose to work in advance and screening threshold voltage. The former uses radon source, which allows ^{133}Ba radioactive tracers used for debugging.

The operating voltage from the measured curve plateau, usually combined with the background count rate in the range of $1/3$ to $1/2$ to select; in the selected operating voltage Under the screening threshold from the measured background count rate - the screening threshold relationship to select the best value on the curve.

5.2 Determination of scintillation cell conversion coefficient k value

Conversion coefficient k value represents the net count rate per unit on behalf of ^{226}Ra Bq number of its measurement method is as follows. the pre-evacuated scintillation

Figure 2 rooms connected. The diffuser filled with a known amount of ^{226}Ra ($1\text{Bq} \sim 10\text{Bq}$) standard solution, radon ventilation after 10min drive when certain archives

between. First opened three clips on the right, and then slowly release the flashing between the chamber and a drying tube clamp screw to control the spread of the bubble countable. Using a scintillation in addition to the negative pressure chamber slowly inhaled air radon, so the diffuser into scintillation radon chamber until no bubbles up. After standing at room flashes 3h radon thorium Measuring analyzer. Blinking into the room before the radon measurements should be evacuated background. After the sample measurement chamber flashing immediately with vacuum pump to Minimize flicker room floor to prevent contamination. It requires accurate determination of when to use each of the scintillation chamber itself k value, the actual monitoring in general also You may use a flashing chamber measured to calculate the average value of k, k values are calculated in the formula (1).

Figure 2 ^{222}Rn transfer device

$A \cdot (1 - e^{-\lambda T})$

$N_1 - N_0$

Where.