

ICS 67.040
CCS C 53



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

GB 14883.5-2016

Replacing GB 14883.5-1994

**National Food Safety Standard -- Determination of radioactive
substance polonium - 210 in foods**

食品安全国家标准 食品中放射性物质钋-210的测定

(English Translation)

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Foreword

This standard replaces GB 14883.5-1994 "test radioactive materials for foods - Determination of polonium-210." this standard compared with GB 14883.5-1994, the main changes are as follows.

- Standard name was changed to "national food safety standards in food radioactive polonium-210 Determination";
- National food safety standards in accordance with the format of the text has been adjusted;
- Sort out and changed the order of some clauses;
- Fixed a calculation formula of the original standards.

National Food Safety Standard Determination of radioactive substance polonium-210

1 Scope

This standard applies to all types of foods polonium -210 (^{210}Po) measurement.

Principle 2

Food fresh sample with nitric acid - hydrogen peroxide - perchloric acid wet ashing destroy organic matter, with silver or nickel sheet from sheet deposition separation ^{210}Po , with alpha radiometric measurement of alpha radioactive sample to calculate the concentration of ^{210}Po in food.

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

hydrochloride Hydrazine ($\text{N}_2\text{H}_4 \cdot 2\text{HCl}$).

3.1.2

sodium hydroxide (NaOH).

3.1.3

phenolphthalein ($\text{C}_{20}\text{H}_{14}\text{O}_4$).

3.1.4

Ethanol ($\text{C}_2\text{H}_6\text{O}$).

3.1.5

nitric acid (HNO_3).

3.1.6

hydrochloric acid (HCl).

3.1.7

perchloric acid (HClO_4).

3.1.8

ascorbic acid ($\text{C}_6\text{H}_8\text{O}_6$).

3.1.9

Hydrogen peroxide (H_2O_2).

3.2 Reagent preparation

3.2.1 25% hydrochloric acid diamide solution. Weigh 25g diamide hydrochloride, dissolved in water and diluted to 100mL.

3.2.2 30% sodium hydroxide solution. Weigh 30g sodium hydroxide dissolved in water and diluted to 100mL.

3.2.3

phenolphthalein indicator (1%). Weigh 0.5g of phenolphthalein dissolved 50mL95% ethanol.

3.3 Standard

210Pb-210Po balance 210Po standard solution or standard solution. radioactivity concentration of about 1×10^3 decays/(min · mL).

3.4 Material

Silver sheet or nickel sheet. the thickness of about 0.1mm electrolytic silver sheet (having a thickness of 0.2mm or electrolytic nickel sheet) cut size, shape and scale the same shape as the quasi supervision source (4.2), in the detergent solution in boiling 10min ~ 20min, washed clean after immersion in water with a spare.

4 Instruments and equipment

4.1

Low Background alpha radiation measuring instrument. probe diameter of not less than 2cm, the background count rate is not more than 1 count/min.

4.2 241Am or 239Pu standards supervisory Source. State legal measures issued by the certified standard plate plating source.

4.3

glass bottle deposit. In the center of the bottom of the bottle 250mL scale plasma drill a hole diameter of 1cm. When the bottom up with the solution and stir Whereby the rods are into the bottle. Put in the bottle cap 0.4cm of aluminum pad, and then placed a silver piece (or nickel plate), plus 0.3cm thick plastic washer. Washer inside diameter of 1.8cm, shall be watertight after screwing on the lid. Electrodeposition tank also.

4.4

thermostatic mixing device. in a constant temperature water bath is installed above the porous stirring device consists of a single-phase series motor associated with the drive. Series in tune Voltage transformer to regulate the speed of rotation of the paddles. Magnetic stirrer versa.

5.1 Sampling

Sampling conducted by GB 14883.1 requirements.

5.2 Sample preparation

5.2.1

FRESH direct analysis. To prevent corruption in the mining milk, may be added to 5mL of formaldehyde per liter of fresh milk.

5.2.2

Weigh sample 5g ~ 50g (accurate to 0.01g) in 500mL beaker was slowly added 100mL nitric acid, heated on a sand bath. for Prevent spillage of sample, should be started when a large amount of sand removed from the beaker bubble bath and stirring constantly, if necessary, can be immersed in cold water in a beaker to slow down the reaction rate, and then heating was continued under stirring, after the disappearance of the foam to the cover with a watch glass, and evaporation was continued when no hydrogen peroxide was added dropwise. According to sample Product amount and kind of decisions of hydrogen peroxide, generally 10mL ~ 60mL. Prior to cooking sticky and no clear solution, concentrated by evaporation and then continue Reduced to about 5mL.

5.2.3

For samples containing more fat, such as milk, meat, fish and eggs, when added to a solution of nitric acid was heated on a sand bath foam disappears the solution obviously divided when oil and water phases, the hot liquid was rapidly poured into a beaker of 250mL separating funnel, standing layer after layer of acid Into the original beaker, 50mL hot oil phase was washed once with nitric acid, combined acid. Discard the oil phase. Continue in the sand bath of nitric acid and hydrogen peroxide Cooking sticky and no solution to clear, and then concentrated to 5mL.

5.2.4

added 15mL 5mL nitric acid and perchloric acid, and evaporation was continued on a sand bath. When nitric acid solution was evaporated and warmed to do with anti-perchlorate Seasonal, most samples will be violent reactions, sometimes rapidly darkening solution. To remove the beaker then press perchlorate handling precautions as soon as possible operating. Coolish, adding 5mL nitric acid and carefully heated. Samples containing organic matter should be repeated several times more heat treatment in the presence of nitric acid, straight Until the solution becomes clear. Remove traces of nitric acid, perchloric acid until a large number of white smoke, and evaporation was continued to dryness, the residue is white, cool.