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

GB 14883.7-2016

Replacing GB 14883.7-1994

**National Food Safety Standard -- Food -- Determination of
natural thorium and uranium for radioactive materials in foods**

食品安全国家标准 食品中放射性物质天然钍和铀的测定

(English Translation)

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Foreword

This standard replaces GB 14883.7-1994 "Examination of radioactive materials in food Determination of natural thorium and uranium." this standard compared with GB 14883.7-1994, the main changes are as follows.

--- Standard name was changed to "national food safety standard radioactive materials for foods - Determination of natural thorium and uranium.";

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

--- Remove the determination of natural uranium extracted with ethyl acetate - Optical fluorescence spectrometry, trialkyl phosphine oxide (TRPO) Extraction - Optical fluorescence Spectrophotometric and visual fluorescence;

--- Natural thorium and natural uranium assay method N235 extraction - spectrophotometry of "N235" to "TOA" instead.

National Food Safety Standard Determination of radioactive materials of natural uranium and thorium

1 Scope

This standard applies to the determination of various foods natural thorium and uranium.

Determination of natural thorium first method TOA extraction - spectrophotometry Principle
2 Food ash with nitric and perchloric acid leaching solution was concentrated phosphate precipitation of uranium and thorium in the presence of aluminum nitrate salting agent trioctylamine from nitric acid solution while thorium and uranium extraction, first with 8mol/L hydrochloric acid solution back-extracted thorium, uranium back-extracted with water, respectively, uranium reagent III Color, spectrophotometric measurement. The method can be used in food uranium and thorium jointly or separately test.

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

TOA ($[\text{CH}_3(\text{CH}_2)_7]_3\text{N}$). commercially pure.

3.1.2

ethyl acetate ($\text{C}_4\text{H}_8\text{O}_2$).

3.1.3

acetone (CH_3COCH_3).

3.1.4

cyclohexane (C_6H_{12}).

3.1.5

nitric acid (HNO_3).

3.1.6

of aluminum nitrate $[\text{Al}(\text{NO}_3)_3]$.

3.1.7

Ammonia ($\text{NH}_3 \cdot \text{H}_2\text{O}$).

3.1.8

Ammonium nitrate (NH_4NO_3).

3.1.9

Uranium reagent III ($C_{22}H_{18}As_2N_4O_{14}S_2$).

3.1.10

oxalic acid ($H_2C_2O_4$).

3.1.11

hydrochloric acid (HCl). pure class distinctions.

3.1.12

urea [$CO(NH_2)_2$].

3.1.13

n-octanol ($C_8H_{18}O$).

3.2 Reagent preparation

3.2.1 10% TOA extraction solvent. the TOA 50mL, 50mL ethyl acetate, 50mL acetone, 2.5mL octanol mixed After cyclohexane diluted to 500mL, and then 2mol/L nitrate solution and extracted wash balanced stand.

3.2.2

aluminum nitrate solution. Weigh 500g of aluminum nitrate, add a small amount of water and ammonia 33mL, diluted with water heated to dissolve 500mL, filter After use.

3.2.3

saturated ammonium nitrate solution. formulated with 2mol/L nitric acid solution.

3.2.4 0.03% uranium reagent III- saturated oxalic acid solution. Weigh 0.3g of uranium reagent III, dissolved in water (if not completely dissolved, add a small amount of hydrogen can be Sodium), diluted to 1000mL. Before using this solution was poured a small vial, oxalic acid was added to saturation.

3.2.5 8mol/L hydrochloric acid solution. amount of 333mL of hydrochloric acid, diluted with water to 500mL, was added about 1g of urea.

3.3 Standard Solution

Thorium standard solution. take 0.600g thorium nitrate [$Th(NO_3)_4 \cdot 4H_2O$] was dissolved 50mL 5mol/L nitric acid solution into the 500mL Flask with 0.5mol/L dilute nitric acid. This stock solution Calibration by gravimetric method. Press the calibration results with 1mol/L nitrate will certainly Stock solution was diluted to a precise amount of standard solution of thorium $1.00\mu gTh/mL$ of.

Calibration. Imbibe 30.0mL stock solution in a beaker, add 70mL water, heated to about 80