NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB 5009.227-2023

National food safety standard - Determination of peroxide value in foods

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Table of Contents

Foreword

This standard replaces GB 5009.227-2016 "National food safety standard - Determination of peroxide value in food".

Compared with GB 5009.227-2016, the main changes in this standard are as follows.

-- The scope of Method A "Indicator titration method" is modified;

-- The sample preparation for non-dairy cream and powdered oil products is added.

National food safety standard - Determination of peroxide value in food

1 Scope

This standard specifies the method for the determination of peroxide value in food.

Method A is suitable for the determination of peroxide value in food.

Method B is suitable for the determination of peroxide value in edible animal and vegetable oils, fats, and margarine.

Method A - Indicator titration method

2 Principle

The prepared oil and fat sample is dissolved in chloroform-glacial acetic acid solution, the peroxide reacts with potassium iodide to generate iodine, and the precipitated iodine is titrated with sodium thiosulfate standard titration solution. The amount of peroxide value is expressed as the mass fraction of peroxide equivalent to iodine or the number of millimoles of active oxygen in 1 kg of the sample.

3 Reagents and materials

Unless otherwise stated, the reagents used in this method are of analytical grade, and the water is the third-grade water specified in GB/T 6682.

3.1.4 Petroleum ether. The boiling range is 30 degrees C~60 degrees C.

Confirmation of petroleum ether. Take 100 mL of petroleum ether in a rotary evaporation bottle, and evaporate to dryness under reduced pressure by using a rotary evaporator in a water bath not higher than 40 °C. Wash the rotary evaporation bottle several times with 30 mL of chloroform-glacial acetic acid solution, and combine the washing liquid into a 250 mL iodine flask. Accurately add 1.00 mL of saturated potassium iodide solution, plug the bottle cap tightly, and shake gently for 0.5 min. Leave it in a dark place for 3 min, add 1.0 mL of starch indicator, and mix well. If no blue color appears, this petroleum ether can be used for the sample preparation; If a blue color appears after adding 1.0 mL of starch indicator and mixing, the reagent needs to be replaced.

3.3.1 Sodium thiosulfate standard titration solution (0.1 mo1/L). It shall be prepared

and calibrated in accordance with the requirements of GB/T 5009.1; or a standard titration solution with national certification and a Reference Material Certificate.

3.3.2 Sodium thiosulfate standard titration solution (0.01 mo1/L). It is prepared from

diluting 0.1 mo1/L sodium thiosulfate standard titration solution with newly boiled and cooled water. Prepare the solution fresh just before use.

3.3.3 Sodium thiosulfate standard titration solution (0.002 mo1/L). It is prepared from

diluting 0.01 mo1/L sodium thiosulfate standard titration solution with newly boiled and cooled water. Prepare the solution fresh just before use.

5.1 Sample preparation

Strong light shall be avoided during the sample preparation process. After preparation, the oil and fat shall be stored in a sealed container and measured as soon as possible.

5.1.1 Animal and vegetable oils and fats

For liquid samples, shake the closed container containing the sample, mix thoroughly, and then take a sample directly; for solid samples, select a representative sample and place it in a closed container, mix well, and then take a sample. If necessary, place the container containing the solid sample in a constant temperature water bath, and heat it until the sample begins to melt; let it completely melt at this temperature, shake and mix well, and take a sample for measurement immediately while the sample is in liquid state.

5.1.2.2 Margarine

Place the sample in a closed container, heat it in an electric constant-temperature drying oven at 60 °C to 70 °C until it melts, shake and mix, continue heating until the emulsification breaks down into layers, and filter the oil layer through the rapid qualitative filter paper into a beaker. The filtrate in the beaker is the sample to be tested, and the sample to be tested shall be clarified. Take a sample and measure it immediately while the sample to be tested is in a liquid state.

5.1.2.3 Non-dairy cream

Take a representative sample in a beaker, add about 5 times the sample volume of petroleum ether, and stir for 2 minutes by using an overhead stirrer to mix evenly. While stirring, add anhydrous sodium sulfate of about 1.6 times the mass of the sample, continue stirring and mixing for 5 minutes, remove the beaker, and let the solution stand for 5 minutes to allow the petroleum ether to layer (if emulsification occurs, cover the top of the beaker with a layer of plastic wrap, and place the beaker in a water bath of not higher than 40 °C for 10 minutes to stratify the petroleum ether). Pour out the supernatant, add about 2 times the sample volume of petroleum ether to the beaker, and repeat the above stirring and standing operations; combine the petroleum ethers, filter, and transfer the filtrate into a brown rotary evaporation bottle; in a water bath of not higher than 40 degrees C, use a rotary evaporator to evaporate the petroleum ether to dryness

under reduced pressure.

5.2 Sample determination

Sample determination shall be avoided under direct sunlight. Weigh 2 g~3 g of the prepared sample (accurate to 0.001 g), place it in a 250 mL iodine flask, add 30 mL of chloroform-glacial acetic acid solution, and shake the sample gently until it is completely dissolved. Accurately add 1.00 mL of saturated potassium iodide solution, plug the bottle cap tightly, shake gently for 0.5 min, and place in a dark place for 3 min. Take out and add 100 mL of water, shake well and immediately use sodium thiosulfate standard titration solution (when the estimated peroxide value is 0.15 g/100 g and below, use 0.002 mol/L standard titration solution; when the estimated peroxide value is greater than 0.15 g/100 g, use 0.01 mol/L standard titration solution) to titrate the precipitated iodine. When the solution turns to light yellow, add 1 mL of starch indicator, continue titrating, and shake vigorously until the blue color of the solution disappears, that is the end point.

6.1 When the peroxide value is expressed as the mass fraction of peroxide equivalent