



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

GB 5009.238-2016

**National standard for food safety - Determination of water
activity in foods**

食品安全国家标准 食品水分活度的测定

(English Translation)

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Foreword

This Standard replaces the GB/T 23490-2009 Determination of water activity in foods and SN 0180-1992 Method for determination of water activity of food.

Compared with GB/T 23490-2009 and SN 0180-1992, the major changes in this Standard are as follows.

- CHANGE the standard name into "National standard for food safety - Determination of water activity in foods"; and
- This Standard integrates the methods for determination of water activity in GB/T 23490-2009 and SN 0180-1992.

National standard for food safety -

Determination of water activity in foods

1 Scope

This Standard specifies the Conway's dish diffusion method and the water activity meter diffusion method for determination of water activity in foods.

This Standard is applicable to the determination of water activity in pre-packaged cereal products, meat products, aquatic products, bee products, potato products, fruit products, vegetable products, milk powder and solid drinks.

This Standard is not applicable to the frozen foods and foods containing volatile ingredients.

Method I (Conway's dish diffusion method) of this Standard applies to the water activity in foods with a range of 0.00 to 0.98; while Method II (water activity meter diffusion method) applies to the water activity in foods with a range of

0.60 to 0.90.

Method I Conway's Dish Diffusion Method

2 Principle

In a sealed Conway's dish at constant temperature, there is inter-diffusion between free water in the sample and standard saturated solution with a higher and lower water activity (A_w). After the equilibrium is reached, the water activity in the sample is determined according to the variation of the sample mass.

3.1 Reagents

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

3.2.1 Saturated lithium bromide solution (water activity of 0.064, 25°C).

Accurately WEIGH 500g of lithium bromide at a readily soluble temperature. ADD 200mL of hot water. COOL to form saturated solution of solid-liquid two-phase. STORE saturated solution in a brown reagent bottle. PLACE at room

temperature for one week before use.

3.2.4 Saturated potassium carbonate solution (water activity of 0.432, 25°C).

Accurately WEIGH 300g of potassium carbonate at a readily soluble temperature. ADD 200mL of hot water. COOL to form saturated solution of solid-liquid two-phase. STORE saturated solution in a brown reagent bottle. PLACE at room temperature for one week before use.

3.2.7 Saturated cobalt oxide solution (water activity of 0.649, 25°C).

Accurately WEIGH 160g of cobalt oxide at a readily soluble temperature. ADD 200mL of hot water. COOL to form saturated solution of solid-liquid two-phase. STORE saturated solution in a brown reagent bottle. PLACE at room temperature for one week before use.

3.2.8 Saturated strontium oxide solution (water activity of 0.709, 25°C).

Accurately WEIGH 200g of strontium oxide at a readily soluble temperature. ADD 200mL of hot water. COOL to form saturated solution of solid-liquid two-phase. STORE saturated solution in a brown reagent bottle. PLACE at room temperature for one week before use.

3.2.9 Saturated sodium nitrate solution (water activity of 0.743, 25°C).

Accurately WEIGH 260g of sodium nitrate at a readily soluble temperature. ADD 200mL of hot water. COOL to form saturated solution of solid-liquid two-phase. STORE saturated solution in a brown reagent bottle. PLACE at room temperature for one week before use.

3.2.12 Saturated ammonium sulfate solution (water activity of 0.810, 25°C).

Accurately WEIGH 210g of ammonium sulfate at a readily soluble temperature. ADD 200mL of hot water. COOL to form saturated solution of solid-liquid two-phase. STORE saturated solution in a brown reagent bottle. PLACE at room temperature for one week before use.

3.2.13 Saturated potassium chloride solution (water activity of 0.843, 25°C).

Accurately WEIGH 100g of potassium chloride at a readily soluble temperature. ADD 200mL of hot water. COOL to form saturated solution of solid-liquid two-phase. STORE saturated solution in a brown reagent bottle. PLACE at room temperature for one week before use.

3.2.16 Saturated potassium nitrate solution (water activity of 0.936, 25°C).

Accurately WEIGH 120g of potassium nitrate at a readily soluble temperature. ADD 200mL of hot water. COOL to form saturated solution of solid-liquid two-phase. STORE saturated solution in a brown reagent bottle. PLACE at room temperature for one week before use.

5.1.1 Powdery solid, granular solid and pasty samples

TAKE at least 200g of representative sample. MIX evenly. PLACE in an airtight glass container.

5.1.4 Mixed samples of various masses

TAKE a representative sample that has been mixed evenly.

5.1.5 Liquid or flowing sauce samples

Directly TAKE a homogeneous sample for weighing.

5.2.1 Pre-processing

PLACE a sealed container, a Conway's dish and a weighing dish containing the samples in a constant temperature incubator. MAINTAIN constant temperature at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. USE and DETERMINE immediately after removal.

5.2.2 Pre-determination

Respectively ADD 12.0mL of saturated lithium bromide solution, saturated magnesium chloride solution, saturated cobalt chloride solution and saturated potassium sulfate solution to the outer chambers of 4 Conway's dishes.