



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

**中华人民共和国国家标准**

GB 5009.5-2010

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**National food safety standard  
Determination of protein in foods**

**食品安全国家标准  
食品中蛋白质的测定**

**Issued on Mar 26, 2010**

**Implemented on Jun 01, 2010**

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**Issued by the Ministry of Health of P.R of China**

## Foreword

This standard will replace GB/T 5009.5-2003 Determination of protein in foods, GB/T 14771-1993 Testing method of protein in foods and GB/T 5413.1-1997 *Milk powder and formula foods for infant and young children--Determination of protein*.

The main revised contents of this method to GB/T 5009.5-2003 are as following:

- Automatic distillation method (Kjeldahl theory) is added in “Method I”;
- Combustion method is added as “Method III”;
- Conversion factor is revised;
- Specification for significant digits of calculated results is revised;
- Determination of the titration end point via pH meter is added.

The former standards replaced by this standard are as following:

- GB/T 5009.5-1985, GB/T 5009.5-2003
- GB/T 14771-1993.

## 1 Scope

This standard specifies the detection method for the determination of protein in foods.

Method I and Method II of this standard apply to the determination of protein in various foods; Method III applies to the determination of protein in solid samples foods with protein content no less than 10g/100g, such as foodstuff, beans, milk powder, rice powder, protein powder, etc, by using screening method.

This standard does not apply to those foods with inorganic nitrogen or organic non-protein content.

## Method I Kjeldahl

### 2 Normative Documents Cited by this Standard

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

### 3 Principle

Food is heated and catalytically digested and protein in it is decomposed into ammonia, which reacts with sulfuric acid into ammonium sulfate. The ammonia is released by distilling the ammonium sulfate in alkali solution, absorbed in boric acid and then titrated with standard sulfuric acid solution or standard hydrochloric acid solution. The content of protein is generated by multiplying the volume of titrant by the conversion factor.

### 4 Reagents and material

All reagents are analytical reagent grade unless otherwise stated.

All water is 3<sup>rd</sup> grade water specified in GB/T 6682

- 4.1 Copper sulfate pentahydrate ( $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ).
- 4.2 Potassium sulfate ( $\text{K}_2\text{SO}_4$ ).
- 4.3 Sulfuric acid ( $\text{H}_2\text{SO}_4$ ), density 1.84g/mL at 20°C.
- 4.4 Boric acid ( $\text{H}_3\text{BO}_3$ ).
- 4.5 Methyl red ( $\text{C}_{15}\text{H}_{15}\text{N}_3\text{O}_2$ ).
- 4.6 Bromocresol green ( $\text{C}_{21}\text{H}_{14}\text{Br}_4\text{O}_5\text{S}$ ).
- 4.7 Methylene blue ( $\text{C}_{16}\text{H}_{18}\text{ClN}_3\text{S} \cdot 3\text{H}_2\text{O}$ ).
- 4.8 Sodium hydroxide ( $\text{NaOH}$ ).
- 4.9 Ethanol ( $\text{C}_2\text{H}_6\text{O}$ ), 95% (v/v).

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