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# GB

NATIONAL STANDARD OF THE  
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## GB 5009.275-2016

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### **National Food Safety Standard - Determination of Boric Acid in Food**

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# National Food Safety Standard - Determination of Boric Acid in Food

## 1 Scope

This Standard specifies the method for determination of boric acid in food.

This Standard is applicable to the determination of boric acid in the following foods such as aquatic products, meat products (e.g. meatballs), beans, pasta, dried bean-curd stick, rice dumplings, cookies, soy sauce, bean jelly, cold noodles, etc.

## 2 Principle

Rapidly enrich, extract the boric acid in the sample through the ethyl hexanediol-chloroform solution; remove the effect of the coexisting salt; use the protonated turmeric mixed through the sulfuric acid and turmeric to react with the boric acid to generate red product. The color depth of the solution is proportional the amount of boric acid in the sample; the boric acid content in the sample can be determined through colorimetry.

## 3 Reagents and Materials

Unless otherwise is specified, the reagents used in this method is analytically pure; while the used water is Class-III water stipulated in GB/T 6682.

### 3.1 Reagents

3.1.1 Sulfuric acid ( $\text{H}_2\text{SO}_4$ ).

3.1.2 Anhydrous ethanol ( $\text{CH}_3\text{CH}_2\text{OH}$ ).

3.1.3 Methanol ( $\text{CH}_3\text{OH}$ ).

3.1.4 Potassium ferrocyanide [ $\text{K}_4\text{Fe}(\text{CN})_6 \cdot 3\text{H}_2\text{O}$ ].

3.1.5 Zinc acetate [ $\text{Zn}(\text{CH}_3\text{COO})_2 \cdot 2\text{H}_2\text{O}$ ].

3.1.6 Curcumin.

3.1.7 Glacial acetic acid ( $\text{CH}_3\text{COOH}$ ).

4.4 Vortex oscillator.

## 5 Analytical Procedures

### 5.1 Specimen preparation

Solid sample: take 2g~10g (accurate to 0.01g) of sample mashed by high-speed grinder into 150mL plastic beaker; add 40mL~60mL of water to mix evenly; slowly titrate 2mL of sulfuric acid; perform ultrasound for 10min to promote the dissolution and mixing. Add 5mL of zinc acetate solution; add 5mL of potassium ferrocyanide solution; add water to make constant volume of 100mL; after filtration, it serves as the prepared specimen solution. Pipette 1.00mL~3.00mL of prepared specimen solution according to the sample content into 25mL plastic tube; add water to 5mL. Add 1mL of sulfuric acid solution (1+1); shake evenly; add 5mL of EHD-CHCl<sub>3</sub> solution; cover it; shake for 2min by the vortex oscillator; stand for stratification; pipette the lower-layer of EHD-CHCl<sub>3</sub> solution; filter by Φ7cm drying fast filter paper. The filtrate is used as the sample test solution.

Liquid sample: take 2g~10g (accurate to 0.01g) of sample into 150mL plastic beaker; add 40mL of water to mix evenly; add 5mL of zinc acetate solution; add 5mL of potassium ferrocyanide solution; add water to make constant volume of 100mL; after filtration, it serves as the prepared specimen solution. Pipette 1.00mL~3.00mL of prepared specimen solution according to sample content into 25mL plastic tube; add water to 5mL; add 1mL of sulfuric acid solution (1+1); shake evenly; add 5.00mL of EHD-CHCl<sub>3</sub> solution; cover it; shake for 2min by vortex oscillator; stand for stratification; pipette the lower-layer EHD-CHCl<sub>3</sub> solution; filter by Φ7cm drying fast filter paper. The filtrate is used as the sample test solution.

NOTE: if the emulsification appears during the extraction process, the extracting solution can be centrifuged for 3min at 3000r/min, or add 1mL of methanol into the measurement system to avoid emulsification or precipitation phenomenon; for instance, the adding methanol shall keep the water-adding constant-volume of 5mL.

### 5.2 Drawing of standard curve

Accurately pipette 0.00mL, 1.00mL, 2.00mL, 3.00mL, 4.00mL, 5.00mL of boric acid standard solution into 25mL plastic tube; separately add water to 5mL. Add 1mL of sulfuric acid solution (1+1); shake evenly; add 5.00mL of EHD-CHCl<sub>3</sub> solution; cover it; shake for 2min by the vortex oscillator; stand for stratification; pipette the lower-layer EHD-CHCl<sub>3</sub> solution; filter by Φ7cm drying fast filter paper.

Separately take 1.00mL of filtrate and place into 50mL plastic tube; successively add 1.0mL of turmeric-glacial acetic acid solution; 0.5mL of sulfuric acid; shake evenly; stand for 30min; add 25mL of anhydrous ethanol; stand for 10min; measure the absorbance at 550nm by 1cm cuvette. Draw the standard curve with the standard

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