



NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC
OF CHINA

中华人民共和国国家标准

GB 5413.9-2010

National food safety standard
Determination of vitamin A,D,E in foods for infants
and young children, milk and milk products

食品安全国家标准
婴幼儿食品和乳品中维生素 A、D、E 的测定

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Foreword

This present National Standard replaces GB/T 5413.9 -1997, *Milk powder and formula foods for infant and young children — Determination of Vitamin A, D, E content*.

This present National Standard, compared with GB/T 5413.9 -1997, has been modified as follows:

- The antioxidant reagent has been modified from original pyrogalllic acid to ascorbic acid.
- The heating and refluxing in the pretreatment method has been modified as constant temperature saponification.
- The correction of standard solution has been supplemented.
- The original single point quantification has been modified as the standard curve method.
- The determination of Vitamin D recovery has been supplemented.
- The calculation formula has been modified.

Annex A of this present National Standard is normative, and Annex B is informative.

The original editions replaced by this present National Standard include:

- GB 5413 -1985 and GB/T 5413.9 -1997.

National food safety standard

Determination of vitamin A, D, E in foods for infants and young children, milk and milk products

1. Scope

This present National Standard specifies the method for determination of Vitamin A, D, E in foods for infant and young children, milk and milk products.

This present National Standard is applicable to the determination of vitamin A, D, E content in foods for infant and young children, milk and milk products.

2. Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this present standard. As for the dated references, all the amendments or revisions after them except the corrigenda are not applicable to this present standard. As for the references that are not dated, their most recent editions are applicable to this present national standard.

3. Principle

After saponification and extraction with petroleum ether, Vitamin A and E is separated by reverse phase chromatography method, of which the content is determined by external standard method; Vitamin D is purified by normal phase chromatography method and separated by reverse phase chromatography method, of which the content is determined by external standard method.

4. Reagents and materials

Unless otherwise specified, all reagents shall be analytical pure or higher graded, and all water used for the experiment shall be Grade 1 water specified in GB/T 6682.

- 4.1 α -Diastase: Enzyme activity ≥ 1.5 U/mg.
- 4.2 Anhydrous sodium sulfate.
- 4.3 Isopropyl alcohol: chromatographically pure.
- 4.4 Alcohol: chromatographically pure.
- 4.5 Potassium hydroxide solution: Weigh 250 g of solid potassium hydroxide, and dissolve it with 200 mL of water.
- 4.6 Petroleum ether: boiling range is 30~60°C.
- 4.7 Methanol: chromatographically pure.
- 4.8 Normal hexane: chromatographically pure.
- 4.9 Cyclohexane: chromatographically pure.
- 4.10 Ethyl alcohol solution of vitamin C: 15 g/L.
- 4.11 Vitamins A, D, and E standard solutions
 - 4.11.1 Vitamin A standard stock solution (based on retinol) (100 $\mu\text{g}/\text{mL}$): Weigh 10 mg of standard substance of Vitamin A accurately, dissolve it with ethyl alcohol (4.4) in a 100 mL brown volumetric flask, and dilute to volume.
 - 4.11.2 Vitamin E standard stock solution (based on α -tocopherol) (500 $\mu\text{g}/\text{mL}$): Weigh 50 mg of standard substance of Vitamin E, dissolve it with ethyl alcohol (4.4) in a 100 mL brown volumetric flask, and dilute to volume.
 - 4.11.3 Vitamin D₂ standard stock solution (100 $\mu\text{g}/\text{mL}$): Weigh 10 mg of standard substance of Vitamin D₂, dissolve it with ethyl alcohol (4.4) in a 100 mL brown volumetric flask, and dilute to volume.

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