National Standard of the People's Republic of China

GB 31638-2016

National Food Safety Standard

Casein

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National Food Safety Standard

Casein

1. Scope

This standard applies to acid hydrolyzed casein, enzymolyzed casein and membrane separated casein.

2. Terms and Definitions

2.1 Casein

It is the product prepared by using milk and/or dairy products as raw materials, through acid method or enzymatic method or membrane separation process, and it is a mixture composed of α, β, κ and γ types and the subtypes thereof.

2.2 Acid hydrolyzed casein

It is the product prepared by using milk and/or dairy products as raw materials, through degreasing and casein precipitation by acidification, followed by filtration, washing, drying and other processes.

2.3 Enzymolyzed casein

It is the product prepared by using milk and/or dairy products as raw materials, through degreasing and casein precipitation by rennet, followed by filtration, washing, drying and other processes.

2.4 Membrane separated casein

It is the product prepared by using milk and/or dairy products as raw materials, through degreasing and casein separation by membrane, followed by concentration, sterilization, drying and other processes.

3. Technical Requirements

3.1 Raw material requirements

Raw materials shall comply with the corresponding food standards and relevant provisions.

3.2 Sensory requirements

Sensory requirements shall comply with the provisions of Table 1.

Table 1 Sensory requirements

Items	Requirements	Test methods
Color	Milk white to milk yellow	Take appropriate amount of test sample and place in a clean white porcelainplate (porcelain plate or similar container), and observe the color and state under natural light. Smell its odor, gargle with warm water and taste
Taste and odor	It has unique taste and odor of this product, no smell	
State	Dry uniform powder, allowing the existence of a small amount of deep yellow particles, no visible foreign bodies	

3.3 Physicochemical indicators

Physicochemical indicators shall comply with the provisions of Table 2.

Table 2 Physicochemical indicators

Items		Indicators			Test methods
		Acid method	Enzymatic method	Membrane separation	
Protein (on dry basis)/(g/100 g)	≥	90.0	84.0	84.0	Kjeldah method or spectrophotometry in GB 5009.5
Casein (in protein)/(g/100 g)	≥	95.0	95.0	82.0	Annex A

Fat/(g/100 g)	≤	2.0	2.0	5.0	Alkali hydrolysis method in GB 5009.6
Moisture/(g/100 g)	≤	12.0	12.0	12.0	GB 5009.3
Free acid/[0.1 mol/L NaOH/(mL/g)]	≤	0.27	—	—	The same as the analysis procedures for casein in GB 5009.239

3.4 Maximum levels of contaminant and maximum levels of mycotoxins

3.4.1 Maximum levels of contaminants shall comply with the provisions of GB 2762.

3.4.2 Maximum levels of mycotoxins shall comply with the provisions of GB 2761.

3.5 Microbiological limits

Microbiological limits shall comply with the provisions of Table 3.

Table 3 Microbiological limits

Items	**Sampling plan [a] and limits (expressed in CFU/g, unless otherwise specified)**				**Test methods**
	n	**c**	**m**	**M**	
Total bacterial count	5	2	5×10^4	2×10^5	GB 4789.2
Coliforms	5	1	10	10^2	GB 4789.3
Staphylococcus aureus	5	2	10	10^2	GB 4789.10
Salmonella	5	0	0/25 g	—	GB 4789.4
[a] The analysis and treatment of sample is performed in accordance with GB 4789.1 and GB 4789.18.					

3.6 Food additives

The use of food additives shall comply with the provisions of GB 2760.

Annex A

Determination of Casein

A.1 Principle

Dissolve the test sample completely, then adjust pH to 4.6 with acetic acid and sodium acetate solution to precipitate casein, filter and collect casein, and the following is the same as the determination principle in Method I or Method II in GB 5009.5.

A.2 Reagents and Materials

Unless otherwise stated, the reagents used in this method are all analytically pure, and water is Grade 3 water specified in GB/T 6682.

A.2.1 Sodium bicarbonate ($NaHCO_3$).

A.2.2 Sodium tripolyphosphate ($Na_5P_3O_{10}$).

A.2.3 Glacial acetic acid (CH_3COOH): guaranteed reagent.

A.2.4 Sodium acetate ($CH_3COONa \cdot 3H_2O$).

A.2.5 Anhydrous sodium acetate (CH_3COONa).

A.2.6 10% acetic acid solution: pipette 10 mL of glacial acetic acid (A.2.3) into a 100-mL volumetric flask, and add water to volume.

A.2.7 Sodium acetate solution (1 mol/L): weigh 41 g of anhydrous sodium acetate (A.2.5) or 68 g of sodium acetate (A.2.4), dissolve with water and then dilute to 500 mL.

A.2.8 Sodium acetate-acetic acid buffer solution: pipette 1.0 mL of sodium acetate solution (A.2.7) and 1.0 mL of acetic acid solution (A.2.6) respectively into a 100-mL volumetric flask, and add water to volume.

A.2.9 Rest reagents and materials are the same as those in GB 5009.5.

A.3 Apparatus and Equipment

It is the same as the apparatus and equipment in GB 5009.5.

A.4 Analysis procedures

A.4.1 Sample treatments

Weigh 0.2 g of test sample (accurate to 0.001 g), transfer into a dry 150-mL conical flask with a stopper, if the test sample is acid hydrolyzed casein, add 0.02 g ± 0.001 g of sodium bicarbonate, then add 8 mL of water; if the test sample is enzymolyzed casein, then add 8 mL of water directly. Mix well, then place in 65 ℃~67 ℃ water bath, and dissolve it completely (gently shake it once every 5 minutes, generally 10 min~15min). Cool down and then add 1 mL of acetic acid solution (A.2.6), mix well, stand for 5 min, then add 1 mL of sodium acetate solution (A.2.7), mix well, stand to precipitate the casein, and filter with dry filter paper. Wash the conical flask and precipitate with small amount of buffer solution for several times, fold the filter paper together with precipitate, place into the digestive tube for digestion, and the following is the same as test sample treatment in GB 5009.5.

A.4.2 Determination of protein

Perform the determination in accordance with Method I or Method II in GB 5009.5.

A.5 Analysis Results Expression

A.5.1 Expression of casein content analysis result shall be performed in accordance with the corresponding method in GB 5009.5.

A.5.2 The content of casein in total protein of test sample shall be calculated in accordance with Formula (A.1):

$$X_1 = \frac{m_1}{m_2} \times 100 \quad \text{(A.1)}$$

Where,

X_1——the content of casein in total protein of test sample, g/100 g;

m_1——the content of casein of test sample, g/100 g;

m_2——the content of protein of test sample, g/100 g.

The calculation result shall keep one decimal place.

A.6 Precision

The absolute difference between the two independent determination results obtained under the repeatability conditions shall not exceed 10% of the arithmetical mean value.