



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

GB 1886.174-2024

Replacing GB 1886.174-2016

**National food safety standard - Food additives - Enzyme
preparations for food industry**

食品安全国家标准 食品添加剂 食品工业用酶制剂

Issued on: February 8, 2024

Implemented on: August 8, 2024

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

This standard replaces GB 1886.174-2016 National food safety standard - Food additives - Enzyme preparations for food industry. Compared with GB 1886.174-2016, the main changes in this standard are as follows: -- The terms and definitions of "excipients for enzyme preparations", "immobilized enzyme preparations" and "immobilized carrier" are added; -- The technical requirements for excipients for enzyme preparations and immobilized carriers are added; -- The indicator requirements for Escherichia coli are modified; -- Appendix requirements for the list of excipients for enzyme preparations are added; -- Some reference methods for enzyme activity determination in the appendix are added. National food safety standard - Food additives - Enzyme preparations for food industry

1 Scope

GB 1886.174-2024 is the Chinese mandatory food safety standard for enzyme preparations used in the food industry, and it is the single most consequential document in the Chinese enzyme trade: an enzyme may only be used in Chinese food production if it appears in this standard, produced from a listed source organism by a listed process. The 2024 edition revises the 2016 text, which it supersedes. It sets the terms and definitions, the product classification, and the technical requirements covering the enzyme activity, the sensory and physicochemical criteria, the limits on heavy metals and on microbiological contamination including the specific pathogens and the antibiotic activity that a fermentation product must be shown to be free of, and the requirements on the production strain and the carriers and excipients used. A normative appendix lists the excipients permitted in enzyme preparations, and a second gives reference methods for determining the activity of a range of individual enzymes, from alpha-acetolactate decarboxylase onward. It was issued by the National Health Commission and the State Administration for Market Regulation and took

effect on 8 August 2024.

This standard applies to enzyme preparations for the food industry that are allowed to be used in National food safety standard - Standards for uses of food additives (GB 2760) and related announcements.

2 Terms and definitions

2.1 enzyme preparations for the food industry A preparation product with special catalytic activity and used in the food industry, which is directly extracted from edible or non-edible parts of animals or plants, or fermented and extracted from microorganisms (including but not limited to bacteria, actinomycetes, and fungal strains) obtained through traditional selection or genetic recombination technology, or prepared through further purification, formulation and other processes (it may contain one or more active enzyme components).

2.2 enzyme activity An indicator of the activity of an enzyme to catalyze a specific reaction under certain conditions.

2.3 antibacterial activity Properties that inhibit or kill microorganisms.

2.6 immobilized carrier The material that plays the role of immobilizing enzymes in immobilized enzyme preparations.

3 Product classification

According to product form, it is divided into solid dosage forms (including immobilized dosage forms) and liquid dosage forms.

4.1 Requirements for raw materials and excipients

4.1.1 The raw materials and excipients used to produce enzyme preparations shall meet relevant requirements and shall not produce residual contamination harmful to health in the final food under the specified conditions of use.

4.1.5 For the activity preservation, circulation and storage, and standardized use of enzyme preparation products, necessary excipients are allowed to be added to commercial enzyme preparations. Excipients for enzyme preparations shall not play a functional role in the final food. They are generally used in appropriate amounts according to production needs, and the varieties and amounts used shall be reduced as much as possible on the premise of achieving the expected purpose. The list of excipients allowed to be used in enzyme preparations is shown in Appendix A.

4.1.6 The immobilized carrier used in the immobilized enzyme preparation shall comply with the National food safety standard - Food contact materials and products - Standards for uses of additives (GB 9685), National food safety standard - Standards for uses of food additives (GB 2760) or other provisions on the list of raw materials allowed to be used in

food.

4.2 Physical and chemical indicators Product enzyme activity shall meet the claims.

4.3 Pollutant limits The pollutant limits shall comply with the provisions of Table 1.

4.4 Microbial limits Microbial limits shall comply with the requirements in Table

2. Among them, producing strains shall not be detected in enzyme preparations produced by microorganisms obtained through genetic recombination technology.

4.5 Antibacterial activity The antibacterial activity shall not be detected in enzyme preparations derived from microorganisms, and the determination of the antibacterial activity is carried out in accordance with the National food safety standard - Food microbiological examination - Determination of antibacterial activity of enzyme preparations derived from microbial origin (GB 4789.43).

Appendix A

List of excipients for enzyme preparations The list of excipients for enzyme preparations is shown in Table A.1. Table A.1 -- List of excipients for enzyme preparations

Appendix B

Reference method for determination of enzyme activity of some enzyme preparations B.1

Reference method for determination of enzyme activity of some enzyme preparations The reference methods for measuring the enzyme activity of some enzyme preparations are

shown in Table B.1. B.3 Determination of pectinase activity B.3.1 Pectinase An enzyme that can hydrolyze pectin and generate products containing reducing groups. B.3.2 Pectinase activity Under the reaction conditions of 50 °C and pH 3.5, 1 g of solid enzyme powder (or 1 mL of liquid enzyme) decomposes pectin in 1 hour to produce 1 mg of galacturonic acid, which is one enzyme activity unit, expressed in U/g or U/mL. B.3.3 Principles Pectinase can hydrolyze pectin, and the reducing uronic group of the generated galacturonic acid can be quantitatively measured by the hypoiodous acid method to express the activity of pectinase.

This method is mainly used to detect the activity of polygalacturonase and pectin lyase in pectinase products. It is not suitable for pectin (methyl) esterase in pectinase products.

B.3.4 Reagents and materials B.4 Determination of glucoamylase (amyloglucosidase)

activity B.4.1 Glucoamylase (amyloglucosidase) Amyloglucosidase that uses starch as a substrate to hydrolyze alpha-1,4, alpha-1,6, alpha-1,3 glucosidic bonds from the non-reducing end of starch under certain conditions to produce glucose. B.4.2

Glucoamylase (amyloglucosidase) activity

1.0 mL of enzyme solution or

1.0 g of enzyme powder hydrolyzes soluble starch to produce 1 mg of glucose in 1 hour at 40 °C and pH 4.6, which is 1 enzyme activity unit, expressed in U/g (or U/mL). B.4.3

Reagents and materials B.4.3.1

0.05 mol/L acetic acid-sodium acetate buffer solution (pH 4.6). Weigh

6.7 g of sodium acetate ($\text{CH}_3\text{COONa} \cdot 3\text{H}_2\text{O}$), absorb

2.6 mL of glacial acetic acid, dissolve with water and dilute to 1000 mL. The pH of the above buffer solution shall be calibrated by using a pH meter. B.4.4 Instruments and equipment B.4.5 Determination procedure B.4.5.1 Preparation of enzyme solution to be tested B.4.5.2 Determination Take two 50 mL colorimetric tubes, add 25 mL of soluble starch solution and 5 mL of acetic acid-sodium acetate buffer solution respectively, and shake well. Preheat in a constant-temperature water bath of $40\text{ }^\circ\text{C} \pm 0.5\text{ }^\circ\text{C}$ for 5 min~10 min. Add