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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 25223-2024

Animal and vegetable fats and oils - Determination of composition of sterols and total sterols contents - Gas chromatographic method

动植物油脂 甾醇组成和甾醇总量的测定 气相色谱法

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1.Structure and drafting rules for standardization documents" Drafting is required. This document replaces GB/T 25223-2010 "Determination of sterol composition and total sterol content in animal and vegetable oils and fats - Gas chromatography method" Compared with GB/T 25223-2010, in addition to structural adjustments and editorial changes, the main technical changes are as follows: -- Added Method

2.Determination of sterol composition and total sterol content in olive oil and olive-pomace oil (see Chapter 5). This document is modified to adopt ISO 12228-1.2014 "Determination of sterol composition and total sterol content by gas chromatography - Part

1.Animal Vegetable oils and fats" and ISO 12228-2.2014 "Determination of sterol composition and total sterol content by gas chromatography Part

2.Olive oil and olive oil Olive pomace oil. Compared with ISO 12228-1.2014 and ISO 12228-2.2014, this document has many structural adjustments. See Appendix A for a list. The technical differences between this document and ISO 12228-1.2014 and ISO 12228-2.2014 and their reasons are as follows: --ISO 3696 was replaced by the normative reference GB/T 6682 to adapt to my country's national conditions; --ISO 661 was replaced by the normative reference GB/T 15687 to adapt to my country's national conditions. The following editorial changes were made to this document. --The name of the standard is changed to "Determination of sterol composition and total sterol content of animal and vegetable oils and fats - Gas chromatography"; -- Deleted the informative appendices that are not applicable in the international standards; -- Deleted inapplicable references to international standards. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed by the State Administration of Grain and Material Reserves. This document is under the jurisdiction of the National Technical Committee on Standardization of Cereals and Oils (SAC/TC 270). This document was

drafted by: National Grain and Material Reserves Administration Scientific Research Institute, Jiangnan University, Shaanxi Keyi Sunshine Testing Technology Service Co., Ltd. Company, Shandong Jinsheng Cereals and Oils Food Co., Ltd., Qingdao Tianxiang Xiyan Food Co., Ltd., Shandong Xiangchi Cereals and Oils Co., Ltd., Nanjing Cai University of Finance and Economics, Feixian COFCO Oils & Fats Industry Co., Ltd., Changshouhua Food Co., Ltd., Shandong Longda Grain & Oil Co., Ltd., Rizhao Quality Inspection and Testing Institute, Pony Testing Group Shanghai Co., Ltd. The main drafters of this document are. Duan Zhangqun, Xue Yalin, Wang Xingguo, Chai Chengliang, Tu Jindi, Gao Guanyong, Yu Qiang, Ma Longkun, Yuan Jian, Liu Peilian, Wang Mingxing, Yang Qian, Li Xiujuan, Liu Ruijie, Gao Hongliang, Zhang Nianying, Zhang Yingjie, Hou Guofeng, Xing Changrui, and Li Peng. The previous versions of this document and the documents it replaces are as follows: --First published in 2020 as GB/T 25223-2010; --This is the first revision. Sterol composition and sterols of animal and plant fats Determination of total amount by gas chromatography

1 Scope

GB/T 25223-2024 gives the Chinese gas chromatographic method for determining the sterol composition and total sterol content of animal and vegetable fats and oils. Sterol profiling is the principal analytical weapon against oil adulteration: every oil carries a characteristic pattern of campesterol, stigmasterol, beta-sitosterol, brassicasterol and the minor sterols, and that pattern survives refining, so a declared olive or camellia oil cut with a cheaper seed oil is exposed by its sterols long after the fatty acid profile has been manipulated to match. The standard sets the principle, the reagents and apparatus, the preparation of the unsaponifiable matter and the isolation of the sterol fraction by thin layer chromatography or an equivalent separation, the derivatisation to the trimethylsilyl ethers, the gas chromatographic conditions, the identification of the individual sterols by relative retention, the calculation of the composition as a percentage and of the total sterol content against an internal standard, and the precision and the test report. It takes effect on 1 April 2025.

This document defines the terms and definitions of sterol composition and total sterol content in animal and vegetable fats and oils and describes the gas chromatographic method for the determination of sterol content in animal and vegetable fats and oils. The principles, reagents, instruments, operating procedures, result expression and precision of sterol composition and total sterol content in vegetable oils and fats. This document is applicable to the determination of sterol composition and total sterol content in animal and vegetable oils and fats. Among them, the second method is only applicable to olive oil and olive oil Determination of sterol composition and total sterol content in pomace oil.

2 Normative references

The contents of the following documents constitute the essential clauses of this document

through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 6682 Specifications and test methods for water used in analytical laboratories (GB/T 6682-2008, ISO 3696.1987, MOD)

GB/T 15687 Preparation of animal and vegetable fat samples (GB/T 15687-2008, ISO 661.2003, IDT)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 composition of sterols Individual sterol components from cholesterol to Delta7-avenosterol in the total amount of sterols measured under the conditions specified in this document.

Note. The component content is calculated by peak area normalization method and expressed as mass fraction.

3.2 Total sterol content Under the conditions specified in this document, the total mass of all individual sterols measured from cholesterol to Delta7-avenosterol accounts for the mass of the sample. Fraction.

Note. The content is expressed in milligrams per kilogram (mg/kg).

4 Method

1 Determination of sterol composition and total sterol content in animal and vegetable fats and oils (other than olive oil and olive pomace fats and oils)

4.1 Principle The sample was saponified by reflux with potassium hydroxide-ethanol solution, and the unsaponifiable matter was separated by solid phase extraction using an alumina column. The ions are adsorbed by the alumina column and the sterols flow out of the column. The sterols are separated from the unsaponifiable matter by thin layer chromatography. Betulin was used as an internal standard, and the sterol components and their contents were qualitatively and quantitatively analyzed by gas chromatography.

4.2 Reagents Unless otherwise stated, only analytical grade reagents were used.