

ICS 67.200.10

CCS X14



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

GB/T 44614-2024

**Inspection of grains and oils - Determination of the
triacylglycerols composition in vegetable oils - High
performance liquid chromatography**

粮油检验 植物油中甘油三酯组成的测定 高效液相色谱法

Issued on: September 29, 2024

Implemented on: April 1, 2025

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

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms and Definitions	1
4 Principle	1
---differential refractive index detector detection method	2
5.1 Reagents and Materials	2
5.2 Instruments and equipment	2
5.3 Sample preparation	2
5.4 Operation Step	2
5.5 Result Presentation	3
5.6 Precision	3
---UV detector detection method	4
6.1 Reagents and Materials	4
6.2 Instruments and equipment	4
6.3 Sample preparation	4
6.4 Operation Step	4
6.5 Result Presentation	5
7 The third method. high performance liquid chromatography-evaporative light scattering detector detection method	5
7.1 Principle	5
7.2 Reagents and Materials	5
7.3 Instruments and equipment	5
7.4 Sample preparation	5
7.5 Operation Step	5
10 Reference	12

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. 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 Cereals and Oils Standardization (SAC/TC270). This document was drafted by: National Grain and Material Reserves Administration Scientific Research Institute, Jiangnan University, Shandong Longda Grain and Oil Co., Ltd., Henan Industry University, Qingdao Pony Testing Co., Ltd., COFCO Engineering (Xi'an) International Engineering Co., Ltd., and Shanghai Liangyou (Group) Co., Ltd. Technology Center. The main drafters of this document are: Duan Zhangqun, Xue Yalin, Guo Mimi, Wang Xingguo, Qiu Dongchao, Bi Yanlan, Chen Tong, Ren Chunming, Huang Xinmin, Wei Wei, Jin Qingzhe, Yang Qizhou, and Zhu Yingdan. Grain and oil inspection-Determination of triglyceride composition in vegetable oils High performance liquid chromatography

1 Scope

GB/T 44614-2024 gives the high performance liquid chromatographic determination of the triacylglycerol composition of vegetable oils. Fatty acid composition is the usual way to characterise an oil, but it is destroyed in the measurement and cannot distinguish oils that share a fatty acid profile while differing in how those acids are arranged on the glycerol backbone; the intact triacylglycerol profile can, which makes it the tool for detecting the adulteration of an expensive oil with a cheap one and for verifying origin claims. The standard sets the principle and then two methods - the first using an evaporative light scattering or equivalent universal detector and the second using ultraviolet detection - each with its reagents and materials, instruments and equipment, sample preparation, operating steps, presentation of results and precision. It takes effect on 1 April 2025.

This document describes the principles, reagents and materials, apparatus and equipment, and test methods for the determination of triglyceride composition in vegetable oils by high performance liquid chromatography. Sample preparation, operating procedures, result expression and precision. This document is applicable to the determination of triglyceride composition in vegetable oils and fats containing long-chain fatty acid triglycerides, especially for those containing a small amount of semi- Determination of triglyceride composition in drying oils (rich in linoleic acid) and vegetable oils with oleic acid as the main unsaturated fatty acid. The third method is suitable for the determination of triglyceride content in vegetable oils with commercial standards.

2 Normative references

The contents of the following documents constitute 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 15687 Preparation of animal and vegetable fat samples

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 The triglyceride components from ECN38 to ECN52 measured under the conditions specified in this document.

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

4 Principle

According to the relationship between the relative molecular mass and unsaturation of triglycerides and the equivalent carbon number (ECN), high performance liquid chromatography was used to separate And quantitative determination of triglyceride composition in vegetable oils. The peak order of triglycerides can be determined by calculating the equivalent carbon number (ECN). The equivalent carbon number can be calculated by formula (1). $ECN = CN - 2n$ (1) Where. CN

---number of carbon atoms; n

---number of double bonds. The equivalent carbon number of triglycerides containing oleic acid, linoleic acid and linolenic acid can be calculated by formula (2).

$ECN = CN - dOnO - dLinLi - dLenLe$ (2) Where. CN

--- number of carbon atoms; nO

--- the number of double bonds in oleic acid;