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

GB/T 47293-2026

Determination of available mercury in soil

土壤有效态汞的测定

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed by the Ministry of Agriculture and Rural Affairs of the People's Republic of China. This document is under the jurisdiction of the National Technical Committee on Soil Quality Standardization (SAC/TC404). This document was drafted by: Zhejiang Academy of Agricultural Sciences, Institute of Geochemistry, Chinese Academy of Sciences, and Nanjing Institute of Soil Science, Chinese Academy of Sciences. Zhejiang Provincial General Station for Farmland Quality and Fertilizer Management, Ministry of Ecology and Environment Soil and Agricultural Rural Ecological Environment Supervision Technology Center, Jiangsu Provincial Quality and Standards Center Standardization Research Institute, Shandong University, Environmental Planning Institute of the Ministry of Ecology and Environment, Shaoxing Municipal Grain and Oil Crop Technology Extension Center, Ruian Municipal Bureau of Agriculture and Rural Affairs Longyou County Farmland Quality and Fertilizer Management Station, Yongkang City Farmland Quality Service Center. The main drafters of this document are. Ye Xuezhong, Zhang Hua, Xiao Wendan, Chen Meijun, Zhang Qi, Chen De, Lin Baoyi, Kong Haimin, Wu Shaofu, and Ye Tingyun. Duan Zengqiang,

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1 Scope

GB/T 47293-2026 is the Chinese national standard covering the plant-available fraction of mercury in a soil - a much smaller and more meaningful quantity than the total, since most soil mercury is bound where nothing can reach it. First edition, in force since 1 October 2026, and it belongs with the total mercury method GB/T 22105.1-2026. It was issued on 31 March 2026 and takes effect on 1 October 2026, as a first edition. The document is under the responsibility of the Ministry of Agriculture and Rural Affairs. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes a method for determining available mercury in soil using atomic fluorescence spectrometry with thioglycolic acid-disodium hydrogen phosphate solution extraction. This document applies to the determination of available mercury content in arable land soil. The limit of detection for this method is 0.2 µg/kg, and the limit of quantitation is 0.6 µg/kg.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 6682 Specifications and test methods for water used in analytical laboratories NY/T

52 Soil Moisture Determination Method

NY/T 395 Technical Specification for Monitoring the Environmental Quality of Farmland Soil

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Mercury in the soil can be absorbed by plants and poses a risk to the safety of agricultural products.

Note. This includes water-soluble mercury, exchangeable mercury, and weakly organically bound mercury (such as methylmercury).

4.Method Principles The sample was extracted with thioglycolic acid-disodium hydrogen

phosphate ($\text{C}_2\text{H}_4\text{O}_2\text{S}-\text{Na}_2\text{HPO}_4$) extractant, and its mercury content was similar to that in crops. The correlation. In acidic medium, mercury in the extract is reduced to gaseous mercury atom vapor by potassium borohydride (KBH_4), which is then carried by the carrier gas (argon). The mercury atoms are atomized in a quartz atomizer and, under the irradiation of a specially designed hollow mercury cathode lamp, the ground-state mercury atoms are excited to a high-energy state, and then return to the ground state. When in the mercury-containing state, it emits fluorescence at a characteristic wavelength. The fluorescence intensity is directly proportional to the mercury content, and quantification is performed using the external standard method.

5. Reagents and Materials Unless otherwise specified, all reagents and water used in this document refer to analytical grade reagents and Grade II water as defined in GB/T 6682; Unless otherwise specified, all solutions described herein are aqueous solutions.

5.1 Nitric acid (HNO_3). $\rho=1.42\text{g/mL}$, analytical grade.

5.2 Hydrochloric acid (HCl). $\rho=1.19\text{g/mL}$, analytical grade.

5.3 Thioglycolic acid ($\text{C}_2\text{H}_4\text{O}_2\text{S}$).