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

**GB/T 39229-2020**

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**Fertilizers and soil conditioners. Determination of arsenic,  
cadmium, chromium, lead and mercury contents**

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### Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard adopts the translation method equivalent to the international standard ISO 17318.2015 "Determination of arsenic, cadmium, chromium, lead, and mercury content in fertilizers and soil conditioners".

The Chinese documents that have a consistent correspondence with the international documents cited in this standard are as follows.

---GB/T 6682-2008 analytical laboratory water specifications and test methods (ISO 3696.1987, MOD).

This standard was proposed by the China Petroleum and Chemical Industry Federation.

This standard is under the jurisdiction of the National Standardization Technical Committee for Fertilizers and Soil Conditioners (SAC/TC105).

Responsible for drafting this standard. Shanghai Research Institute of Chemical Industry Co., Ltd., Hunan Provincial Product Quality Supervision and Inspection Institute, Anhui Provincial Division

Special Fertilizer Industry Co., Ltd., Shanghai Chemical Industry Institute Testing Co., Ltd., Tianji Coal Chemical Group Co., Ltd.

### 1 Scope

This standard specifies test methods for the determination of arsenic, cadmium, chromium,

lead, and mercury in fertilizers and soil conditioners that are soluble in nitric acid.

This standard applies to the determination of arsenic, cadmium, chromium, lead, and mercury content in fertilizers and soil conditioners; special attention should be paid to the analysis of certain micronutrient fertilizers.

Pay attention to the applicability of this standard.

## 2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

ISO 3696 Laboratory analysis water specifications and test methods

## 3 Principle

The arsenic, cadmium, chromium, lead, and mercury in the sample are extracted by microwave digestion with nitric acid; the digested solution is extracted by inductively coupled plasma emission spectrometry

(ICP-OES) for measurement. When determining the content of lead and chromium, indium is used as the internal standard.

Note. It is recommended to use internal standards to correct the difference in solution matrix between the standard solution and the fertilizer digestion solution; any other fertilizer samples with the same effect

All substances contained can be used as internal standards.

## 4 reagent

Warning. Nitric acid is corrosive and oxidizing. Related operations should be completed in a fume hood. This standard does not point out all possible security risks.

The experimenter is responsible for taking appropriate safety and health protection measures, and to ensure that the relevant operations comply with relevant regional laws and regulations.

During the test, all analytically pure chemical reagents and tertiary water meeting the requirements of ISO 3696 were used.

### 4.2 Nitric acid solution. Add 1 volume of nitric acid to 9 volumes of water.

### 4.3 Arsenic, cadmium, chromium, lead, mercury element standard stock solution.

1000mg/L, certified standard material.

4.4 Indium standard stock solution. 1000mg/L. Weigh the equivalent of 0.2620g indium nitrate [ $\text{In}(\text{NO}_3)_3$ ] indium nitrate hydrate [ $\text{In}(\text{NO}_3)_3 \cdot x\text{H}_2\text{O}$ ]

Dissolve in a 100mL beaker with nitric acid solution (4.2) and transfer quantitatively to a 100mL volumetric flask, use nitric acid solution

(4.2) Dilute to scale and mix well.

4.5 Indium standard solution. 5mg/L. Take 1000mg/L indium standard stock solution and dilute to 5mg/L with nitric acid solution (4.2).