

ICS 65.080
CCS G21
Record No. :

HG

Chemical Industry Standard of the People's
Republic of China

HG/T 5935—2021

Fulvic acid micro-element fertilizer

黄腐酸微量元素肥料

(English Translation)

(报批稿)

Issue date: XXXX - XX - XX

Implementation date: XXXX - XX - XX

Issued by Ministry of Industry and Information Technology of
the People's Republic of China

Foreword

SAC/TC 105/SC 7 is in charge of the English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This document is drafted in accordance with the rules given in the GB/T 1.1—2020 *Directives for standardization—Part 1: Rules for the structure and drafting of standardizing documents*.

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This document was proposed by China Petroleum and Chemical Industry Federation.

This document was prepared by SAC/TC 105/SC 7 Subcommittee 7 on Humic-Acids Fertilizers of National Technical Committee 105 on Fertilizers and Soil Conditioners of Standardization Administration of China.

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Fulvic acid micro-element fertilizer

1 Scope

This document specifies terms and definitions, classification, requirements, test methods, inspection rules, marking, packaging, transport and storage of fulvic acid micro-element fertilizer.

This document is applicable to fulvic acid micro-element fertilizer made of fulvic acid as raw material and adding appropriate amount of copper, iron, manganese, zinc, boron and molybdenum.

2 Normative references

The following documents content constitute the indispensable provisions of this document through normative reference in this text. For dated reference, only the edition cited applied. For undated references, the latest edition of the referenced document (including any amendments) applies.

- GB/T 191, *Packaging — Pictorial marking for handling of goods*
 GB/T 6679, *General rules for sampling solid chemical products*
 GB/T 6680, *General rules for sampling liquid chemical products*
 GB/T 8170, *Rules of rounding off for numerical values & expression and judgement of limiting values*
 GB/T 8569, *Packing of solid chemical fertilizers*
 GB/T 8576, *Determination of free water for compound fertilizers — Vacuum oven method*
 GB/T 14540, *Determination of copper, iron, manganese, zinc, boron and molybdenum content for compound fertilizers*
 GB 18382, *Fertilizer marking — Presentation and declaration*
 GB/T 34764, *Determination of copper, iron, zinc, manganese, boron and molybdenum content in fertilizers — Inductively coupled plasma optical emission spectroscopy*
 GB/T 34765-2017, *Determination of mineral fulvic acids content*
 GB 38400, *Limitation requirements of toxic and harmful substance in fertilizers*
 HG/T 3278, *Sodium humate*
 HG/T 5334-2018, *Potassium fulvate*
 JJF 1070, *Rules of metrological testing for net quantity of products in prepackages with fixed content*
 NY/T 887, *Liquid fertilizers — Determination of density*
 NY/T 1108, *Liquid fertilizers — Tech-regulations of package*
 NY/T 1973, *Water-soluble fertilizers — Determination of water insoluble matter content and pH*
 NY/T 1974, *Water-soluble fertilizers—Determination of copper, iron, manganese, zinc, boron, molybdenum content*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

mineral fulvic acid

fulvic acid extracted from organic minerals such as weathered coal, lignite, peat and oil shale

3.2

bio-fulvic acid; BFA

fulvic acid prepared from sugar based residue, plant straw, bagasse, sawdust, kitchen waste and alcohol waste by microbial fermentation or under high temperature and high pressure

3.3

mineral fulvic acid micro-element fertilizer

the mineral fulvic acid reacts with one or more of the trace elements of copper, iron, manganese, zinc, boron and molybdenum to make a fertilizer containing a certain amount of fulvic acid and nutrients

3.4

bio-fulvic acid micro-element fertilizer

the bio-fulvic acid reacts with one or more of the trace elements of copper, iron, manganese, zinc, boron and molybdenum to make a fertilizer containing a certain amount of fulvic acid and nutrients

4 Classification

According to different types of fulvic acid raw materials, it is classified into mineral fulvic acid micro-element fertilizer and bio-fulvic acid micro-element fertilizer.

5 Requirements

5.1 Technical specifications of mineral fulvic acid micro-element fertilizer

5.1.1 The solid products of mineral fulvic acid micro-element fertilizer shall comply with the requirements in Table 1 and the marked values on the packaging container.

Table 1 — Requirements for solid products of mineral fulvic acid micro-element fertilizer

Items	Specifications
Appearance quality	Uniform black or black brown solid without visible mechanical impurities
Mineral fulvic acid content (on dry basis)/%	≥ 25
Total content of micro-element ^a /%	≥ 6.0
Moisture ^b (H ₂ O) /%	≤ 10.0
Value of pH (1:100 dilution)	5.0~9.0
Chlorine ion content/ %	≤ 3.0
<p>^a The total content of micro-element refers to the sum of one or more of the following six elements of copper, iron, manganese, zinc, boron and molybdenum. If the content of a single element is less than 0.05 %, it is not included in the total content. The content of molybdenum shall not be higher than 1.0 % (except for products containing only molybdenum elements).</p> <p>^b The moisture is subject to the factory inspection data of the production enterprise.</p>	

5.1.2 The liquid products of mineral fulvic acid micro-element fertilizer shall comply with the requirements in Table 2 and the marked values on the packaging container.

Table 2 — The technical specifications for liquid products of mineral fulvic acid micro-element fertilizer

Items	Specifications
Appearance quality	Uniform black or black brown liquid without obvious stratification
Mineral fulvic acid content/(g/L)	≥ 100
Total content of micro-element ^a /(g/L)	≥ 50
Value of pH (1:100 dilution)	5.0~9.0
Water insoluble content/(g/L)	≤ 60
Chlorine ion content/ (g/L)	≤ 30
<p>^a The total content of micro-element refers to the sum of one or more of the following six elements of copper, iron, manganese, zinc, boron and molybdenum. If the content of a single element is less than 0.6 g/L, it is not included in the total content. The content of molybdenum shall not be higher than 10 g/L (except for products containing only molybdenum elements).</p>	

5.2 Technical specifications of bio-fulvic acid micro-element fertilizer

5.2.1 The solid products of bio-fulvic acid micro-element fertilizer shall comply with the requirements in Table 3 and the marked values on the packaging container.

Table 3 — The technical specifications for solid products of bio-fulvic acid micro-element fertilizer

Items	Specifications
Appearance quality	Uniform black, black brown or tawny solid without visible mechanical impurities
Bio-fulvic acid content (on dry basis)/%	≥ 20
Total content of micro-element ^a /%	≥ 10.0
Moisture ^b (H ₂ O) /%	≤ 10.0
Value of pH (1:100 dilution)	5.0~9.0
Chlorine ion content / %	≤ 3.0
<p>^a The total content of micro-element refers to the sum of one or more of the following six elements of copper, iron, manganese, zinc, boron and molybdenum. If the content of a single element is less than 0.05 %, it is not included in the total content. The content of molybdenum shall not be higher than 1.0 % (except for products containing only molybdenum elements).</p> <p>^b The moisture is subject to the factory inspection data of the production enterprise.</p>	

5.2.2 The liquid products of bio-fulvic acid micro-element fertilizer shall comply with the requirements in Table 4 and the marked values on the packaging container.

Table 4 — The technical specifications for liquid products of bio-fulvic acid micro-element fertilizer

Items	Specifications
Appearance quality	Uniform black, black brown or tawny liquid without obvious stratification
Bio-fulvic acid content/(g/L)	≥ 200
Total content of micro-element ^a /(g/L)	≥ 50
Value of pH (1:100 dilution)	5.0~9.0
Water insoluble content/(g/L)	≤ 60
Chlorine ion content/ (g/L)	≤ 30
<p>^a The total content of micro-element refers to the sum of one or more of the following six elements of copper, iron, manganese, zinc, boron and molybdenum. If the content of a single element is less than 0.6 g/L, it is not included in the total content. The content of molybdenum shall not be higher than 10 g/L (except for products containing only molybdenum elements).</p>	

5.3 Limit requirements of toxic and harmful substances

Toxic and harmful substances shall comply with the limit requirements in GB 38400.

6 Test methods

6.1 Appearance quality

Visual method.

6.2 Fulvic acid content

Measure as specified in 6.4 and 6.5 of HG/T 5334-2018.

6.3 Content of micro-element

Prepare sample solution as specified in GB/T 14540 and determined as specified in GB/T 34764 or NY/T 1974, in which GB/T 34764 is the arbitration method.

6.4 Moisture

Measure as specified in GB/T 8576.

6.5 Value of pH

Measure as specified in HG/T 3278.

6.6 Water insoluble content

Measure solid products as specified in HG/T 3278; measure liquid products as specified in NY/T 1973.

6.7 Chlorine ion content

Measure as specified in Annex A of GB/T 34765-2017.

6.8 Density of liquid fertilizer

Measure as specified in NY/T 887, the result is used for mass concentration conversion.

6.9 Content of toxic and harmful substances

Measure as specified in GB 38400.

7 Inspection rules

7.1 Inspection type and inspection items

Product inspection is divided into factory inspection and type inspection. The factory inspection items are those in Table 1 or Table 2 or Table 3 or Table 4, and the type inspection items include all items in Clause 5.

Type inspection is carried out under any of the following cases:

- a) when appraisalment of trial manufacture of new products or products produced by new plant is conducted;
- b) when significant changes in raw materials and process after the formal production, which is possible to impact the indicators of the products quality;
- c) when production is resumed after 6 months of production suspension;
- d) for normal production, type inspection shall be carried out periodically and at least once every 6 months;
- e) the state quality supervision institution require to carry out the type inspection.

7.2 Group batch

The products are inspected according to batches, and one batch of ingredients is regarded as one batch. The maximum batch size of solid products is 50 t and that of liquid products is 300 t.

7.3 Sampling plan

Carry out solid products sampling as specified in GB/T 6679 and carry out liquid products sampling as specified in GB/T 6680.

7.4 Result judgment

7.4.1 The "rounding off value comparison method" in GB/T 8170 is used to judge whether the quality index is qualified.

7.4.2 When all the type inspection items conform to the requirements, the batch of products is judged to be qualified.

7.4.3 When the production enterprise carries out the factory inspection, if all the inspection items conform to the requirements of this document, the batch of products is judged to be qualified. In case of any unqualified items, double quantity of packaging bags shall be sampled from the same batch of products for re-inspection. When the re-inspection results comply with all the requirements of this document, the product is judged as qualified. If there are still unqualified items, the product is judged as unqualified.

8 Marking

8.1 The product conformity mark or quality certificate shall specify: name of the production enterprise, address, product name, type of raw materials (mineral source or biomass), batch number or production date, net content, technical specifications and number of this document.

8.2 The packaging container of product shall specify: name of the production or business enterprises, address, product name, number of this document, type of raw materials (mineral source or biomass), content of mineral fulvic acid (or bio-fulvic acid), content of micro-element, value of pH and net content.

8.3 The micro-element content shall be marked with the content of each single micro-element and the total content of micro-element.

8.4 The net content of each bag shall be marked with a single value, 10 kg for example.

8.5 Carry out the rest marking as specified in GB 18382.

9 Packaging, transport and storage

9.1 Carry out the package of solid products as specified in GB/T 8569; carry out the package of liquid products as specified in NY/T 1108.

9.2 The net content of each bag of solid products shall not be less than (50 ± 0.5) kg, (40 ± 0.4) kg and (25 ± 0.25) kg respectively; the minimum sales package of liquid products shall not be less than 100 mL. When users have special requirements for the net content of each bag (bottle) of product, it can be implemented according to the agreement agreed by the supplier and the demander and shall comply with the provisions of JJF 1070.

9.3 Small packaging materials with other components shall not be added to the packaging containers.

9.4 The products shall be moisture-proof, sun-proof and crack-proof during transport and storage, and the warning instructions are implemented according to those specified in GB/T 191.