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Water Soluble Fertilizers – Determination of Water Insoluble Matter Content and pH

水溶肥料 水不溶物含量和 pH 的测定

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Water Soluble Fertilizers – Determination of Water Insoluble Matter Content and pH

1 Scope

This Document specifies test methods for the determination of water-insoluble matter content and pH of water-soluble fertilizers.

This Document applies to the determination of water-insoluble matter content and pH in liquid or solid water-soluble fertilizers.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 6682 Water for Analytical Laboratory Use – Specification and Test Methods

GB/T 11415 Laboratory Sintered (Fritted) Filters - Porosity Grading, Classification and Designation

NY/T 887 Liquid Fertilizers - Determination of Density

3 Terms and Definitions

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

3.1 Water soluble fertilizers

The liquid or solid fertilizers that are dissolved or diluted in water for irrigation and fertilization, foliar fertilization, soilless cultivation, seed soaking and root dipping, etc.

4 Determination of Water Insoluble Matter Content

4.1 Principle

After the specimen is dissolved or diluted with water, it is sucked and filtered with a glass crucible filter; and the obtained residue is dried and weighed to calculate the water-insoluble matter content.

4.2 Reagents and materials

The water used in this Document is Class-3 water specified in GB/T 6682.

4.3 Apparatus

4.3.1 Balance: Sensitivity of 0.001g and 0.0001g.

4.3.2 Glass crucible filter: It shall conform to the provisions of GB/T 11415; designation is P70; pore size of filter plate is 50μm~70μm; volume is 30mL.

4.3.3 Decompression and suction filtration device.

4.3.4 Drying oven: The temperature can be controlled at (110±2) °C.

4.4 Preparation of specimen

After the solid sample has been divided for several times, take out about 100g; quickly grind it until it all passes through a 0.50mm sieve (if the sample is wet, it can pass through a 1.00mm sieve); mix it evenly; and place it in a clean and dry container. After shaking the liquid sample for several times, quickly take out about 100mL and place it in a clean, dry container.

4.5 Test procedures

At (25±5) °C room temperature, take 1g of specimen (accurate to 0.001g); put it in a beaker; add 250 mL of water; stir well for 3 min; let stand for (15±3) min. Then, use a glass crucible filter that was pre-dried to constant weight in a drying oven at (110±2) °C for suction filtration. When transferring during suction and filtration, first pour the solution in the upper layer of the beaker, shake it evenly (or stir evenly with a glass rod) when a small amount of solution (about 20 mL) remains at the bottom; and then pour it into the filter; and finally add a small amount of water (no more than 50 mL) to rinse the beaker to transfer all the residue into the filter. Put the filter with residue in the drying box; after the temperature reaches (110±2) °C, dry for 1 h; take it out and transfer it to the desiccator. Cool to room temperature and weigh it (accurate to 0.0001 g). The blank test takes the same procedures as the specimen determination except that no specimen is added.

NOTE: The glass crucible filter needs to be washed after use. It can be washed and soaked overnight with potassium dichromate-concentrated sulfuric acid; rinse repeatedly with tap water; and then filtered with Class-3 water for later-use.

4.6 Processing of test data

The content of water insoluble matter is measured in *w*; the value is expressed in mass fraction

5.3 Apparatus

5.3.1 Balance: The sensitivity is 0.001g.

5.3.2 pH meter: The sensitivity is 0.01 pH unit, with temperature compensation function.

5.4 Preparation of specimen

Follow the provisions of 4.4.

5.5 Test procedures

The test shall be carried out at room temperature of (25±5) °C. First, set the pH meter temperature compensation system to 25°C prior to measurement; use pH standard buffer solution to calibrate the pH meter. Take 1g of specimen (accurate to 0.001g); put it in a beaker; add 250 mL of decarbonated water; stir well for 3 min; let stand for 15 min; immerse the electrode in the solution to avoid bubbles. Record pH after the instrument reading is stable. Rinse the electrode with water after measurement.

NOTE 1: The change of reading of pH meter within 1min is less than 0.05 pH unit, which can be regarded as stable.

NOTE 2: The multi-point calibration method can be used to calibrate the pH meter by using the pH standard buffer solution according to the instrument manual. If the pH meter is equipped with automatic temperature compensation, it is not necessary to adjust the standard buffer solution to the same temperature as the sample. During calibration, the temperature probe that comes with the electrode can automatically measure the temperature of the standard buffer solution; and the pH of the standard buffer solution is automatically set to the pH at this temperature. When measuring the sample, the actual temperature of the sample is automatically measured and the slope of the electrode is compensated; and the measurement result (indication value of the instrument) is the pH at the actual temperature of the sample.

5.6 Processing of test data

Take the arithmetic mean of the parallel measurement results as the measurement result; and the result is expressed to 2 digits after the decimal point.

5.7 Precision

Under repeatability conditions, the absolute difference between the results obtained from 2 independent tests shall be no more than 0.20 pH unit.

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