

SCHEDULE 2

METHODS OF ANALYSIS

PART I

25b.

EXTRACTION OF WATER-SOLUBLE TRACE ELEMENTS

1 SCOPE

1. This method defines the procedure for extracting water-soluble forms of the following trace elements: boron, cobalt, copper, iron, manganese, molybdenum and zinc. The aim is to carry out the minimum number of extractions, making use wherever possible of the same extract to determine the level of each of the trace elements listed above.

2 FIELD OF APPLICATION

2. This procedure concerns fertilisers containing one or more of the following trace elements: boron, cobalt, copper, iron, manganese, molybdenum and zinc. It is applicable to each trace element the declared content of which is less than or equal to 10%.

3 PRINCIPLE

3. The trace elements are extracted by shaking the fertiliser in water at $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

(Note) The extraction is empirical and may or may not be quantitative.

4 REAGENTS

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4.1. Dilute hydrochloric acid (HCl) solution, above 6 M:

Mix 1 volume of hydrochloric acid ($\rho = 1.18\text{ g/ml}$) with 1 volume of water.

5 APPARATUS

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5.1. Rotary shaker set at about 35 to 40 rpm.

5.2. pH-meter.

(Note) Where the boron content of the extract is to be determined, do not use borosilicate glassware. Teflon or silica is preferable for this extraction. Rinse the glassware thoroughly if it has been washed in detergents containing borates.

6 PREPARATION OF THE SAMPLE

6. See Method 1.

7 PROCEDURE

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Status: This is the original version (as it was originally made). This item of legislation is currently only available in its original format.

7.1. Test sample

Take a quantity of fertiliser weighing between 2 and 10 g depending on the declared content of the element in the product. The following table shall be used to obtain a final solution which, after appropriate dilution, will be within the measuring range for each method. The samples should be weighed to within 1 mg.

Declared content of trace element in the fertiliser(%)	<0.01	0.01 – <5	≥5 – 10
Mass of test sample (g)	10	5	2
Mass of element in the sample (mg)	1	0.5-250	100 – 200
Volume of extract V (ml)	250	500	500
Concentration of element in extract (mg/l)	4	1 – 500	200 – 400

Place the sample in a 8 250 or 500 ml flask (according to the Table).

7.2. Preparation of the solution

Add about 200 ml of water to the 250 ml flask or 400 ml of water to the 500 ml flask.

Stopper the flask well. Shake vigorously by hand to disperse the sample, then place the flask on the shaker and shake for 30 minutes.

Make up to volume with water and mix thoroughly.

7.3. Preparation of the test solution

Filter immediately into a clean, dry flask. Stopper the flask. Carry out the determination immediately after filtering.

(Note) If the filtrate gradually becomes cloudy, make another extraction following 7.1 and 7.2 in a flask of volume V_e . Filter into a calibrated flask of volume W which has previously been dried and has received 5.00 ml of dilute hydrochloric acid (4.1). Stop the filtration at the exact moment when the calibration mark is reached. Mix thoroughly.

Under these conditions the value of V in the expression of results is:

$$V = V_e \times W / (W - 5).$$

The dilutions in the expression of results depend on this value of V .

8 DETERMINATION

8. The determination of each trace element is carried out on the aliquot portions indicated in the method for each individual trace element.

If necessary, remove organic chelating or complexing substances from an aliquot portion by using Method 25c. In the case of determination by atomic absorption spectrometry, such removal may not be necessary.