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**Organo-mineral fertilizers —
Extraction of phosphorus by formic acid**

ICS:

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European foreword

This document(CEN/prEN 17767) has been prepared by Technical Committee CEN/TC 260 “Fertilizers and liming materials”, the secretariat of which is held by DIN.

This is a working document

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This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association..

1 Scope

This document specifies the procedure for the extraction of phosphorus in 2 % formic acid (20 g/l), representing the amount of soft natural phosphates.

The extracts are suitable for analysis using CEN/TS 17774.

NOTE Alternatively, inductively coupled plasma mass spectrometry (ICP-MS) can be used for the measurement if the user proves that the method gives the same results.

This method is applicable to organo-mineral fertilizers and to the fertilizing product blends where the EU fertilising product organic and organo-mineral fertilizer contained in the blend represents the highest % by mass in the blend. In case of equal shares, the user may apply either this or the standard(s) applicable to the other component product(s).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 17774¹, *Organic and organo-mineral fertilizers — Determination of the content of specific elements by ICP-AES after extraction by water*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

4 Principle

To differentiate between hard natural phosphates and soft natural phosphates, phosphorus soluble in formic acid is extracted from the test portion with a 2 % formic acid solution under specified conditions.

5 Sampling

Sampling should be performed carefully, following the principles described in EN 1482 (all parts) with appropriate adaptations, required to account for specificities of organic and organo-mineral fertilizers.

6 Reagents

6.1 Water, with a specific conductivity not higher than 0,2 mS/m at 25 °C, free from the elements to be determined.

¹ Under preparation

6.2 Formic acid 2 %, ($\rho \approx 20$ g/l)

Make 82 ml of formic acid (concentration 98 % to 100 %; density at 20 °C $\rho_{20} = 1,22$ g/ml) up to 5 l with distilled water.

7 Apparatus

7.1 Common laboratory equipment and glassware.

7.2 **500 ml graduated flask**, with a wide neck (e.g. Stohmann).

7.3 **Rotary shaker**, 35 turns to 40 turns per min.

7.4 **Dry pleated filter**, free from phosphates.

8 Procedure

8.1 Test portion

Weigh, to the nearest 0,001 g, 5 g of the laboratory sample and place it in a dry 500 ml graduated flask (7.2).

8.2 Extraction

While continuously rotating the flask by hand, add formic acid (6.2) to the test portion at (20 ± 2) °C until it is approximately 1 cm below the graduation mark and make up to the volume with formic acid (6.2). Close the flask with a rubber stopper and shake for 30 min at (20 ± 2) °C on a rotary shaker (7.3).

Filter the solution through a dry pleated filter (7.4) into a dry glass receptacle. Discard the first portion of the filtrate. Continue the filtering until a sufficient quantity of filtrate is obtained to carry out the phosphorus determination. The determination of phosphorous after extraction shall be done according to CEN/TS 17774.

The extracts can be kept at (4 ± 2) °C for maximum two days before determination.

The determination of phosphorus after extraction shall be done according to CEN/EN 17774².

9 Test Report

In the test report of the determination method (CEN/TS 17774), a reference to this standard shall be included as well as the date of extraction and potential deviation while applying this method.

² Under prepreparation

Bibliography

- [1] EN 1482 (all parts), *Fertilizers and liming materials — Sampling and sample preparation*
- [2] CEN/TS 17774, *Organic and organo-mineral fertilizers — Determination of the content of specific elements by ICP-AES after extraction by water*