

METHOD STATEMENT



Determinand:

Determination of Extractable Potassium and Extractable Magnesium

Matrix:

Sample Type: soil samples.

Principle of Method:

Potassium and Magnesium are extracted from the soil with molar ammonium nitrate. The concentrations in the extract are determined by ICP-OES.

Sampling and Sample Preparation:

Ground soils are stored at room temperature; wet soils are refrigerated at $3 \pm 2^\circ\text{C}$.

Soil samples are dried and ground according to method WSC15 prior to analysis.

Provided the samples are dried and ground within 7 days of sampling, the dried soil has 1 month to be extracted within stability (BS ISO 18512:2007). The extracted portion is stable for 8 weeks (Wakefield In-House Data).

Interferences

The choice of appropriate analytical wavelengths minimises any spectral interferences.

Performance of Method:

Range of Application:

is 0 - 150 mg/l without dilution for potassium and magnesium when using the Agilent and 0 - 100 mg/l for potassium and 0 - 150 mg/l for magnesium when using the Optima.

The analytical range may be extended by sample dilution with 1M ammonium nitrate

Limit of Detection and Calibration Bias:

| | Optima | | Agilent | | WSC13 |
|-----------|----------|-----------|----------|-----------|-----------|
| | LOD mg/l | LOD mg/kg | LOD mg/l | LOD mg/kg | MRV mg/kg |
| K | 0.5 | 2.5 | 0.12 | 0.6 | 7.5 |
| Mg | 0.33 | 1.65 | 0.35 | 1.75 | 13.9 |

Recoveries of Compounds:

OPTIMA

| | Clay Soil | | Sandy Soil | | Loam | |
|---------------------|-----------|-------|------------|-------|-------|-------|
| | K | Mg | K | Mg | K | Mg |
| Concentration mg/l | 33.4 | 50.3 | 14.2 | 8.13 | 36.0 | 31.1 |
| Concentration mg/kg | 167 | 251 | 70.9 | 40.6 | 180 | 155 |
| Recovery % | 96.98 | 95.55 | 99.36 | 95.02 | 97.27 | 96.45 |
| RSD % | 7.64 | 5.69 | 6.81 | 5.18 | 6.33 | 4.88 |

AGILENT

| | Clay Soil | | Sandy Soil | | Loam | |
|---------------------|-----------|--------|------------|-------|--------|-------|
| | K | Mg | K | Mg | K | Mg |
| Concentration mg/l | 79.78 | 28.34 | 21.82 | 16.13 | 38.11 | 19.41 |
| Concentration mg/kg | 398.90 | 141.70 | 109.10 | 80.65 | 190.55 | 97.05 |
| Recovery % | 98.13 | 90.52 | 98.39 | 95.31 | 99.54 | 98.06 |
| RSD % | 1.24 | 1.25 | 2.37 | 2.28 | 1.41 | 1.37 |

**References:**

The Analysis of Agricultural Materials, Reference Book 427, 3rd edition. Ministry of Agriculture, Fisheries and Food. HMSO. ISBN 0 11 242762 6. Methods 40 and 63.

Fertiliser Recommendations, Reference Book 209. Ministry of Agriculture, Fisheries and Food. HMSO. ISBN 0 11 242813 4. Appendix 1.

Agilent 5900 ICP-OES Series Hardware Guide.

Perkin Elmer Optima 7300 ICP-OES Series Hardware Guide