Method Guide: 40149

Atomic Absorption Method Guide
Ca in Plant Materials

Key Words

- Plant Materials
- Calcium
- Flame
- Atomic Absorption

Principle

The sample is digested in mixed nitric/sulphuric/perchloric acids, and calcium is determined by flame atomic absorption spectrometry using a nitrous oxide-acetylene flame. ~ 2000 mg/L of potassium ionisation buffer is added to all solutions.

Reagents

Nitric acid (AnalaR grade, concentrated, s.g. 1.42)

Sulphuric acid (AnalaR grade, concentrated, s.g. 1.84)

Perchloric acid (AnalaR grade, concentrated, 72 %)

Potassium chloride (AnalaR grade)

Calcium master standard (1000 mg/L, Spectrosol or equivalent)

Calcium sub-stock standard solution (25.0 mg/L)

Transfer 2.5 mL of calcium master standard solution to a 100.0mL volumetric flask, dilute to volume with deionised water.

Working standards

Transfer 0, 5.0 and 10.0 mL of the calcium sub-stock standard solution into a series of 100 mL volumetric flasks containing 20 mL of deionised water. Add 1.0 mL of sulphuric acid and 0.5 g of potassium chloride to each flask and dilute to volume with deionised water. The working standards will contain 0, 1.25 and 2.50 mg/L of calcium.

Sample Preparation

Weigh 0.200 g of dry plant material into a 100 mL long necked Kjeldahl flask, add 1.0mL of sulphuric acid, 5.0 mL of nitric acid and 1.0 mL of perchloric acid. Heat gently until the initial reaction subsides, then heat more strongly until white fumes of sulphuric acid appear. Continue to heat for 15 minutes, then cool and transfer to a 100.0 mL volumetric flask and dilute to volume with deionised water. The total digestion time will be 1-1.5 hours. Transfer 10.0 mL of this solution to a 100 mL flask, add 1.0 mL of sulphuric acid and 0.5 g of potassium chloride and dilute to volume with deionised water. 2.5 mg/L in solution is equivalent to 1.25 % m/m of calcium in the original sample.

Instrument Parameters

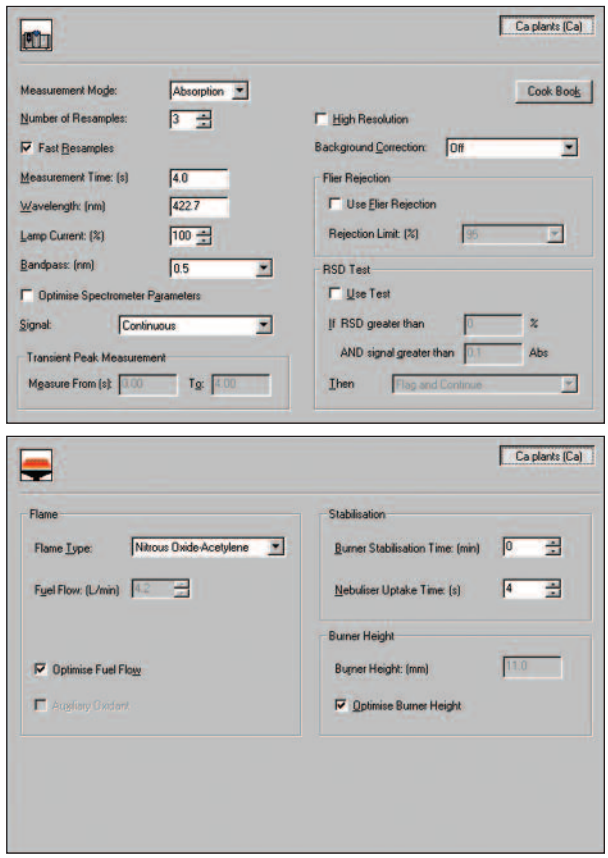

Figure 1: Instrument parameters

Thermo SCIENTIFIC

Results

Sample	Heather (1)	Heather (2)	Oak leaves	Peat
Calcium found (%m/m)	0.18	0.32	2.80	0.11
Reference value (%m/m)	0.17 - 0.19	0.31 - 0.33	2.74 - 2.87	0.10 - 0.11

The method of sample treatment described in this publication should be performed only by a competent chemist or technician trained in the use of safe techniques in analytical chemistry. Users should acquaint themselves with particular hazards which may be incurred when toxic materials are being analysed and handled in the instruments, and the instrument must be used in accordance with the operating and safety instructions given in the Operators manual.

The exact model of instrument on which this analysis was performed may differ from that stated. Although the contents have been checked and tested, this document is supplied for guidance on the strict understanding that neither Thermo Fisher Scientific, nor any other person, firm, or company shall be responsible for the accuracy or reliability of the contents thereof, nor shall they be liable for any loss or damage to property or any injury to persons whatsoever arising out of the use or application of this method.

In addition to these offices, Thermo Fisher Scientific maintains a network of representative organizations throughout the world.

Africa
+43 1 333 5034 127
Australia
+61 2 8844 9500
Austria
+43 1 333 50340
Belgium
+32 2 482 30 30
Canada
+1 800 530 8447
China
+86 10 8419 3588
Denmark
+45 70 23 62 60
Europe-Other
+43 1 333 5034 127
France
+33 1 60 92 48 00
Germany
+49 6103 408 1014
India
+91 22 6742 9434
Italy
+39 02 950 591
Japan
+81 45 453 9100
Latin America
+1 608 276 5659
Middle East
+43 1 333 5034 127
Netherlands
+31 76 579 55 55
South Africa
+27 11 570 1840
Spain
+34 914 845 965
Sweden/Norway/ Finland
+46 8 556 468 00
Switzerland
+41 61 48784 00
UK
+44 1442 233555
USA
+1 800 532 4752

www.thermo.com

FM 09032
Thermo Electron Manufacturing Ltd (Cambridge) is ISO Certified.

AN40149_E 03/08C