DATE: SEPT 2004

Nitrate and Ammonium in Soil and Tissue

1. Application

In this procedure nitrogen, in the form of nitrate and nitrite ion, is extracted from soil or tissue samples and analyzed by flow injection.

2. Summary of Methods

KCl is used to extract NO_3^--N and NH_4^--N from the soil and tissue samples.

3. Safety

Each chemical compound should be treated as a potential health hazard. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material handling data sheets should be made available to all personnel involved in the chemical analysis.

4. Interferences

5. Apparatus and Materials

5.1 Weigh boat (metal or glass)
5.2 Erlenmeyer flasks (50-ml)
5.3 Pipette bank (15-ml)
5.4 Time-controlled, oscillating shaker.
5.5 Filter paper, 9-cm (Whatman No. 2 or equivalent)
5.6 Funnel tubes (15-ml)
5.7 Glass test tubes (6.2-ml)
5.8 Flow injection

6. Reagents

6.1 2 N KCl solution (1044.40 g of KCl to 7 liters of de-ionized water).

7. Methods

7.1 Weigh out 1.50 g of soil or .25 g of tissue into a weigh boat.
7.2 Transfer sample to a 50-ML Erlenmeyer flask.
7.3 Add 15-ml of 2 N KCl solution using constant suction pipette.
7.4 Shake for 15 minutes on oscillating shaker.
7.5 Filter immediately.

7.6 Pipette 5-ml of filtrate into glass test tube.
7.7 Analyze by flow injection.

8. Calculations

Sample concentration is calculated from a regression equation by plotting response verses standard concentration.

9. Quality Control

9.1 Laboratory Reagent Blank (LRB) – At least one LRB is analyzed with each batch of samples to assess contamination from the laboratory environment. Contamination from the laboratory or reagents is suspected if LRB values exceed the detection limit of the method. Corrective action must be taken before proceeding.
9.2 Standard soil – One or more standard soils of known extractable nitrate content are analyzed with each batch of samples to check instrument calibration and procedural accuracy.

10. Reporting

Results are reported as ppm of nitrogen in the form of nitrate NO_3^--N or NH_4^-- N in soil.

11. References

11.1 Lachet Instruments. 1995. Total Kjeldahl Nitrogen in Soil/Plant. QuickChem Method 12-107-04-1-B.
11.2 Jaromir Ruzicka. 1983. Flow Injection Analysis – From Test Tube to Integrated Microconduits. Analytical Chemistry 55: 1040A-1053A.