

Soil - Nitrate and Ammonium Protocol

•Dan Noble, November 2019
adapted from Hood-Nowotny et al., 2010

Make solutions:

1 M potassium chloride (KCl)

- Add 500 ml ultrapure water to 1 litre volumetric flask.
- Add 37 g of KCl to 1 litre volumetric flask.
- Not regulated but should probably be labeled as **HAZARDOUS WASTE** if needed.
- Ideally, the whole experiment is done with the same batch of KCl, so make enough to pre-treat filters, extract samples, and then have some for controls and blanks.

Soil processing:

1. After soil collections, soils should be stored at 4°C until they can be air-dried.
2. Remove samples from plastic bags and spread soil samples very thin to increase drying rate and air dry (at less than 50°C)
3. Grind dry soil in a coffee mill to homogenize the sample. Make sure to brush out coffee mill after each sample (do not use water).
4. Sieve soil sample (10 mesh) to get homogenized sample.
 - a. Discard particles (roots, leaves) that do not pass through sieve.
5. If you cannot analyze immediately place sieved soil samples in plastic bags. The plastic bag will help minimize adsorption of ammonia-N (NH₃-N) from the atmosphere during storage.

Soil extraction:

Ammonium and nitrate can be extracted simultaneously using 1 mol KCl

1. Weigh out 1.5 g subsample of soil into borosilicate test tubes.
2. Using a graduated cylinder, add 15 ml of 1 mol/L KCl to each borosilicate test tubes.
3. Make sure to have blank tubes with extract (no sample).
4. Place borosilicate test tubes with KCl extraction on lab shaker for 1 hour at 200 rpm.
5. Allow samples to settle for 1 hour after shaking.
6. Pretreat filters by leaching them twice with 1 M KCl.
7. Filter samples gravimetrically through Whatman filter paper.
8. Collect extract into pre-labeled sample vials.
9. Analyze immediately or freeze extracts until analysis is possible (2 weeks).
10. Run extracts using aqueous protocols for ammonium and nitrate.

Reporting results:

“Inorganic N was determined by extraction with potassium chloride (Hood-Nowotny et al., 2010).”

Waste disposal:

Most reagents will get stored for future use. Look in hood for labeled hazardous waste containers (might need to create a new one). Package plates in plastic bag (in hood). If things are getting full (they cannot be >75% full!!!), please [fill out this form](#) from EHS and email it to ehs@uoguelph.ca to request pickup.