

SOIL EXTRACTION AND ¹⁵N POOL DILUTION PROTOCOL
AIR RESOURCES BOARD PROJECT

June 22, 1995

Preparation.

1. Dissolve 1193 g KCl in 8 L deionized water, 3 times.
2. Label and weigh empty 8 oz specimen cups + lids, **1** for inorganic N, **2** for pool dilutions.
3. Measure 150 mL 2 M KCl into each 8 oz specimen cup.
4. Weigh cups + lids + KCl.
5. Label large plastic bags.
6. Label small plastic bags.
7. Label 4 oz specimen cups, **1** for inorganic N, **2** for pool dilutions.
8. Label Lachat tubes, **1** for inorganic N, **2** for pool dilutions.
9. Rinse Whatman #1 filter papers with 3 rinses of 2 M KCl (may be done in stacks of 25).
10. Measure 97 mg KNO₃ (natural abundance) and 32 mg 99 atom% ¹⁵N-KNO₃ into 600 mL of deionized water. Makes 30 μg N mL⁻¹ at 25 atom% ¹⁵N. Refrigerate.

In the Field.

1. Soil cores will be taken at a distance of 30 cm from each gas flux ring.
2. Pound a 7 cm diameter core into the soil
3. Empty the soil into a plastic bag
4. Mix thoroughly
5. Using a 50 mL beaker, remove 2 scoops of soil into a separate plastic bag for moisture determinations and NPs.
6. Using the 50 mL beaker, remove 1 scoop of soil, empty it into a 150 mL of 2 M KCl and shake. Put on ice.
7. Spray 1 squirt (using fine mist) of NO₃⁻ solution on the soil and mix thoroughly.
8. Repeat step 7 four times (total of 5 squirts).
9. Fifteen minutes later, use a 50 mL beaker to remove one scoop of soil, empty it into a cup of 2 M KCl, and shake. Put on ice.
10. Record the time of extraction.
11. Tie the bag with a slip knot with as much headspace as possible, plant the bag of soil back in the hole, and shade it with a paper bag, if necessary.
12. Six hours later, collect the bag of soil. Take a 50 mL scoop of soil, empty it into a cup of 2 M KCl, shake, and put on ice.
13. Record the time of extraction.

Laboratory.

1. Weigh the cups + lids + KCL + soil.
2. Shake soil slurries for 1 hr.
3. Put rinsed 18.5 cm diam. Whatman #1 filters in filter funnels.
4. Rinse each filter with 25 mL 2 M KCl, then discard the filtrate and the cup it was rinsed into.
5. Place clean, labeled 4 oz specimen cups under the funnels.
6. After soils have shaken for 1 hr, pour the liquid into the filter, and retain all fractions larger than 2 mm in the 8 oz cup. (The less sediment that goes into the filter, the faster it will drain.)
7. Pour off an aliquot of the extract into a Lachat tube (leave 1 cm empty at the top), then cap off the Lachat tube and the cup, and put them in an ice chest with dry ice.
8. From the bag of soil reserved for water content, measure about 20 g of soil into a weighing tin and record the fresh weight.
9. Dry the soils in a 70° C oven overnight.
10. Sieve the residues from the soil extracts through a 2 mm mesh.
11. Place the rocks in weighing tins, and dry in a 70° C oven overnight.
12. Record the dry rock weights from the soil slurries, then discard the rocks.
13. Weigh the dry water-content soil samples.
14. Wet-sieve the water-content soil samples through a w mm mesh.
15. Place the rocks in weighing tins, and dry in a 70° C oven over night.
16. Record the dry rock weights from the water-content samples, then discard the rocks.