

Protocol for inorganic nitrogen extraction in soils (KCl method)

Purpose

Nitrate-nitrogen ($\text{NO}_3\text{-N}$) is extracted from soils with potassium chloride and analyzed by reduction to nitrite ($\text{NO}_2\text{-N}$) via cadmium reduction and measured spectrophotometrically at 520nm.

Reagent

2M potassium chloride (KCl): Dissolve 150 g reagent grade KCl in 1L deionized water

Procedure on field-moist soils

If possible, extract soils the same day as collection.

1. Place a centrifuge tube on the balance and tare.
2. Weigh 6.00 g \pm 0.05 g of **field moist** soil into 50 mL centrifuge tube. Record tube number and weight of soil. Field soils will not be sieved, but avoid roots as best as you can.
3. Add 30.0 mL of 2M KCl extracting solution
4. Weigh each soil twice (replicate A and B)
5. Include blanks
6. Shake for 1 hr on a reciprocating shaker
7. Remove from shaker and let sit for ~30min so that the soil can settle to the bottom of the centrifuge and make filtration easier.
8. Using gloves, fold Whatman filters and place on acid-washed funnels.
9. Rinse filter paper three times with KCl to minimize any contamination.
10. Filter the solution* into a scintillation vial and either analyze immediately or freeze until analysis is possible (within 2 weeks).

Soil preparation

If soils cannot be extracted immediately, follow this procedure.

1. After 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. After drying, pass soils through a 2-mm sieve (10 mesh) and place in a plastic bag. The plastic bag helps minimize adsorption of ammonia-N ($\text{NH}_3\text{-N}$) from the atmosphere during storage.
4. Extract as soon as possible.

Procedure on air-dried soils

1. Place a centrifuge tube on the balance and tare.
2. Weigh 5.00 g \pm 0.05 g of **air-dried** soil into 50 mL centrifuge tube. Record tube number and weight of soil.
3. Add 25.0 mL of 2M KCl extracting solution
4. Weigh each soil twice (replicate A and B)
5. Include blanks.
6. Shake for 1 hr on a reciprocating shaker
7. Remove from shaker and let sit for ~30min so that the soil can settle to the bottom of the centrifuge and make filtration easier.

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8. Using gloves, fold Whatman filters and place on acid-washed funnels.
9. Rinse filter paper three times with KCl to minimize any contamination.
10. Filter the solution* into a scintillation vial and either analyze immediately or freeze until analysis is possible (within 2 weeks).

* If the solution is cloudy or has any sediment in it, re-filter it before freezing