

# Determination of ammonium by spectrophotometer

Baethgen WE, Alley MM (1989) A manual colorimetric procedure for measuring ammonium nitrogen in soil and plant Kjeldahl digests. Commun. Soil Sci. Plant Anal. 20 (9&10) 961-969

## Reagents

1. Solution of 50% NaOH.
  - a. dissolve 100 g of NaOH in water, dilute to 200 mL
2. Buffer solution:
  - a. to a 1000 mL flask add 600 mL of water,
  - b. add 14.2 g of  $\text{Na}_2\text{HPO}_4$  or 17.8 g of  $\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$  or 35.8 g of  $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$  and dissolve
  - c. add 50 g of K Na tartrate ( $\text{C}_4\text{H}_4\text{KNaO}_6 \cdot 4\text{H}_2\text{O}$ )
  - d. add 108 g of 50% NaOH
3. Salicylate/nitroprusside solution
  - a. in a 1000mL flask dissolve 150 g of Na Salicylate ( $\text{C}_7\text{H}_5\text{NaO}_3$ ) and 0.30 g of sodium nitroprusside ( $\text{Na}_2[\text{Fe}(\text{CN})_5\text{NO}] \cdot 2\text{H}_2\text{O}$ ) and make up to 1L
  - b. store in dark in brown bottle
4. Hypochlorite solution
  - a. dilute 6 mL of 5.25% sodium hypochlorite to 100 mL
  - b. prepare daily as it isn't stable
5. A "Diluent" solution
  - a. This contains the metal catalyst, or digestion solution, or the extraction solution

## Standards

1. 1000 mg/L  $\text{NH}_4\text{-N}$  stock
  - a. In a 1000 mL flask dissolve 4.715 g of ammonium sulphate ( $\text{NH}_4)_2\text{SO}_4$  (dried at 105C).  
Make up to 1000 mL with the "diluent" solution
2. 100 mg/L  $\text{NH}_4\text{-N}$ 
  - a. Dilute 10 mL of the 1000 mg/L solution to 100 mL using "diluent"
1. Series of  $\text{NH}_4$  standards
  - a. Dilute 0, 1, 2, 3, 4, 5, 6 of 100 mg/L to 100 mL with "diluent"
  - b. This series contains 0, 1, 2, 3, 4, 5, 6 mg/L of  $\text{NH}_4\text{-N}$

## Procedure

1. Turn on spectrophotometer and set wavelength to 650 nm
2. Transfer 1mL of solution or standard to a test tube
3. Add 5.5 mL of buffer solution. Mix and agitate with vortex
4. add 4 mL of salicylate/nitroprusside solution and mix
5. add 2 mL of hypochlorite solution and mix
6. let rest for 45 min at 25C or 15 min at 37C
7. read absorbance at 650 nm within 2 hours