Use of Diffusion to Determine Soil Cation-Exchange Capacity by Ammonium Saturation. (S08-mulvaney170106-Poster)

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Abstract:

A rapid and convenient technique was developed to measure soil cation-exchange capacity (CEC) by ammonium saturation. In this technique, 0.5 g of soil (< 2 mm) was leached under vacuum with 15 mL of 1 M ammonium acetate (pH 7) in a 10-mL disposable syringe containing a stainless-steel frit (2 micrometer pores), and excess ammonium-N was subsequently removed by leaching with 2-propanol in six 5-mL aliquots. After a brief period of vacuum aeration to ensure complete drying, the ammonium-saturated soil was transferred from the syringe into a 1-pint (473-mL) wide-mouth Mason jar, and the sample was treated with 10 mL of 2 M KCl and 0.2 g of MgO. Exchangeable ammonium-N was liberated in 1.75 h at 45-50C on a hot plate, collected in 5 mL of 4% boric acid-indicator solution in a petri dish suspended from the jar lid, and determined by titration with 0.01 M sulfuric acid. Comparative studies showed CEC values determined for a wide range of surface soils by the rapid diffusion technique to be in close agreement with data obtained by conventional methods of measuring CEC that involve an overnight ammonium saturation.

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