KCl extraction of fresh soil

Introduction

Soil is extracted with KCl so as to provide a solution that can be analysed to determine "available" nutrients.

A soil sample is shaken end to end (at 100 rpm) with 1.0 M Potassium Chloride in a ratio of 1:5 (soil FW:extractant) for 90 minutes.

Reagents

Extracting Solution: 1.0M Potassium Chloride (KCl)

1. In a 1-L beaker dissolve 74.55 g of KCl in approximately 600mL Type-I water
2. Ensure all crystals are dissolved,
3. Transfer to a 1.0-L standard flask and make to the mark with Type-I water, mix.
4. Store in a suitably labelled container for up to six months (the fridge is a good place to store KCl – it will not precipitate)

Sample preparation

1. Try and avoid storing samples for greater than 24 hours and subjecting them to large shifts in temperature.
2. Sieve soil to pass a 2.0-mm sieve. This is dusty so don't do it in the lab
3. Arrange soil samples and label tubes, also label tubes for blanks. Have at least 3 blanks per batch of extracts. 4 is a better number if you are planning on centrifuging the extracts because then you can put one blank in each bucket

Extraction:

1. Mix sample thoroughly to achieve homogeneity
2. Weigh 8.0g (±0.05g, do not record weight) of fresh <2mm soil into a suitably labelled 50mL screw top plastic centrifuge tube
3. Dispense 40.0 +/- 0.4mL of 1M KCl into extraction tube (use a bottle-top dispenser for this step)
4. Cap tightly and ensure soil is wet
5. Shake end-to-end at 100 rpm for 90 minutes (use the shaker for this. Read the shaker's instructions before using it)
6. Centrifuge (e.g. 3200 g for 15 minutes). This step is not compulsory, but centrifuging the samples will make them several times quicker to filter
    - It is imperative that you read the instructions for the centrifuge
    - Balance the centrifuge buckets by having the same number of samples and blanks in each bucket. Do not put all of the blanks in one bucket, or have different numbers of blanks in the buckets. This will lead to a major imbalance because blanks are 8 g lighter than samples.
    - Clean the centrifuge once finished. Be especially important to clean any KCl (use water + neutral detergent, not an alkaline detergent
7. Filter into a clean, labelled container
8. Store at -20C, or analyse within 24 hours

Notes:

Data are presented on a dry mass basis; therefore, you must determine FW/DW ratio (weigh a known amount of fresh soil into a tin weighing boat, put it in the 105C oven for >2 days and then record the dry weight)