1.0 SCOPE

1.1 The KCl soil extraction was developed to extract soil plant available NH4-N and NO3-N (PAN).

2.0 DEFINITIONS

2.1 Laboratory Control Sample: The laboratory control sample is an intralaboratory developed sample whose true PAN value is approximated by the average of repeated measures.

2.2 Duplicate Samples: A duplicate test involves splitting a sample into two sub-samples and processing each through the same sample preparation procedure in order to determine the precision of the method.

2.3 Preparation Blank: The Preparation Blank is a sample that contains only the reagents used in the extraction procedure. The preparation blanks is processed through the same preparation procedures as the samples and therefore gives an indication of any contamination picked up during the sample preparation process.

2.4 ICP-AES: Inductively Coupled Plasma-Atomic Emission Spectrometry.

3.0 EQUIPMENT AND SUPPLIES

3.1 No. 10 (2 mm opening) sieve

3.2 Automatic extractant dispenser, 20 mL capability

3.3 Laboratory Balance: Any laboratory balance accurate to within ± 0.01 grams may be used (all weight measurements are to be within ± 0.01 grams)

3.4 Rotating shaker with a capability of 150 excursions per minute (epm)

3.5 Drying oven

3.6 Extraction vessels, 50ml centrifuge tubes.

3.7 ≥18 MΩ deionized water (DI).

3.8 2.0M KCl extraction solution.

3.9 0.45µm nylon syringe filters
3.10 15mL glass vials

4.0 PROCEDURE

4.1 Air dry or oven dry samples at < 60°C.

4.2 Sieve samples through the #10 sieve in order to obtain the 2mm fraction.

4.3 Weigh 2.00g of sample into 50mL centrifuge tubes.

4.4 Add 20mL (±0.4) of 2.0M KCl extraction.
   4.4.1 Record dispenser calibration in appendix.

4.5 Shake at 150 or more epm for 2h.

4.6 Remove from shaker, place in 40-slot swinging-bucket rotor, centrifuge at max rpm for 15 minutes, and syringe filter at least 10mL into 15mL falcon tubes.

4.7 Freeze all samples

4.8 Contents of centrifuge tubes may be dumped down the drain and washed in .5 M HCL acid bath.

5.0 QUALITY CONTROL

5.1 Laboratory Control Sample (LCS): The laboratory control sample must fall within ± 20% of the known value or within the 95% prediction interval of the certified value. The laboratory control sample must be run with each batch (14) of extractions.

5.2 Sample Duplicates: The relative percent difference (RPD) must be no more than ±20%. At least one sample duplicate must be run with every batch (14) of extractions.

   \[
   RPD = 100 \times \frac{(S - D)}{\text{Avg. (S,D)}}
   \]

5.3 Preparation Blank: If any analyte concentration is above the method detection limit in the preparation blank, the lowest concentration of the analyte reported in associated samples must be ≥ 10 times the preparation blank concentration. A preparation blank must be run with every batch (14) of extractions.

6.0 REFERENCES


Pipette Calibration

<table>
<thead>
<tr>
<th>Volume</th>
<th>g DI</th>
<th>g DI</th>
<th>g DI</th>
<th>g DI</th>
<th>g DI</th>
<th>date</th>
<th>initials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.0 INTERPRETATION

7.1 The KCl extraction is commonly used to evaluate plant available N. Table 1 shows critical soil test values for N, for corn and wheat (Vitosh, Johnson, and Mengel, 1995).

Table 1. Mehlich3 critical soil test levels for macronutrients P, K, Ca, and Mg, for corn, soybean, wheat, and alfalfa.

<table>
<thead>
<tr>
<th></th>
<th>Corn</th>
<th>Wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAN</td>
<td>70</td>
<td>37.5</td>
</tr>
</tbody>
</table>