The Pennsylvania State University
Department of Agricultural and Biological Engineering, Water Analysis Laboratory
Testing of P-source materials for
Water Extractable Phosphorus (1:200 solid:solution ratio)

Methodology

1. To the maximum extent practicable, all analyses must be performed on representative aliquots.

2. Analyze P-source for %-solids content using standard methods. [Oven at 103-105 ^{o}C overnight.]

3. Using solids content information from step 2 above, weigh-out 0.5g *dry-weight equivalent* of P-source in a 200 or 250ml wide-mouth (screw-top) plastic bottle. [Example: For 20% solids material, a 2.5g *wet-weight* aliquot would be used.]

4. Add distilled-deionized water until the total mixture mass is 100.5g. [The resultant solids:solution ratio is 0.5g solids:100ml solution (including entrained liquid in the P-source material), or 1:200.

5. Seal bottles with screw top caps and place in a standard laboratory shaker set at 70 revolutions per minute for 60 minutes.

6. Upon completion of agitation, centrifuge sealed bottles (step 5) at 2000 rpm for 10 minutes.

7. Gravity filter centrate from step 6 using Whatman #2 filter paper. [Suggest 150mm circular filters folded and placed in simple plastic lab funnels.]

8. Place 0.5ml of 1:1 concentrated HCl in clean 25ml volumetric flasks. [This step to preserve samples at pH<2.0.]

9. Fill 25ml volumetric flasks in step 8 with filtrate (step 7) to volume, and refrigerate at 3-5 ^{o}C until analysis.

10. Analyze for P via Murphy-Riley (colorimetric) or by inductively coupled plasma emission spectroscopy (ICP).

11. Water extractable P should be expressed in percent after calculating the Standard WEP in the following way:
    - Standard WEP -- as mg of P per kg of biosolids or other P-source (dry weight).

      Percent WEP -- PWEP = (WEP ÷ P_T) × 100. [P_T = total P as mg of P per kg of biosolids or other P-source (dry weight) via acceptable method (e.g. EPA Digestion Method 3050 or 3051 and analytical Method 6010 or 6020, or Standard Method 4500-P; etc.] This equates to the amount of total phosphorus which is water extractable.

Example: Standard WEP = 1000 mg P/kg biosolids (dry weight) = 0.1% dry weight

Total P = 30000 mg P/kg biosolids (dry weight) = 3.0% dry weight

PWEP = (1000 ÷ 30000) x 100 = 3.3% This means that 3.3% of the Total P is water extractable.

Note: Please report the results on the Characteristics Report (3400-49) by writing the parameter on a blank line as follows:

Parameter Number	Parameter	Units
686	**Phosphorus, Water Extractable**	**Percent**

The sample point number, sample date, sample type, and result should also be filled in.