CCE soil processing for pH and Texture

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*Protocol:*

Mineral soil samples were air dried for multiple weeks following field collection. Each sample was then pulverized through a 10-mesh sieve (<2mm) to remove coarse woody debris and large rocks. For each soil sample, 10g +/- 1g of mineral soil were placed in a container for pH testing and 50g +/- 0.05g for texture analysis. Soil pH was measured by creating a 2:1 slurry of deionized water to mineral soil. The slurry was mixed for 20 seconds then left to sit for 30 minutes. Following this period, the soil was stirred again for 20 seconds and measured with a pH probe. Soil texture was determined using the hydrometer method (please refer to the photos below; the protocol from Michael Sloan (Forestry) and used by Anita Antoninka).

*Hydrometer Method Notes:*

* Ensure that control graduated cylinder temperature and density is measured at the 40s mark (or at the beginning of your procedure) and 2-hour mark. These are critical measurements used to control for the added Sodium Hexametaphosphate density.
* The amount shown in the materials and prep sections of the hydrometer protocol will vary depending on how many samples you do at a time. You will always have one control graduated cylinder (that can be used over many days or weeks, if covered with parafilm to protect from evaporation or contamination), but you can have as many unknown samples as you have hydrometers (this is the limiting factor).
* It is useful to label the milkshake cups and graduated cylinders to ensure there are no mix-ups.

*Particle Analysis Calculations: (from OSU Hydrometer Protocol)*

*Calculating Sand, Silt, and Clay*

1. Correct hydrometer readings for temperature:

For temperatures above 20 degrees C:

Hydrometer reading =

Measured reading g/l + [(measured

temperature – 20) x 0.36 g/l]

For temperatures below 20 degrees C:

Hydrometer reading =

Measured reading g/l – [20 –

(measured temperature) x 0.36 g/l]

To correct the hydrometer readings for temperature, add 0.36 gram/liter for every

1 degree C above 20 degrees C; subtract 0.36 gram/liter for every 1 degree C below 20

degrees C.

1. Recall sample hydrometer and temperature readings. (e.g. If hydrometer reads 35 g L-1 at 22C, the corrected hydrometer reading is 35.72 g L-1). This should be done for each sample (soil checks and blanks included) at both time intervals.
2. Calculate Silt+Clay Fraction:
3. Subtract the corrected blank hydrometer reading at 40 seconds from the corrected sample hydrometer reading at 40 seconds. This step accounts for any effect the dispersing solution may have had on the density of the solution mixture. Note: The values should be calculated using the blank ran on the corresponding day of the unknown samples.
4. Divide the value calculated in step 2a by the sample weight then multiply by 100 to determine (%) silt+clay per liter of sample mixture.
5. Calculate Clay Fraction
6. Subtract the corrected blank hydrometer reading at 2 hours from the corrected sample hydrometer reading at 2 hours.
7. Divide the value calculated in step 3a by the sample weight then multiply by 100 to determine (%) clay per liter of sample mixture.
8. Calculate Silt Fraction
   1. Subtract percent clay from percent silt+clay.
9. Calculate Sand Fraction
   1. Subtract percent silt+clay from 100.

OSU Full Protocol Link: <https://soilfertility.osu.edu/sites/soilf/files/imce/Protocols/Texture%20Protocol%20-%20OSU%20Soil%20Fertility%20Lab%20(July%202020).pdf>

If you have any questions, please do not hesitate to reach out to me (Ellie Pierce) at [elliepierce02@gmail.com](mailto:elliepierce02@gmail.com)!

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