

SOP-C-132

Preparation of Soil Samples for Analysis on SEAL AQ300

Revision 0


Approval:



Laboratory Manager

6-21-21

Date



Concurrence

21 June 2021

Date

Effective date: 6-30-21

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6-22-22 or 4-12-20 SM

Texas Institute for Applied Environmental Research

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- i. Identification of the method**
 - a. Standard Soil Methods for Long-Term Ecological Research, 1999
 - b. UC Davis, ANR Analytical Lab, 2021
- ii. Applicable matrix or matrices**
 - a. Soils and other solids (not TNI accredited)
- iii. Limits of detection and quantitation**
 - a. NA
- iv. Scope and application, including parameters to be analyzed**
 - a. The purpose of the procedure is to provide a method for the preparation of soil samples for analysis.
- v. Summary of the method**
 - a. Soil drying, physical grinding and sieving.
- vi. Definitions**
 - a. Air drying – To place a sample in an open container or area of butcher paper and leave for a period of time until dry; as opposed to oven drying.
- vii. Interferences**
 - a. Humidity when air drying
 - b. Potential contamination if mortar and pestle or sieve are not cleaned properly between samples.
 - c. Lack of removal of leaves, twigs, or other visible organic matter prior to grinding.
- viii. Safety**
 - a. Conduct activities in room with good airflow to reduce dust.
 - b. Wear gloves especially when working with anaerobic soils to reduce risks of infection.
- ix. Equipment and supplies**
 - a. Mortar and pestle -ceramic
 - b. Rolling pin – Bakery style - wooden

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- c. Sieve (US ASTM Std. No. 10 – 2.0 millimeters) – a circular metal pan with a fine mesh for the bottom, through which only fine particles will pass. Larger sieves may be used as needed for pre-filters prior to the introduction to the No. 10 sieve.
 - d. Paint brush
 - e. Butcher paper—used to place samples on while air-drying and during sieving.
 - f. Plastic bags – Ziplock™ type or equivalent
 - g. Ponar dredge
 - h. Teflon scoop
 - i. Plastic and glass bottles
 - j. Spatulas, spoons and other utensils
- x. Reagents and standards**
- a. Reagents: None
 - b. Standards: None
- xi. Sample collection, preservation, shipment and storage**
- a. See C-162, “Analysis of Soil Phosphorus by Mehlich 3 Extraction,” for sample collection methods using Ponar dredge or Teflon scoop for sediment sample collection or hammer. probe for upland soil collection. Field samples should be collected in plastic bottles or glass jars.
 - b. Samples may be refrigerated to $>0\text{-}\leq 6^{\circ}\text{C}$ until drying.
 - c. Samples are not normally collected or shipped by the lab.
 - d. Holding Times are generally 180 days
- xii. Quality control**
- a. All aspects of this procedure comply with QAM-Q-101, “Laboratory Quality Control”.
 - b. Duplicate samples shall be created when the samples are weighed out for extraction purposes.
 - c. Subsamples taken from original containers shall be representative of the entire sample by mixing, stirring or otherwise homogenizing the original sample. Subsample aliquots shall be uniquely labeled with an identifier in addition to the sample number.

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xiii. Calibration and standardization

a. NA

xiv. Procedure

- a. Upon sample receipt, verify that sample containers are properly sealed to avoid spillage and that excess moisture or condensation is not present on the sample container.
- b. Wet samples should be processed as soon as possible to avoid biological degradation.
- c. Sticks, leaves, organisms, or other materials should be physically removed from the sample if the client does not wish them to be considered part of the sample.
- d. Solid and semi-solid samples should be stirred or otherwise mixed to obtain representative sample, especially if the entire sample is not dried.
- e. Spatulas, spoons, and other utensils should be used to obtain representative portions from different sections of the original container prior to transfer to butcher paper for drying, especially if the entire sample is not dried.
- f. Air drying of the samples.
 - i. Lay out butcher paper on the shelves designated for soil drying.
 - ii. Pour or use a clean spatula to transfer each sample onto a discrete location on the butcher paper.
 - iii. Label each sample with the appropriate sample number immediately after laying out the sample.
 - iv. Allow the samples to air dry for 24 - 48 hours, or until dry. A longer time may be required if the samples were damp when collected, or the humidity in the drying room is high.
- g. Grinding and sieving the samples
 - i. Pour a small amount of a sample, about 0.5 L, onto a clean sheet of butcher paper. Use a clean rolling pin to initially grind the sample.
 - ii. Pick up the butcher paper with the ground soil sample and forming a spout, transfer the ground soil into the

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No. 10 sieve, which is placed on a clean sheet of butcher paper.

- iii. Shake the No. 10 sieve over the butcher paper to sieve the soil through the sieve.
 - iv. Transfer the sieved soil into a plastic bag that is labeled with the appropriate sample number, date of sampling, and analyst.
 - v. Transfer the soil that did not pass through the sieve into a mortar and grind with the pestle.
 - vi. Pour the ground soil from the mortar into the No. 10 sieve, which is placed on a clean sheet of butcher paper.
 - vii. Shake the No. 10 sieve over the butcher paper to sieve the soil through the sieve.
 - viii. Transfer the sieved soil into the labeled plastic bag from step xiv.g.iv.
 - ix. Repeat steps xiv.g.v through xiv.g.viii until sufficient soil for analyses has been ground, sieved, and collected in the labeled plastic bag.
 - x. Retain excess sample for possible later use.
- h. Cleaning equipment between samples
- i. Using clean, moist paper towels, wipe down the mortar, pestle and rolling pin to remove soil from the prior sample. Use clean, dry paper towels to dry these items prior to working with the next sample.
 - ii. Use the paint brush to brush any remaining soil particles from the No 10 sieve.
 - iii. Discard the butcher paper from the prior sampling and replace with new sheets of butcher paper for the next sample.

xv. Data analysis and calculations

- a. NA

xvi. Method performance

- a. NA

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xvii. Pollution prevention

- a. Pollution prevention: refer to QAM-W-101, "Disposal of Laboratory Waste"

xviii. Data assessment and acceptance criteria for quality control measures

- a. Data assessment and acceptance: refer to QAM-Q-101, "Laboratory Quality Control"

xix. Corrective actions for out-of-control data

- a. Corrective action: refer to QAM-Q-105, "Corrective Actions"

xx. Contingencies for handling out-of-control or unacceptable data

- a. Refer to QAM-Q-101, "Laboratory Quality Control" and QAM-Q-105, "Corrective Actions."

xxi. Waste management

- a. Waste management: refer to QAM-W-101, "Disposal of Laboratory Waste". No hazardous waste is expected to be generated from this procedure unless from samples.

xxii. References

- a. The National Environmental Laboratory Accreditation Conference Institute (NELAP) standard, 2016.
- b. ANR Analytical Lab Sampling and Preparation, Regents of the University of California, Division of Agriculture and Natural Resources, UC Davis, 2021.
- c. Standard Soil Methods for Long-term Ecological Research, Soil sampling, preparation, archiving, and quality control. Boone, et. al. 1999.

xxiii. Any tables, diagrams, flowcharts and validation data

- a. none