

## Soil sieving

### Background

Sieving is a key step in sample preparation that conditions the quality of subsequent analyses. Soil analyses are traditionally performed on the fine earth (< 2mm) fraction, since coarse fragments (> 2 mm) are considered unreactive due to their small specific surface area. Even though this view is sometimes called into question (see for instance Ugolini et al., 1996), sieving to 2 mm remains accepted practice prior to chemical characterization. Removal of coarse fragments has the benefit of homogenizing the sample and allowing aliquots as small as 1 g or lower to remain fairly consistent and representative of the sample.

Common difficulties during sieving include:

- The necessity to break up hardened aggregates, without abrading primary particles and thus changing the sample's particle size distribution;
- Avoiding loss of material (spilling or dust during shaking);
- Avoiding contamination or cross-contamination;
- Maintaining careful records (weights of fine earths, coarse fragments and roots);
- Ensuring that samples are correctly labelled and stored. Work carefully and maintain a log of your activities in a dedicated notebook.

### Safety/ Protective equipment



\* dust mask (recommended to prevent soil inhalation)

### Procedure

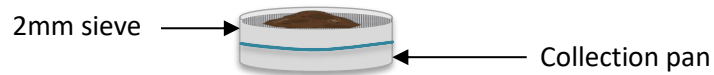
1. Start with dry samples. Thoroughly air-dried or oven-dried samples (45°C to 105°C) are acceptable.

Moist samples will clog the sieve unless very sandy.

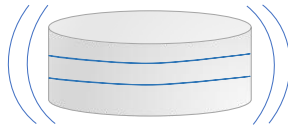
2. Tare a bucket and record the starting weight of the sample in your notebook.



3. Pour the sample onto a 2mm sieve fitted with a collection pan. Don't overload the sieve (work in batches of ~ 200g).



4. Fit the lid and shake the sieve a few times.



5. Wait for a few seconds to remove the lid so that silts have the time to settle.
6. Check the material remaining in the sieve. Pick out obvious, clean stones and place in the coarse fragments storage cup.
7. Pour the rest of the material remaining in the sieve in a ceramic mortar.



8. Tap large clods with the pestle and gently grind the sample to destroy macro-aggregates.
9. As soon as fine material appears, pour the sample back onto the sieve to remove the fine earths.  
Do not keep grinding once fine material appears as this will lead to particle comminution.
10. Repeat steps 4 to 9 until all macro-aggregates are destroyed and only clean, coarse fragments remain on the sieve (two to eight times).
11. Tare a storage cup and fill with the fine earths. Record the weight.
12. Do the same thing for coarse fragments and any large roots.
13. Carefully label all containers (sample name on cups and lids; date, name and project on secondary container).
14. Carefully clean the sieve, pan and lid as well as mortar and pestle with a small brush. Gently dislodge small gravels from the sieve by pushing with a spatula.
15. Wipe all equipment with ethanol before moving on to next sample.
16. At the end of the day, thoroughly clean all equipment. Soak, scrub with soap in warm water and rinse abundantly. Clean counters and vacuum the floor.

## References

Ugolini FC, Corti G, Agnelli A, Piccardi F (1996) Mineralogical, physical, and chemical properties of rock fragments in soil. *Soil Science* 161(8): 521-542