# Soil Slaking

**Background**

- What is soil slaking?
  - **Slaking** is the breakdown of large, air-dry soil **aggregates** (>2-5 mm) into smaller sized micro-aggregates (<0.25 mm) when they are suddenly immersed in water. Slaking occurs when aggregates are not strong enough to withstand internal stresses caused by rapid water uptake. Internal stresses result from differential swelling of clay particles, trapped and escaping air in soil pores, rapid release of heat during wetting, and the mechanical action of moving water.
  - In contrast to slaking, tests for aggregate stability measure how well soil withstands external destructive forces, such as the splashing impact of raindrops.
- Why is understanding slaking important?
  - Slaking indicates the stability of soil aggregates, resistance to erosion and suggests how well soil can maintain its structure to provide water and air for plants and soil biota when it is rapidly wetted.
- What practices can potentially cause slaking?
  - Conventional tillage methods that disturb soil and accelerate organic matter decomposition,
  - Burning, harvesting or otherwise removing crop residues, and
  - Using pesticides harmful to soil organisms that cycle organic matter and promote aggregation.
- What are the impacts of soil slaking?
  - Slaked soil particles block soil pores, form a soil crust, reduce infiltration and water movement through soil, and increase runoff and erosion.
  - Small aggregates produced by slaking settle together resulting in smaller pore spaces than where present with larger aggregates.
  - Pore volume may be reduced and the ability of plants to use water stored in pore spaces may be altered.
  - Limited slaking suggests that organic matter is present in soil to help bind soil particles and micro-aggregates into larger, stable aggregates.
- What are some ways to prevent slaking?
  - Conservation tillage systems, such as no-till, reduce slaking by reducing soil disturbing activities that break aggregates apart and accelerate decomposition of organic matter.
  - No-till and residue management lead to increased soil organic matter and improved aggregate stability and soil structure, particularly when cover crops or sod-based rotations provide an additional source of residue.

**Supplies**

- Two tall glass jars
- Two strips wire mesh
- Water
- Two different soil samples

**Instructions**

1. Take a strip of wire mesh and create a cradle in the jar
2. Repeat for the other jar
3. Fill the jars ¾ full with water
4. At the same time place the two soil samples on in each jar resting on the cradle
5. Observe and answer questions on the *Observation Questions* worksheet

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# Observation Questions

1. What do you notice about each sample?

2. What color is the water in each jar? Why is this?

3. What other factors affect how much slaking happens?

4. Which sample would represent healthy soil? Why?

5. Which sample would represent unhealthy soil? Why?