

Slakes: A Free Smartphone App to Measure Aggregate Stability

Now Available in Google Play and the App Store.



The Slakes app uses image analysis to measure the ability of dry soil aggregates to resist dispersion once rewetted. Weaker aggregates will slake (or break apart) more easily, while stronger aggregates will slake less, indicating better soil aggregation and healthier soil.

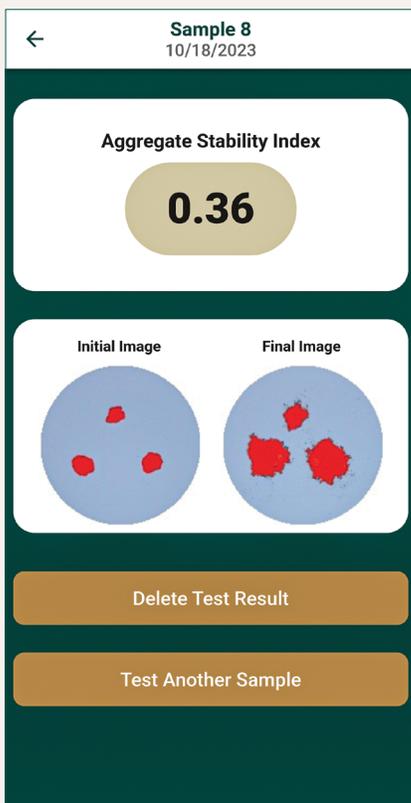


Figure 1. Screenshot of aggregate stability test results in the Slakes app.

Introduction

Aggregate stability is one of the most common indicators of soil health. Soils with greater aggregate stability are more resistant to wind and water erosion, and are linked to improved water capture, infiltration, and storage. The Soil Health Institute (SHI) recommends measuring aggregate stability using the Slakes app as part of a minimum suite of measurements to assess management induced changes in soil health.

The Slakes app uses a smartphone camera to take a picture of three dry soil aggregates before and after exposing them to water for 10 minutes. The app then automatically calculates an aggregate stability value.

Materials Needed:

Android or iOS Smartphone



3 Soil Aggregates



2 Clear Plastic Dishes



(Petri Dishes Recommended)

Tap Water



Smartphone Mount



(Tripod or 4-6" Can or Jar)

Analyzing Aggregate Stability with the Slakes App

- 1 Collect and Dry Aggregates:** Remove an intact clod from the top 2 inches of the soil, gently break apart into pea-sized aggregates, and dry overnight.
- 2 Set-up:** Mount smart phone approximately 4 - 6 inches above empty clear plastic dish, select 3 aggregates and place in dish. Fill the second dish with water.
- 3 Start Test:** Tap 'Start Aggregate Stability Test' to enter sample ID and capture initial image of dry soil in dish. Move the second dish filled with water into camera view, gently transfer aggregates to the water filled dish, and take pic to start test.
- 4 Complete Test and Receive Results:** After ten minutes, the app will automatically capture the final image and display the aggregate stability index value for the sample.
- 5 Export & Interpret Data:** On the My Results Tab, tap 'Export Test Results'. Upload results to a computer, add management and location data, and track changes in aggregate stability index values.

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Collecting Soil Aggregates for the Slakes App



Use a soil knife or shovel to remove an intact clod from the surface 2 inches of soil (Figure 2).

By hand, gently break apart the clod into pea-sized aggregates with diameters ranging from 0.125 to 0.375 inches.

Avoid collecting any aggregates that were smeared when inserting the soil knife or shovel into the ground.

Place the aggregates in a paper bag or on a flat surface to dry overnight.

Figure 2. Intact soil clod containing well-formed aggregates.

Interpreting Slakes App Results

To evaluate changes in aggregate stability over time, sampling should occur within a similar agronomic time window each year. Management comparisons should only be made if samples were collected during similar time windows and from similar soil types within a growing region. SHI recommends collecting multiple knife slices from different parts of a management zone, running a few tests, and averaging the results. Averaged aggregate stability index values for different management zones can then be compared (Figure 3).



Figure 3. Slakes app results from neighboring fields with and without cover crops can be compared to assess the impact of management practices on soil health.

To learn more about Slakes and download the app, scan here.



For more information on SHI's recommended measurements to scale soil health assessment, scan here.



Aggregate stability index values can be compared across management practices to measure improvements in soil health. Soils with greater aggregate stability are more resistant to wind and water erosion, and are linked to improved water capture, infiltration, and storage.

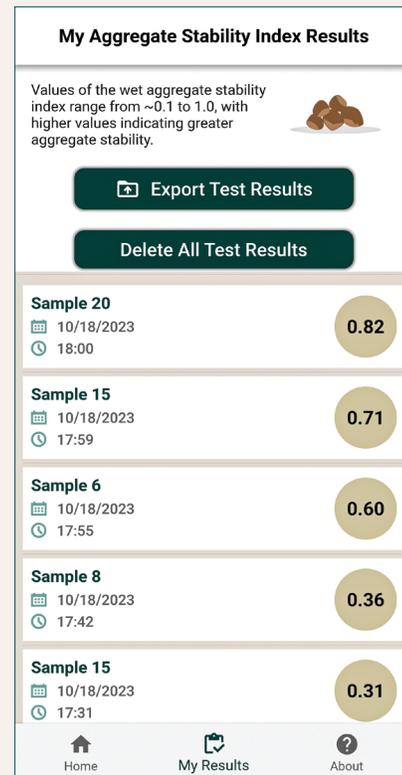


Figure 4. Screenshot of 'My Results' Tab in the Slakes app. Results from each test are stored within the app and can be exported to .csv files by tapping 'Export Test Results'.