

Slakes: A soil aggregate stability test in your pocket

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We have developed a new methodology for the assessment of soil slaking that will be available as a smart phone application (app) so farmers can carry this soil test in their pocket. To do this we have developed an image recognition algorithm that measures the projected area of soil aggregates immersed in water at regular intervals. Our results show that the kinetics of the slaking process can be effectively modeled using a three coefficients model (a, b and c), which are closely related to selected soil properties and land-use. Coefficient a, is equivalent to the maximum slaking potential of the samples, and is found to be linearly related to exchangeable sodium, pH, clay percentage, calcium/magnesium and total carbon/nitrogen, and non-linearly related to total carbon. The coefficients b and c reflect the initial slaking and the slaking rate respectively, they were found to be linearly related to nitrogen and total carbon. The coefficient a, was significantly lower in the undisturbed natural sites reflecting a higher aggregate stability in those soils. The methodology was originally tested in a dataset covering a great part of the agro-ecological variability of New South Wales (NSW), Australia (Fajardo et al., 2016).

Having observed the potential of the methodology we are developing a simple smart phone application that is capable to measure the projected area of soil aggregates immersed in water in time, fit a model and return coefficients that can be finally used as a soil aggregate stability indicator. We are putting soil tests into farmers pockets.

Fajardo, M., McBratney, A.B., Field, D.J., Minasny, B., 2016. Soil slaking assessment using image recognition. *Soil and Tillage Research* 163, 119-129.