

## Soil Quality: An In-field Test for Active Carbon in Soils



Soil quality is the ability of a soil to perform various functions to support biological activity and diversity for plant and animal productivity, to regulate water flow and storage, and to provide an environmental buffer to mitigate effects of hazardous compounds. The need for an effective, low cost method to evaluate soil quality is important to give farmers an immediate assessment of the effects of soil and crop management practices. Soil organic carbon (SOC) or soil organic matter is an important indicator of soil quality due to its effects on many soil properties and plant growth factors. We now know that SOC is composed of several fractions including labile or active C that is responsible for much of the biological activity in soil and has the greatest influence on soil quality. A laboratory method that selectively extracts active C is based on reacting soil with potassium permanganate (KMnO<sub>4</sub>).

*To help farmers rapidly assess soil quality on the farm, we are developing an easy-to-use in-field soil C test kit.* Soils collected from fields are mixed with KMnO<sub>4</sub> reagent (above L); after allowing to sit for a short reaction time, the suspension may be measured using a field spectrophotometer (above, Center) or by quick reference by comparison to a field color chart (above R). Preliminary testing reveals that the kit readily differentiates soils with a range of SOC and management practices thereby indicating relative soil quality. The outcome of this work will be a rapid and inexpensive kit for testing soil quality on the farm. Such information readily acquired by the farmer will allow rapid assessment of management effects on soil quality and for timely decisions necessary for adjustment of management practices to further improve soil quality and minimize soil and environmental degradation.

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