

Comparison of Mid-Infrared, Near-Infrared and Dry Combustion for the Determination of Soil Organic- and Inorganic- C. (S05-reeves133631-Oral)

Authors:

- J.B.Reeves, III* - *AMBL, ANRI, USDA, Beltsville, MD*
- G.W.McCarty - *EQL, ANRI, USDA, Beltsville, MD*
- V.B.Reeves - *CVM, FDA, Beltsville, MD*
- R.F.Follett - *SPNRU, Fort Collins, CO*
- J.M.Kimble - *NSSL, NRCS, Lincoln, NE*

Abstract:

The determination of soil carbon is an important aspect of studies ranging from soil chemistry to C sequestration and global warming. Traditional methods vary from chemical oxidation which has inherent accuracy problems to combustion which while highly accurate is expensive and time consuming. Also, combustion requires two determinations (one after acidification of the soil to remove carbonates) in order to determine both organic and inorganic C. With the increasing need to analyze thousands or perhaps even hundreds of thousand of soil samples in C sequestration determinations, accurate and rapid methods of determining both organic and inorganic C in soils are urgently needed. Studies using both near- and mid-infrared diffuse reflectance spectroscopy have demonstrated that both methods can accurately, rapidly and simultaneously determine organic and inorganic C in soils. However, there are factors which need to be considered before one method is chosen for building the soil databases needed for C sequestration. Thus, while the mid-infrared produces more accurate calibrations with fewer outlier problems, the instrumentation is not nearly as advanced with respect to sample handling. For example, in the near-infrared one can chose from large sample cells, rotating sample cells or fiber optic probes. However, in the mid-infrared one is limited to non-rotating sample cells in which only a sample area with a diameter of 2 mm is scanned, thus resulting in greater problems with sample heterogeneity, etc.

Corresponding Author Information:

James B. Reeves, III phone: 301-504-8294
US Department of fax: 301-504-8162
Agriculture e-mail:
Bldg 306, Room 101, JREEVES@ANRI.BARC.USDA.GOV
BARC East
Beltsville, MD 20705

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