

ABSTRACT

Soil quality can be briefly defined as how well a soil is able to function within an ecosystem. One way to assess soil quality is to use a quantitative method such as the United States Department of Agriculture-Agricultural Research Service (USDA-ARS) Soil Quality Test Kit. The kit measures various biological, physical, and chemical indicators but does not include a test for determining soil organic matter. The objectives of this study were to test two field methods for determining soil organic matter using soils from 41 sites across Alberta and to compare to measured soil organic matter and light fraction carbon obtained through conventional laboratory analyses. The first field method determines active carbon utilizing a deep purple solution of potassium permanganate, which is reduced to a lighter color when it reacts with soil organic carbon. This color change is quantitatively measured using a colorimeter. The second field method visually estimates soil organic matter and involves a solution of Basic Ethylenedinitro Tetraacetic Acid. The color of this solution is dependent upon the amount of soil organic matter in each sample. Results indicate that the method for determining active carbon showed a strong relationship between measured soil organic matter and active carbon ($R^2=0.82$), but a weak relationship between light fraction carbon and active carbon ($R^2=0.18$). A relationship was found between the visually estimated soil organic matter values and conventional laboratory results ($R^2=0.67$). Based on our findings both methods have the potential to become an integral part of the USDA-ARS Soil Quality Test Kit for measuring soil organic matter in Alberta.