THE EFFECT OF ORGANIC MATTER UPON SEVERAL PHYSICAL PROPERTIES OF SOILS

L. D. BAVER

Organic matter constitutes a portion of the colloidal content of surface soils. Since colloidal material is responsible for most of the physico-chemical phenomena observed in soils, it is evident that organic matter plays an important rôle in the physical properties of surface soils.

The absorptive capacity of soils for cations is increased considerably by the presence of organic matter. Kerr (3) found that the absorptive capacity due to organic matter varied from 7% to 28% in the three soils that he studied. It has been observed that organic matter has a decided effect on the plasticity of soils as measured by the Atterberg plasticity constants (5). Burr and Russell (1) found that depletion of the organic content of the soil lowered the scouring point, decreased the plastic range, and increased the toughness and solidity. Addition of organic material increased the stability of the soil granules and increased porosity. Robinson (4) maintains that a mechanical analysis of a soil containing much organic matter does not give a true indication as to the prime particle structure of the soil. He advocates oxidation of the organic matter by a H₂O₂ treatment in order to secure correct results.

It is the purpose of this paper to report the results of a study of the relation of organic matter to the absorptive capacity for cations, water absorption, plasticity constants, and mechanical analyses of soils.

EXPERIMENTAL

Four soils with widely different physical characteristics were chosen for this study. The soils were air-dried and crushed to pass a 2-mm screen. Four hundred grams of each of these soils were oxidized by a H₂O₂ treatment. This was accomplished by placing 50 grams of soil and 150 cc of a 3% solution of H₂O₂ in a 1-liter beaker on a water bath at a temperature of 55° C. The soil suspension was frequently stirred in order to hasten the oxidation. When frothing and the