BEFORE beginning a study of the relation of oxidation-reduction (redox) potentials of soils to plant growth and to various chemical and biological processes of the soil, it was deemed advisable to investigate existing methods of determining the redox potentials (Eh) of soils. Preliminary studies soon revealed that none of the existing methods adequately fulfilled the requirements which were believed necessary for the type of investigation contemplated. Methods, to be satisfactory for collecting, preserving, and analyzing samples of soil for redox studies, should (a) inhibit bacterial action so as to prevent reduction within the sample after removing it from the field; (b) prevent oxidation of reduced compounds existing in the soil; (c) refrain from appreciably dissolving substances existing as solid matter in the soil; (d) and result in the redox potential obtained being the same as that existing in the soil in its natural state, or be comparable to it so that one soil can be compared with another.

The investigation reported herein was conducted for the purpose of developing a satisfactory method for determining soil redox potentials.

METHOD OF PRESERVING SAMPLES OF SOIL

Soil-water suspensions containing easily decomposable organic matter will be reduced materially if allowed to stand more than 24 hours at temperatures of 80° to 90° F. Conversely, soil-water suspensions containing easily oxidizable substances will become oxidized appreciably in a few minutes if exposed to atmospheric oxygen, especially if agitated. A number of workers (1, 2, 8, 9, 10, 12) suspended soils in 0.1 N H$_2$SO$_4$ and thereby prevented bacterial reduction, but only two, Kohnke (8) and Willis (14), considered the expulsion of air with nitrogen gas a necessary procedure for the prevention of oxidation during analysis. On the other hand, a few investigators disregarded the possibility of oxidation or reduction of the soil during analyses (3, 5, 6, 7, 11, 13).

Since the type of investigation contemplated at this Station involved the collecting of samples from remote locations in the state, thus making it impossible to determine their redox potentials for at least 72 to 96 hours, a method had to be perfected which would prevent oxidation or reduction of samples of soil during transit and storage.

Oxidation of the soils during transit and in storage was inhibited by submerging them in oxygen-free water and corking tightly with paraffined corks.

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1Contribution from the Department of Agronomy and Soils, Alabama Agricultural Experiment Station, Auburn, Ala. Published with the approval of the Director. Received for publication January 7, 1939.

2Soil Chemist.

3Reference by figures in parenthesis is to "Literature Cited", p. 351.