RAPID CHEMICAL METHODS FOR THE ESTIMATION OF
THE CAPACITY OF THE SOIL TO SUPPLY PHOSPHORIC
ACID TO PLANTS

G. S. Fraps and J. F. Fudge

Methods for estimating the capacity of soils to supply phosphoric acid to crops are of considerable agricultural importance. The 0.2 N nitric acid method has been studied thoroughly in this laboratory (3, 4, 5), and the results compared with pot experiments with favorable results on many of the soils of this state. Recently, the "Hi-lo-fosfate" method (1) and the Truog-LaMotte method have been proposed for use in field work for the rapid estimation of so-called available phosphoric acid in the soil. Truog (7) and Nemec, et al. (6) have proposed rapid laboratory methods. It was considered desirable to compare these methods with respect to ease of manipulation, concordance of the results on the same samples, and the relative quantities of phosphoric acid removed from soils by each. If they remove different quantities of phosphoric acid from the same soils, the interpretation of the results must vary with the method. As samples of soils tested by means of pot experiments were available, it was considered desirable also to compare the results by the various methods with the results of the pot experiments, as had been done with 0.2 N nitric acid method. Since previous work had shown the 0.2 N nitric acid method to be preferable to most of those tested, it seemed desirable to devise a rapid colorimetric method which would give similar results.

The method of Nemec is based upon the 1% citric acid used extensively in Germany and interpreted by the standards used there. The interpretation of the Hi-lo-fosfate method is based upon field observations, but data supporting the interpretation of the Truog method and of the Truog-LaMotte method have not been presented.

DESCRIPTION OF METHODS

HI-LO-FOSFATE FIELD METHOD

Some of the soil is placed in a test tube. The reagent, consisting of hydrochloric acid containing ammonium molybdate, is added. The color is developed by stirring with a tin rod and compared with the color chart.

COLORIMETRIC TRUOG LABORATORY METHOD

Two grams of soil are shaken for 30 minutes with 400 cc of 0.002 N sulfuric acid buffered with 3 grams of ammonium sulfate per liter.

1Contribution from the Division of Chemistry, Texas Agricultural Experiment Station, College Station, Texas. Technical paper No. 206 of the Texas Agricultural Experiment Station. Also presented before American Chemical Society, New Orleans, La., March 30, 1932. Received for publication July 22, 1932.

2Chief of Division and Chemist, respectively.

3Reference by number is to "Literature Cited," p. 229.