

THE OXIDATION OF ORGANIC MATTER AND THE DECOMPOSITION OF AMMONIUM SALTS BY AQUA REGIA, IN LIEU OF IGNITION, IN THE DETERMINATION OF POTASH IN FERTILIZERS.

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IN the determination of potash in fertilizers errors may arise, by reason of a loss of potash, when the residue obtained upon evaporation is ignited to destroy organic matter and to drive off salts of ammonium. Such loss may easily occur, either by spattering or a mechanical carrying off of potassium sulphate by the voluminous fumes of sulphuric acid used in the Lindo-Gladding method. In the alternate method, a loss of potash may occur by reason of direct volatilization. Extreme care must be exercised in the ignition, both in the Lindo-Gladding, and in the alternate method, in order to obtain accurate results.

In order to avoid the errors which might arise from such ignition, and, in fact, to do away with the necessity for any ignition whatever, I tried the action of aqua regia. J. Lawrence Smith has shown that salts of ammonium are readily destroyed by aqua regia, and it is well known that organic matter is oxidized thereby. I found, upon evaporating a solution of a mixed fertilizer, prepared as in the Lindo-Gladding method, with nitric and hydrochloric acids, that the salts of ammonium were completely destroyed, and that the organic matter was either entirely destroyed, or else so highly oxidized that it no longer exercised a reducing action upon platinum chloride.

By preparing a suitable solution of a fertilizer and evaporating an aliquot portion of this solution with aqua regia, we ought, therefore, to obtain a residue quite as well adapted to the determination of potash by platinum chloride as a residue obtained by evaporation and ignition.

The *details* of a method for the determination of potash in fertilizers, based upon this principle, have not yet been thoroughly worked out. Some excellent results have been obtained and

some results which were not so good, but, on the whole, the method is quite promising and will be the subject of further study by me, which I trust may result in a somewhat more accurate and more convenient method than those now in general use.

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ON CERTAIN PHENOMENA OBSERVED IN THE PRECIPITATION OF ANTIMONY FROM SOLUTIONS OF POTASSIUM ANTIMONYL TARTRATE.

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I HAVE elsewhere called attention to the behavior of solutions of tartar emetic when treated with solutions of other salts, (see *Am. Jour. Sci. and Arts*, October, 1889 and October, 1890) and with Mr. H. E. Sauer have determined the conditions of precipitation by carbonates, acetates, and phosphates. (*J. Anal. Appl. Chem.*, March, 1891.)

When to solutions of the antimony salt sulphates, chlorides, nitrates, and oxalates of the alkali metals are added no precipitation occurs, even with elevation of temperature. With carbonates, acetates, phosphates, borates, thiosulphates, sulphites, tungstates, and some other compounds, clear solutions can be made at a low temperature, but precipitation follows at a higher point. The precipitate, in nearly all cases, consists of hydrated antimony oxide, and its amount is a function of time, temperature, and amount of added salt.

With mixtures of the tartrate and sodium carbonate, for instance, it was found that in the cold, at the end of twenty-four hours, amounts were precipitated as shown in the following table. In each test five grams of the tartrate were dissolved in sixty cc. of warm water and cooled to 20°. Then different weights of pure sodium carbonate were dissolved in thirty-five cc. of water; these solutions were added to the others and the mixtures were brought up to 100 cc. They were allowed to stand until precipitation was complete, usually over night or longer. An aliquot part of the clear supernatant liquid was