

Agricultural

Determination of Plant Ash Constituents in the Presence of Silica.

J. Davidson. (*J. Assoc. Off. Agric. Chem.*, 1931, **14**, 551–558.)—Wheat and rice straws, grown with and without fertilisers, have been analysed for total and acid-soluble ash, silica, phosphorus, potassium, calcium, magnesium, iron and aluminium, and manganese. When the ash of the straw was dissolved in dilute hydrochloric acid, without previous volatilisation of silica, the results of analysis were too low in every case. Digestion of the acid-insoluble residue with hydrofluoric and sulphuric acids to expel the silica, with subsequent re-resolution in dilute hydrochloric acid, yielded additional quantities of the ash constituents. When the

ash was digested directly with hydrofluoric and sulphuric acids, and then dissolved in dilute hydrochloric acid, the results agreed with the sum of the respective results obtained from the solutions of the ash and the insoluble residue after digestion with hydrofluoric and sulphuric acids, except for the acid-soluble ash and silica. The exception in these cases is due to the conversion of the bases into sulphates, rendering the results for acid-soluble ash too high and those for silica too low.

Volatilisation of silica, or possibly some other procedure to prevent retention of bases by the acid-insoluble residue, is essential for the proper analysis of ash constituents of plant substances rich in silica. It is recommended that the acid-soluble ash in plant substances rich in silica be determined, as well as the total ash, when analyses of the ash constituents are omitted.

The mechanism by which a soluble portion of ash constituents is held in the acid-insoluble residue cannot be determined from the data at hand. The fact that the variations in silica content have no effect on the magnitude of the retention does not point to adsorption. On the other hand, the fact that retention tends to increase with the concentration of the acid-soluble ash constituents, is in agreement with adsorption phenomena.

T. H. P.

Colorimetric Methods for the Determination of Manganese in Plant Materials. J. Davidson and R. G. Capen. (*J. Assoc. Off. Agric. Chem.*, 1931, 14, 547–551.)—Determinations of manganese in plant materials and inorganic manganese compounds have been made by the potassium periodate (*cf.* Davidson and Capen, *J. Assoc. Off. Agric. Chem.*, 1929, 12, 310), ammonium persulphate (*cf.* Newcomb and Sankaran, *ANALYST*, 1929, 54, 348), and sodium bismuthate (*cf.* Gortner and Rost, *J. Ind. Eng. Chem.*, 1912, 6, 522) colorimetric methods, and by the gravimetric method. The first two of these methods are equally suitable for plant materials, but the sodium bismuthate method gives appreciably lower results. Ammonium persulphate is much cheaper than potassium periodate, but, when the plant materials contain an appreciable quantity of chlorides, the ash must be ignited with sulphuric acid to expel the chlorine if the persulphate method is to be used, whereas chlorides (as distinguished from hydrochloric acid) do not interfere with the periodate method. The gravimetric method is found to be inaccurate for determining manganese in plant materials.

T. H. P.