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A Modification of Bettendorff's Arsenic Test and a Quantitative Determination from Small Concentrations of Mercury

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THE EFFECTS OF POTASH AND CROP RESIDUES ON AVAILABLE POTASSIUM IN SOME ALKALI SOILS OF IOWA

HARTZELL C. DEAN AND F. B. SMITH

Many investigators have found that high-lime soils may often be deficient in available potassium. According to the present theory, the low availability of the potassium in such soils is probably due to the high concentrations of calcium salts. The "so-called" alkali soils of Iowa have been found to contain high concentrations of both calcium carbonate and calcium bicarbonate. Apparently the concentrations of these salts are so high that they tend to depress the availability of the potassium in the soil.

Greenhouse and laboratory experiments were made to determine the effects of various treatments on the availability of potassium in two so-called alkali soils. The original soils were found to be very low in available potassium. All of the treatments, potassium chloride, straw, and sweet clover, increased the available potassium in both of the soils. Potassium chloride gave the greatest increase while straw and sweet clover showed approximately the same effect. Apparently, some of the potassium that was applied in the various treatments entered the exchange complex, probably replacing part of the calcium that was previously present.

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A MODIFICATION OF BETTENDORFF'S ARSENIC TEST AND A QUANTITATIVE DETERMINATION FOR SMALL CONCENTRATIONS OF MERCURY

W. BERNARD KING AND F. E. BROWN

The presence of mercuric chloride affects Bettendorff's test for arsenic. The addition of enough mercuric chloride to make its concentration 0.00001 M., before the addition of stannous chloride: (1) hastens the appearance of the coloration, (2) increases the sensitivity of Bettendorff's test ten fold to one hundred fold and (3) enables the test to be made in a lower concentration of hydrochloric acid. Mercuric chloride in 0.00001 M. solutions does not produce turbidity when stannous chloride is added. In the presence

of mercuric chloride Bettendorff's test will detect a smaller quantity of arsenic than Gutzeit's test or Marsh's test. The rate of formation of the colloidal arsenic is a function of the concentration of mercuric chloride. Because of this unknown, concentrations of mercuric chloride as small as 0.00000002 M. may be determined by comparing the rate of appearance of color in the unknown solutions with the rate of appearance in the presence of known concentrations of mercuric chloride.

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THE SALT EFFECT OF CERTAIN INDICATORS IN SLIGHTLY BUFFERED SOLUTIONS

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The change in the colorimetric pH with changes in salt concentration is determined with reference to the quinhydrone electrode. The salts used caused a more alkaline reading with the quinhydrone electrode and a more acid reading with the colorimetric method. The effect is much more pronounced in the lower concentrations. The "colorimetric pH" does not change appreciably in concentrations from about 1 molar to saturation.

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SOME REACTIONS IN LIQUID SULFUR DIOXIDE

JACOB CORNOG AND VERNON A. LAMB

Experiments by the authors support the following observations.

1. Reactions in liquid sulfur dioxide are usually solvolytic in the sense that the solvent participates in the reactions.

2. Liquid sulfur dioxide under atmospheric pressure does not appreciably react with chlorine save in the presence of a catalyst.

3. Thionyl chloride and sodium sulfite do not react as indicated in the following equation.

$$SOCl_2 + Na_2SO_3 = NaCl + 2\,SO_2$$