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ANALYSIS OF ORGANIC SILVER COMPOUNDS.

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It is not always an easy procedure to determine the metallic part of a substance when the latter is in organic combination or associated with a large amount of organic matter. When the element is easily reduced to the metallic state the simplest method is to burn the substance. When the element forms volatile compounds on ignition, a more complicated procedure is required.

In order to have a method applicable to both classes of elements the author, several years ago, adopted and modified the Lehman method,[1] which was originally used for the determination of arsenic in arsphenamine. This method is of special interest to pharmaceutical chemists, for the analysis of Argentum Proteinicum Mite and Fortior. The latter is a true silver protein salt (of acids similar to protalbinic and lysalbinic acids) dissolved in excess of the same protein substance, while the former is true *colloidal* silver with a protective colloid.

The method has the following advantages:

1. In the case of a volumetric determination, the analysis is finished in the same Erlenmeyer flask in which it is started.
2. A light-colored solution is always obtained for titration.
3. There are no interfering elements to be removed when finishing the assay gravimetrically.

Method for Argentum Proteinicum Mite and Fortior:

Weigh a one-Gm. sample into a 300-ml. Erlenmeyer flask; dissolve in 10 mls. of water and add 10 mls. of concentrated H_2SO_4; cover the neck of the flask with a small watch glass. Begin to add, immediately, small portions of finely powdered $KMnO_4$. Keep the solution hot. The addition of $KMnO_4$ is discontinued when a deep red solution is obtained; the red color remains for more than five minutes. About two Gm. of $KMnO_4$ are required.

Heat the solution to boiling, wash down the sides of the flask and add finely powdered oxalic acid until the red color disappears, and the oxides of manganese are dissolved. Quite often, the last traces of these oxides are not dissolved until the solution is boiled; an excess of oxalic acid is to be avoided. Again heat solution, and boil for a few minutes; add 5 mls. concentrated nitric acid, and heat on steam-bath for 15 minutes. Cool the flask and contents, and add 50 mls. of water, and 2 mls. of 10% solution of ferric alum. Titrate with $N/10$ potassium thiocyanate V. S., to the regular end-point.

The number of mls. of $N/10$ potassium thiocyanate V. S. used multiplied by 1.08 and divided by weight of sample equals the per cent of silver.

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[1] Lehman, "Ueber die Bestimmung des Arsens in Salvarsen und Neo-Salvarsen," *Apoth. Ztg.*, 27, 545 (1912).