U. S. Department of Commerce
Frederick B. Dent
Secretary

National Bureau of Standards
Richard W. Roberts, Director

National Bureau of Standards
Certificate of Analysis
Standard Reference Material 919
Sodium Chloride
(Clinical Standard)

This Standard Reference Material is certified as a chemical of known purity. It is intended primarily for use in the calibration and standardization of procedures employed in the determination of sodium and chloride ions in clinical analyses. The sample consists of highly purified sodium chloride. Chemical assay as well as analyses for specific impurities indicate that the material may be considered essentially pure, except for occluded moisture.

Purity . . . . . 99.9 ± 0.0 percent

The above value for the purity of the material is based on a sample dried over magnesium perchlorate for 24 hours. At room temperature sodium chloride is hygroscopic above 60 percent relative humidity. The sorbed water can be removed, however, by desiccation over freshly exposed P_2O_5 or $Mg(ClO_4)_2$ for 24 hours. Chloride was determined using the coulometric method of Marinenko and Taylor [J. Res. NBS, 67A, 31(1963)].

Based on 8 independent measurements of chloride content, the sample is considered homogeneous.

When the material is crushed and dried at 200 °C for 18 hours, the loss of moisture is about 0.08 percent. Coulometric determinations of chloride on the dried material indicate 99.995 ± 0.004 percent purity.

The sodium chloride used for this Standard Reference Material was obtained from the J. T. Baker Chemical Company, of Phillipsburg, New Jersey. Analyses were performed by G. Marinenko, J. R. Baldwin, M. Darr, and T. C. Rains.

The overall direction and coordination of technical measurements leading to the certification were under the chairmanship of R. A. Durst.

The technical and support aspects concerning the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by T. W. Mears.

Washington, D. C. 20234
August 6, 1973
Revised November 23, 1973

J. Paul Cali, Chief
Office of Standard Reference Materials

(over)

This material was examined for compliance with the specifications for reagent grade sodium chloride as given in Reagent Chemicals, 4th edition, published by the American Chemical Society. The material meets or exceeds the minimum requirements in every respect.

Sodium was assayed using a gravimetric procedure in which the sodium chloride was converted to sodium sulfate. Approximately 250 mg of sodium chloride (dried at 500 °C for 4 hours in a platinum crucible) was dissolved in ultrapure sulfuric acid solution (1:1) and evaporated to dryness. Ammonium carbonate was added and the crucible slowly heated to 600 °C, then 900 °. This treatment was repeated until the weight of sodium sulfate remained constant. Based on 6 determinations, the sodium assay is 39.3_2 weight percent or 99.9_6 percent of the amount computed for perfectly pure, stoichiometric NaCl.

A semiquantitative survey for trace elements by emission spectroscopy indicated less than 10 μg/g calcium, copper, iron, and magnesium. A value of less than 3 μg/g magnesium was obtained by atomic absorption spectrometry. Flame emission spectrometry indicated the presence of the following elements: potassium, 11 μg/g; calcium and cesium, less than 2 μg/g; and rubidium and lithium less than 0.5 μg/g.

This Standard Reference Material is intended for "in vitro" diagnostic use only.

This material is intended for use as a standard for the determination of sodium and chloride ions in clinical chemistry.

Sodium is most frequently determined by flame emission photometry. The operative details of this methodology vary from instrument to instrument and are discussed at length in their respective operating manuals. A standard solution of 100 mmol of sodium chloride per liter (suitable for both sodium and chloride determinations) may be prepared by placing 5.85 g of SRM 919 (dried at 110 °C) in a 1-liter volumetric flask and adding 3 ml of concentrated nitric acid (ACS Reagent Grade) and 100 ml of deionized water. After the NaCl is dissolved, dilute to the mark with deionized water. The concentration required for analysis may be prepared by accurate dilutions with distilled water.

This Standard Reference Material should be stored in the well-closed original bottle under normal laboratory conditions. It is recommended that weighing and other manipulations not be made when the relative humidity exceeds 60 percent.

Solutions of SRM 919 are stable indefinitely when stored in a well-stoppered, all-glass container. All such solutions should be clear and display no turbidity.

References:

[1] N. W. Tietz, Fundamentals of Clinical Chemistry, pp. 616-618; 621-625, W. B. Saunders Co., Philadelphia, Pa. (1970).

[2] R. D. Henry, Clinical Chemistry, Principles and Practice, pp. 345-350; 402-409, Hoeber Medical Division, Harper & Row, New York, N. Y. (1967).

This Standard Reference Material has been measured and certified at the laboratories of the National Bureau of Standards, Gaithersburg, Maryland. All inquiries should be addressed to:

Office of Standard Reference Materials
Room B311, Chemistry Building
National Bureau of Standards
Washington, D. C. 20234

The date of issuance and certification of this Standard Reference Material was August 6, 1973.