

Sodium Prec

Mg-Uranylacetate. Colorimetric. Precipitation Liquid

Store at 2-8 °C

Configuration

REF	HB016
VOL	60 mL
Reagent 1	1 x 60 mL
Reagent 2	1 x 60 mL
Standard	1 x 2 mL
Instrument	Universal

Intended use

Quantitative determination of sodium in human serum. For *in vitro* diagnostic use only. For professional use only.

Clinical significance

Sodium is the major cation of extra-cellular fluid. It plays a central role in the maintenance of the normal distribution of water and the osmotic pressure in the various fluid compartments. The main source of body sodium is sodium chloride contained in ingested foods. Only about one-third of the total body's sodium is contained in the skeleton since most of it is contained in the extra-cellular body fluids. Hyponatremia (low serum sodium level) is found in a variety of conditions including the following: severe polyuria, metabolic acidosis, Addison's disease, diarrhea, and renal tubular disease. Hypernatremia (increased serum sodium level) is found in the following conditions: hyperadrenalism, severe dehydration, diabetic coma after therapy with insulin, excess treatment with sodium salts. Clinical diagnosis should not be made on a single test result; it should integrate clinical and other laboratory data.

Principle

The present method is based on modifications of those first described by Trinder in which sodium is precipitated with Mg-uranylacetate as the triple salt, sodium magnesium uranyl acetate. The excess uranyl ions then react with thioglycolic acid, producing a chromophore whose absorbance varies inversely as the concentration of sodium in the test specimen.

Reagent composition

Reagent 1	Ammonium thioglycolate (550 mmol/L) Ammonia (550 mmol/L)
Reagent 2	PREC Uranyl acetate (19 mmol/L) Magnesium acetate (140 mmol/L)
Standard	Sodium sol. (see value on label)

Precautions

- Reagent1: Danger. H302: Harmful if swallowed. H314: Causes severe skin burns and eye damage. H335: May cause respiratory irritation.
- Reagent2: Warning. H226: Flammable liquid and vapor. H302: Harmful if swallowed.
- P280: Wear eye protection, face protection, protective clothing, protective gloves. P501: Dispose of contents in an appropriate container observing applicable local regulations.
- All body fluid samples should be considered potentially infectious materials and the appropriate precautions should be taken. Wear personal protective equipment such as gloves, safety glasses, lab coats or aprons when working with possible biohazard contaminants.
- Use Good Laboratory Practices (GLP) when handling this product.
- Please refer to the MSDS, available on our website, for further information.

Preparation

Reagents are ready to use.

Storage, stability and disposal

All the components of the kit are stable up to the date of expiration as specified on the label, when stored tightly closed, protected from light and contaminations prevented during their use. Storage temperature for this kit is 2-8 °C.

Handle standard very carefully to prevent contamination. Precipitating solution becomes discolored when exposed to the light. Store protected from light. A slight turbidity does not affect the determination.

Do not use the product if deterioration or contamination is suspected or beyond the expiration date or open container stability period. Dispose unused or deteriorated product and waste in compliance with local regulations.

Additional material required but not provided

- Spectrophotometer or colorimeter measuring at 410 nm
- Matched cuvettes 1,0 cm light path
- General laboratory equipment ^{Note 2,3,4}

Samples

Serum

Procedure

Make sure the reagents and samples are at room temperature.

1. Wavelength 410 nm (360-410); Temperature 37 °C; Cuvette (1 cm light path).
2. Adjust the instrument to zero with distilled water.
3. Pipette into a cuvette:

PRECIPITATION STEP:	
For Standard	20 µL Standard + 1,0 mL Reagent 2
For Sample	20 µL Sample + 1,0 mL Reagent 2
Close tubes and mix well. Allow stand for 5 minutes. Shake intensively for at least 30 sec. Allow standing for 30 min. Centrifuge at high speed (± 5000 rpm) for 5-10 minutes. Separate the clear supernatant and pipette into another cuvette:	
TEST STEP: pipette into a cuvette:	
For Blank	20 µL Reagent 2 + 1,0 mL Reagent 1
For Standard	20 µL Supernatant + 1,0 mL Reagent 1
For Sample	20 µL Supernatant + 1,0 mL Reagent 1
Mix and incubate for 5-30 minutes at room temperature. Read the absorbance (A) of the blank, standard and samples. The color is stable for at least 30 minutes.	

Calculation

$$\text{Sodium (mEq/L)} = \frac{A_{\text{Sample}} - A_{\text{Blank}}}{A_{\text{Standard}} - A_{\text{Blank}}} \times \text{stand. conc.} \left(\frac{\text{mEq}}{\text{L}} \right)$$

Conversion Factor:

mmol/L = 1 x mEq/L
mg/dL = 2,299 x mmol/L

Quality control

Control sera are recommended to monitor the performance of assay procedures. Use Biochemistry Normal and Pathological Controls Specific (HBC01-S, HBC02-S).

Prepare and measure these controls the same as samples. If control values are found outside the defined range, check the instrument, reagents and calibrator for problems. Each laboratory should establish its own QC scheme and corrective actions if controls do not meet the acceptable tolerances.

Reference values¹

Serum	135 - 155 mEq/L (135 - 155 mmol/L)
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These values are for orientation purpose. Each laboratory should establish its own reference range.

Performance characteristics

Measuring range: from 49 mEq/L (detection limit) to 300 mEq/L (linearity limit). If the obtained results are greater than 300 mEq/L, dilute the sample 1:2 with distilled water, repeat the determination, and multiply the result by factor 2.

Precision:

	intra-assay (n=20)		inter-assay (n=20)	
	Mean (mEq/L)	SD	CV (%)	CV (%)
Mean (mEq/L)	94	156	94	156
SD	2,0	1,4	4,0	5,4
CV (%)	2,13	0,89	4,27	3,47

Sensitivity: 1 mEq/L = 0,0023 AU

Accuracy: Results obtained using CYPRESS DIAGNOSTICS reagents did not show systematic differences when compared with other commercial reagents. The results of the performance characteristics depend on the analyzer used.

Interferences

The following substances do not interfere with sodium determination at the indicated concentrations: 500 mg/dL hemoglobin, 20 mg/dL ascorbic acid. Bilirubin yielded a very low interference at a concentration of 40 mg/dL.

Notes

1. For best use of this kit on a Cypress Diagnostics analyzer, we kindly advise to follow the application sheets of the respective analyzer. Please log in to our website (www.diagnostics.be) as a registered user to download the latest application sheets, which are located under the section of the corresponding analyzer. Compatible Cypress analyzers: CYANSmart, CYANStart, CYANVision
2. Calibration with the aqueous standard may cause a systematic error in automatic procedures. In this case, it is recommended to use a serum based Biochemistry calibrator Specific (HBC03-S).
3. Detergents usually contain high sodium concentrations. The equipment (test tubes, pipettes, stoppers, cuvettes) must therefore be rinsed carefully with distilled water. Avoid contamination by traces of sodium.



4. Disposable plastic tubes are recommended for the determination to avoid contaminations.

Bibliography

1. Trinder P. Analyst, 76: 596 (1951).

2. Henry R.J. et al., Clin. Chem., Harper & Row New York, Sec. Edit. 643 (1974)

Notice: Any serious incident that has occurred in relation to the device shall be reported to Cypress Diagnostics and the competent authority of the Member State in which the user and/or patient is established.

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