

SODIUM (Colorimetric)

INTENDED USE

Bioline Sodium is used for the quantitative colorimetric determination of Sodium in human serum.

CLINICAL SIGNIFICANCE

Sodium is the major cation of extracellular 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 the sodium chloride contained in ingested foods. Only about one-third of the total body sodium is contained in the skeleton since most of it is contained in the extracellular 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.

METHOD AND PRINCIPLE

The present method is based on reaction of sodium with a selective chromogen producing a chromophore whose absorbance varies directly as the concentration of sodium in the test specimen.

REAGENT COMPOSITION

1. Sodium Standard :Sodium 150 mEq/L
2. Triethylamine 50 mmol/l DMSO 400 mmol/l Phosphonazo 50 mmol/l.

WARNING AND PRECAUTIONS:

(Please read carefully before running test.)

Sodium Reagent: Contains high amount of DMSO. Wash with sufficient amount of water in case of skin contact.

Reagent is slightly viscous in nature due to high amount of DMSO and Glucose present in it, For accurate readings we recommend to discard the first reagent blank reading , consider the second reagent blank for calculating the Factor. Like wise at the time of aspirating the standard consider 2nd reading for factor generation.

Also rinse the flow cell with ample amount of distilled water so that DMSO and Glucose are completely disposed off from the flowcell and do not interfere the Laboratory Glucose readings. Plastic disposable cuvettes are recommended for Sodium test.

REAGENT PREPARATION

Both the reagent and standard are in ready to use form.

REAGENT STORAGE AND STABILITY

The reagents are stable until the expiration date stated on the label. Store between 15 - 30°C and protected from light.

REAGENT DETERIORATION

Do not use if the reagent is turned turbid or blue color, it is a sign of reagent contamination.

SPECIMEN COLLECTION AND STORAGE

Freshly drawn serum is the specimen of choice .Plasma from non-sodium containing anticoagulants (e.g., lithium, calcium, magnesium or heparin) is an acceptable alternative. Sodium is stable for at least 24 hours at room temperature and 2 weeks when refrigerated.

INTERFERENCES

Blood calcium, chloride and potassium levels of up to 3 times normal reportedly exert no adverse influence on the procedure; phosphorus levels exceeding 5 times normal likewise present no problems.

ASSAY PROCEDURE FOR SEMIAUTO ANALYZER.

Wavelength : 630 nm

Temperature : RT

	Blank	Standard	Sample
Reagent	1000 µL	1000 µL	1000 µL
Distilled water	10 µL	-	-
Standard	-	10 µL	-
Sample	-	-	10 µL

Mix and read the optical density (OD) of standard and sample against the reagent blank after 5 minutes of incubation at RT.

CALCULATIONS

Abs. = Absorbance

$$\frac{\text{Abs. of unknown}}{\text{Abs. of Standard}} \times \text{Concentration of Standard (mEq/L)} = \text{Concentration of Sodium (mEq/L)}$$

CALIBRATION

The procedures are calibrated with the standard solution which is included with each series of tests. Its absorbance is used to calculate results.

LIMITATIONS

1. Samples with Sodium values above 180 mEq/L should be diluted with distilled water, re-run and resulting value multiplied by dilution factor.
2. Care should be exercised not to touch pipette tips with the fingers.

QUALITY CONTROL

Normal and abnormal control sera of known concentrations of Sodium should be analyzed routinely with each group of unknown samples.

EXPECTED VALUES

Serum: 135-155 mEq/L.

The above values are taken from literature and should serve only as a guideline. It is recommended that each laboratory establish its own range of expected values since differences exist between instruments, laboratories, and local populations.

PERFORMANCE CHARACTERISTICS

1. Linearity: upto 180 mEq/L.

Imprecision : Reproducibility was determined using in an internal protocol. The following results were obtained.

	Within Run		Between Run	
	Level 1	Level 2	Level 1	Level 2
Control				
No of samples	40	40	40	40
Mean (mEq/L)	127	147	129	148
SD (mEq/L)	4	7	8	5
CV%	3	5	6	4

Method Comparison Comparison studies were carried out using another commercially available sodium reagent as a reference. Normal and abnormal human serum samples were assayed in parallel and the results compared by least squares regression. The following statistics were obtained.
Correlation coefficient 0.92

General testing Parameters.

Mode	End Point
Wavelength (Filter)	630 nm(600-650)nm
Reaction Direction	Increasing
Reagent Blank	Yes
Sample Vol.	10 µL
Reagent Vol.	1000 µL
Incubation Time	5 min at RT
Reagent Blank Abs.(Max)	NMT 0.800 Abs
Calibration Method	1- Point
Standard (Conc.)	150 mEq/L
Linearity	180 mEq/L
Decimal Places	1
Temp.	RT
Unit	mEq/L
Ref. Low	135 mEq/L
Ref. High	155 mEq/L

REFERENCES

1. Tietz, N.W., Fundamentals of Clinical Chemistry, W.B. Saunder Co., Phila, PA, p. 874.
2. Henry R.F., et. al., Clinical Chemistry Principles and Technics, 2nd Ed., Harper and Row, Hagerstein, M.D., (1974).