

Potassium

PROCEDURE FOR SPECTROPHOTOMETER

Follow the instrument manufacturer's instructions for calibration.

TEST PROCEDURE (1)

- A. Pipette 2.9 ml of reagent into reagent tube. Place the reagent tube in the test well and adjust the photometer to zero absorbance.
- B. Label reagent tubes, as "STANDARD" and "PATIENT".
- C. Place a pipette tip on the automatic pipette. Use the pipette to draw 50 µl of potassium standard. With one rapid, smooth stroke, QUICKLY expel the tip's contents into the tube labeled "STANDARD". Cap the tube and mix well by inversion (2).
- D. Place a tip on the automatic pipette. Use the pipette to draw 50 µl of patient sample. Wipe serum from the outside of the tip with a lint-free tissue. With one rapid, smooth stroke, QUICKLY expel the tip's contents into the "PATIENT" tube and mix well.
- E. Let both tubes at room temperature for exactly 1 minute.
- F. Wipe reagent tubes clean with a lint-free tissue. Insert each tube into the test well and record the absorbance of the "STANDARD" and "PATIENT" samples.

Calculation Patient potassium =

absorbance of "PATIENT" sample
----- X value of standard
absorbance of "STANDARD" sample

EXPECTED VALUES Serum: 3.6-5.5 mEq/L
 Plasma: 4.0-5.8 mEq/L

- NOTES:
1. The slightest degree of hemolysis in serum sample will contribute to falsely elevated serum potassium levels. The technician should attempt to treat each tube in a series of tests in a consistent fashion. The dynamics of technique can affect test results.
 2. The reacted standard vial may be used for a 24 hour period provided that it is gently inverted 4 times just before being placed in the optical module.

INTENDED USE

Quantitative turbidimetric determination of potassium in serum or plasma.

SUMMARY AND EXPLANATION

The most common methods for the determination of potassium are the turbidimetric, flame photometric, and ion selective electrodes (2-5). The King Diagnostics potassium method is the modification of Sunderman and Sunderman by substitution of diethyleneglycol for gum ghatti as dispensing agent. The results correlate well with those obtained by flame photometry.

TEST PRINCIPLE

Potassium ions in a protein-free alkaline medium react with sodium tetraphenylboron to produce a finely divided turbid suspension of potassium tetraphenylboron. Diethyleneglycol is utilized as a stabilizing and dispensing agent.

MATERIALS PROVIDED

Cat No 60305 (1 x125 ml)

REAGENTS

For In Vitro Diagnostics use.

Reagent contains 6.0% sodium tetraphenylboron in a solution containing preservatives and thickening agent.

CAUTION! Do not take these reagents internally or allow them to come in contact with the body. Discard unused reagents.

STORAGE

Store reagents at room temperature (20-25° C, 68-77° F). All reagents are stable till the expiration date stated on the label when stored at room temperature.

ADDITIONAL MATERIALS REQUIRED

- 1.Spectrophotometer, blood analyzer or colorimeter
- 2.Pipetting device suitable for delivering 50 µl
- 3.Commercially available assayed control serum

SAMPLE PREPARATION

Serum and plasma specimens must be handled so as to prevent hemolysis and should be separated from the clot immediately. Anticoagulants containing potassium must not be employed.

EXPECTED VALUES (1)

Serum: 3.6-5.5 mEq/L

Plasma: 4.0-5.8 mEq/L

The above range is intended as a guide. Each laboratory should establish its own normal range.

PERFORMANCE

1. Precision - The precision study was done by
 - (a) repetitive assay (N=52) of normal serum specimen. This assay yielded a mean of 3.5 mEq/L, a standard deviation of 0.06 mEq/L and a coefficient of variation of 1.7%.
 - (b) repetitive assay (N=28) of abnormal serum specimen. This assay yielded a mean of 6.1 mEq/L, a standard deviation of 0.15 mEq/L and a coefficient of variation of 2.5%.
 - (c) 8 day reproducibility study. A pool serum specimen with a mean of 5.9 mEq/L yielded a standard deviation of 0.15 mEq/L and a coefficient of variation of 2.5%.
2. Accuracy - The accuracy study was done by
 - (a) running 68 serum and plasma specimens on ion specific electrode method (ISE) and King Diagnostics method on Gilford Stasar III (registered trademark of Gilford Instruments). The study yielded a regression equation of $King = 1.025 * \text{reference method} - .139$ and a correlation of 0.94.
 - (b) adding known potassium aqueous standards of varying concentration. With King Diagnostics method, recovery was in the range of 98-102%.

LIMITATIONS OF THE PROCEDURE

This procedure is linear between 2 and 6.5 mEq/L beyond which the specimen should be diluted 1:2 with deionized water. Reassay the specimen and multiply the results by 2.

QUALITY CONTROL

Standard practice for quality control should be applied to this system. Commercially available lyophilized controls can be used. Daily quality control must fall within 2 standard deviations of the established value. If correlation is not obtained and repetition of the assay excludes error in technique, the following steps should be taken:

1. Calibrate the instrument according to manufacturer's instructions.
2. Check the cleanliness of the reagent tube.
3. Check the expiration date of the reagent package.
4. Contact King Diagnostics Technical Services Department in Indianapolis, IN.

REFERENCES

1. Henry, R. J., Clinical Chemistry - Principles and Techniques, Harper and Row, N.Y., 1974,

pp 350-356.

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3. Power, M.H., Ryan, C., Clin Chem 2:230, 1956 (Abstract).
4. Sunderman, F.W., Jr., Sunderman, F.W., Am. J. Clin. Path. 29:95, 1958.
5. Hillman, Von G. Beyer, 2 Klin Chem u Klin Biochem 5:93, 1967.
6. King Diagnostics Laboratory Data, Indianapolis, IN, 1981, 1986.