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URIC ACID REAGENT SET

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For the quantitative determination of Uric Acid in serum.

INTRODUCTION
Uric Acid is the end-product of purine metabolism. Nearly half of the total Uric Acid is eliminated and replaced each day by way of urinary excretion and through microbial degradation in the intestinal tract. Increased Uric Acid levels are commonly associated with both nitrogen retention and urea, creatine, and other non-protein constituents. The quantitation of Uric Acid is an aid in the diagnosis of gout, decreased renal function, myeloproliferative disorders, and other conditions in which the cause for the hyperuricemia is not well known.[1]

Uric Acid is most commonly determined by a phosphotungstate method[2] and iron reduction method.[3] Due to serum interferences, the enzyme uricase has been widely used instead; uricase is more specific for Uric Acid since uricase acts only on Uric Acid.[4,5]

PRINCIPLE
The enzymatic reaction sequence employed in the assay of Uric Acid is as follows:

$$\text{Uric acid} + 0_2 + 2H_20 \xrightarrow{\text{Uricase}} \text{Allantoin} + CO_2 + H_20_2$$

$$2H_20_2 + \text{4-Aminoantipyrine} + \text{DHBS} \xrightarrow{\text{Peroxidase}} \text{chromogen} + 4H_20$$

Uric Acid is converted by uricase into allantoin and hydrogen peroxides. The hydrogen peroxide initiates the coupling of 4-aminoantipyrine to 3,5-dichloro-2-hydroxybenzene sulfonic acid (DHBS) to form the chromogen which is measured at 52Onm and which is proportional to the amount of hydrogen peroxide generated from Uric Acid.

REAGENT COMPOSITION
When reconstituted as directed, the reagent for Uric Acid contains the following:
1. (Concentrations refer to the reconstituted reagent.)
   Uric Acid Reagent: 4-Aminoantipyrine 4mM, 3,5 Dichloro-2-hydroxybenzenesulfonate 2mM, Stabilizer and Surfactant, Uricase (microbial) ≥ 150 U/L, Peroxidase (horseradish) 10,000 U/L, buffer pH 7.5.
2. Uric Acid Standard (5 mg/dl).

WARNINGS AND PRECAUTIONS
1. For in vitro diagnostic use. CAUTION: In vitro diagnostic reagents may be hazardous. Handle in accordance with good laboratory procedures which dictate avoiding ingestion, and eye or skin contact.
2. Serum specimens should be considered infectious and handled appropriately.

STORAGE AND STABILITY
The reagent set is stored refrigerated (2 - 8°C). The dry reagent is stable until the expiration date shown on the label. When stored at 2 - 8°C, the reconstituted is stable for 30 days.

REAGENT DETERIORATION
The reagent should be discarded if:
1. Turbidity has occurred; turbidity may be a sign of contamination.
2. Moisture has penetrated the vial and caking has occurred.
3. The reagent blank has an absorbance of 0.40 or greater at 520nm.
A slight pink color is normal.

SPECIMEN COLLECTION
1. Test specimen should be serum and free from hemolysis.
2. Bacterial contamination should be avoided to preserve the loss of Uric Acid.
3. Uric Acid in serum is stable for three (3) days at 2 - 8°C and up to six (6) months when frozen.[6]

INTERFERING SUBSTANCES
1. Bilirubin and Ascorbic Acid can result in falsely depressed Uric acid levels.
2. Lipemic samples may cause falsely elevated Uric Acid levels.
3. Collection tubes containing formaldehyde as a preservative must be avoided.
4. For a comprehensive review of drug interferences refer to Young el a1.[7]

MATERIALS REQUIRED BUT NOT PROVIDED
1. Pipette devices.
2. Test tubes/rack.
3. Timing device.
4. Heating block (37° C).
5. Spectrophotometer capable of reading at 52Onm.

GENERAL INSTRUCTIONS
The reagent for uric acid is intended for use either as an automated procedure on chemistry instruments or as a manual procedure on a suitable spectrophotometer.

PROCEDURE (AUTOMATED)
Consult the appropriate instrument application guide available from us.

PROCEDURE (MANUAL)

1. Reconstitute reagents according to instructions.
2. Label test tubes, "reagent blank", "standard", "controls", "unknowns", etc.
3. Pipette 1.0ml of working reagent into all tubes.
4. Prewarm all tubes at 37°C for three (3) minutes.
5. Add 0.025ml (25 µl) of sample to respective tubes and mix.
6. Incubate all tubes at 37°C for ten (10) minutes.
7. After incubation, zero the spectrophotometer with the reagent blank at 520nm and read/record the absorbance of all tubes.(Wavelength range:500-550).
8. Repeat procedure for each sample.

* USE MULTI PURPOSE CALIBRATOR TO REPLACE STANDARD.

ALTERNATE VOLUMES

If the spectrophotometer being used requires a final volume greater than 1.0ml for accurate reading, use 0.05ml (50µl) of sample to 3.0ml of Reagent. Perform the test as described above.

PROCEDURAL LIMITATIONS

The reagent is linear to 25mg/dl Uric Acid. Samples with values exceeding 25mg/dl should be diluted 1:1 with saline, reassayed and the results multiplied by two (2). Lipemic samples will give falsely elevated results and a serum blank must be run.

Serum blank: Add 0.025ml (25µl) of sample to 1.0ml water. Zero the spectrophotometer with water. Read and record absorbance and subtract reading from test absorbance.

CALCULATIONS (RATIOMETRIC)

A = Absorbance

$$\frac{A\ unknown}{A\ standard} \times \text{concentration of standard} = \text{value for unknown(mg/dl)}$$

Example: If the unknown A = 0.170, standard A = 0.180, concentration standard = 5mg/dl, then:

$$\frac{0.170}{0.180} \times 5 = 4.7 \text{mg/dl}$$

SI UNITS (mmol/L): Multiply the result (mg/dl) by 10 to convert dl to liter and divide by 168 (the molecular weight of Uric Acid).

$$\text{mg/dl} \times \frac{10}{168} = \text{mmol/L} \qquad \text{mg/dl} \times .0595 = \text{mmol/L}$$

QUALITY CONTROL

It is recommended that controls be included in each set of assays. Commercially available control material with established Uric Acid values may be used for quality control. The assigned value of the control material must be confirmed by the chosen application. Failure to obtain the proper range of values in the assay of control material may indicate either reagent deterioration, instrument malfunction, or procedural errors.

EXPECTED VALUES

1.5 - 7.0mg/dl.[8]

It is strongly recommended that each laboratory establish its own normal range.

PERFORMANCE CHARACTERISTICS

1. Linearity: 25 mg/dl
2. Sensitivity: Based on an instrument resolution of 0.001 Absorbance, the present procedure has a sensitivity of 0.03 mg/d1.
3. Comparison: A comparison with another commercial enzymatic Uric Acid procedure yielded a correlation coefficient of 1.00 with a regression equation of Y = 1.02X -0.22.
4. Precision studies:

Within Run

Mean (mg/d])	S.D.	C.V.
3.9	0.06	2.0%
7.9	0.04	1.0%

Run to Run

Mean (mg/d])	S.D.	C.V.
3.9	0.08	2%
8.4	0.50	6%

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