MEDICA

IVD CE

REF 10208-4 4 x 39 mL

URIC ACID (URIC)

Wedges each contain a usable volume of 39 mL of reagent.

INTENDED USE

The EasyRA URIC reagent is intended for the quantitative determination of uric acid in human serum or plasma, using the MEDICA "EasyRA® Clinical Chemistry Analyzer". Uric Acid measurements are used in the diagnosis and treatment of numerous renal and metabolic disorders, including renal failure, gout, leukemia, psoriasis, starvation or other wasting conditions, and of patients receiving cytotoxic drugs.
For *in vitro* diagnostic use only. For professional use only.

SUMMARY AND EXPLANATION

The process of nucleic acid degradation produces xanthine and hypoxanthine, which reacts with xanthine oxidase to produce uric acid. Elevated levels of serum Uric Acid (URIC) are helpful in the diagnosis of gout and are also associated with chronic hemolytic anemias and lympho-proliferative disorders. Impaired renal function also shows an increase in uric acid levels [1]. The early method of quantitating uric acid was based on the reduction of phosphotungstic acid by uric acid to a blue complex [2], which could be measured. This method proved to be non-specific, because of the presence of other reducing agents in the serum. The procedure of Fossati, et. al. [3] uses uricase to produce hydrogen peroxide from uric acid. The hydrogen peroxide then reacts with the phenolic compound 3, 5-dichloro-2-hydroxybenzene sulfonate (DHBS) to produce a red-colored dye, which can be measured spectrophotometrically at 520 nm.

PRINCIPLE OF THE PROCEDURE

In the modified procedure of Fossati et. al. [3], Uric Acid is oxidized by uricase to producing allantoin and hydrogen peroxide according to the following equation:

$$\text{Uric Acid} + O_2 + 2H_2O \xrightarrow{\text{Uricase}} \text{Allantoin} + CO_2 + H_2O_2$$

One mole of hydrogen peroxide (H_2O_2) is produced for each mole of uric acid oxidized. The H_2O_2 then reacts with 3,5-dichloro-2-hydroxybenzene sulfonate (DHBS) and 4-aminoantipyrime (4-AAP), in the presence of horseradish peroxidase to produce a red-colored quinonedmine dye.

$$2H_20_2 + \text{DHBS} + \text{4-AAP} \xrightarrow{\text{Horseradish Peroxidase}} \text{quinoneimine dye (Red)} + 4\ H_20$$

The intensity of the red color at the maximum absorbance at 520 nm is directly proportional to the Uric acid concentration in the sample.

REAGENTS

DHBS	1.8 mmol/L
4-Aminoantipyrine	0.5 mmol/L
Horseradish Peroxidase	≥ 3500 U/L
Uricase (Candida utilis)	≥ 200 U/L

Stabilizers and Preservatives

PRECAUTIONS

1. Good laboratory safety practices should be followed when handling any laboratory reagent. (*CLSI,* GP17-A2).
2. The reagent contains less than 0.1% sodium azide, which may react with lead and copper plumbing to form highly explosive metal azides. Refer to the Safety Data Sheet for risk, hazard and safety information.
3. As with any diagnostic test procedure, results should be interpreted considering all other test results and the clinical status of the patient.
4. Do not use washed cuvettes.

INSTRUCTIONS FOR REAGENT HANDLING, STORAGE AND STABILITY

The reagent is ready to use as supplied. Unopened reagent is stable until the expiration date listed on the label if stored at 2 – 8°C. The reagent is stable on-board in the refrigerated reagent area of the EasyRA Analyzer for the number of days programmed on the RFID chip on the reagent wedge Do not use the reagent if it is turbid or cloudy or if it fails to recover known serum control values.

SPECIMEN COLLECTION AND STORAGE / STABILITY
Clear unhemolyzed serum or plasma should be used. Serum URIC is stable for 2 – 3 days at 18 – 25°C, 3 – 5 days at 2 – 8°C and for 6 – 12 months at – 20°C [4].

PROCEDURE

Materials Provided
Medica URIC Reagent Wedge, REF 10208

Additional materials required

Medica EasyCal Chemistry, REF 10651
Medica EasyQC® Chemistry/Electrolytes – Level A, REF 10793
Medica EasyQC Chemistry/Electrolytes – Level B, REF 10794
Medica Precision Test Dye Wedge, REF 10764
Medica Cleaner Wedge – Chemistry & ISE, REF 10660 *or*
Medica Cleaner Wedge – Chemistry, REF 10661

Instructions for Use
The reagent is ready to use as supplied. Remove the cap and place the reagent in the EasyRA Analyzer reagent tray located in the reagent area. Opened reagent is stable on-board in the refrigerated reagent area of the EasyRA Analyzer for the number of days programmed on the RFID chip on the reagent wedge (21 days maximum) or when removed and stored refrigerated at 2-8°C (capped) after first opened.

Note: Check inside the neck of the wedge for foam after removing the cap and placing the wedge on the analyzer. If there is foam, remove it with a swab or a disposable pipette before performing the test.

Calibration
Medica EasyCal Chemistry (REF 10651) is recommended for the calibration of the assay. The calibration interval (30 days maximum) is programmed on the RFID chip on the reagent wedge. Recalibration is required whenever there is a change in reagent lot number or if a shift in quality control values occurs.

Quality Control

It is recommended that two levels of human serum based controls (normal and abnormal) be run with the assay daily whenever patient testing is performed and with each reagent lot change. Failure to obtain the proper range of values in the assay of control material may indicate reagent deterioration, instrument malfunction, or procedural errors. The laboratory should follow local, state and federal quality control guidelines when using quality control materials.

Results
After completion of the assay, the EasyRA Analyzer calculates the Uric Acid concentration from the ratio of the change in absorbance of the unknown sample to the change in absorbance of the calibrator multiplied by the calibrator value.

$$\text{URIC (mg/dL)} = \frac{\Delta A_{U520}}{\Delta A_{C520}} \times \text{CalValue}$$

Where ΔA_{U520} is the change in absorbance of the unknown sample, and ΔA_{C520} is the change in absorbance of the calibrator.

Expected Values [1]
The reference range for URIC in serum is as follows:

Male:	3.5-7.2 mg/dL
Female:	2.6-6.0 mg/dL

These values are guidelines. It is recommended that each laboratory establish its own range of expected values, since differences exist among instruments, laboratories and local populations.

Procedural Limitations (e.g. if sample is above assay range)
Only unhemolyzed serum or plasma samples should be used.

The EasyRA Analyzer flags any result above 12 mg/dL as Linearity High “LH”. If the “Re-run” icon is selected by the operator, the sample may be re-tested using one half (1/2) the sample volume. The retest results are calculated to reflect the use of the smaller sample volume. This will effectively extend the reportable range of the URIC test to 24 mg/dL.

PERFORMANCE CHARACTERISTICS [5]

Reportable Range
The reportable range is 0.11 to 12.00 mg/dL. Extended range is 0.11 to 24.00 mg/dL when half of the sample is used (1:1 dilution).

Inaccuracy / Correlation (CLSI, EP9-A2)
The following table lists the data obtained in a comparison of the Medica Reagent for Uric Acid (y) on the EasyRA Analyzer to the performance of a similar Uric Acid reagent (x) on the Roche COBAS MIRA* Analyzer. The data shown below represents single determinations obtained on the EasyRA Analyzer vs. the average of two replicate values obtained on the Roche COBAS MIRA Analyzer.

Number of samples	48	Range of Samples	0.26 to 11.72 mg/dL
Slope	1.0392	y Intercept	-0.1944
Correlation Coefficient	0.9907	Regression Equation:	Y = 1.0392*X – 0.1944

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The following table lists the data obtained in a comparison of matched serum (x) and plasma (y) samples using the Medica Reagent for URIC on the EasyRA Analyzer. The data below represents a single plasma determination vs. The average of two replicated serum values.

Number of samples	53	Range of Samples	0.8 to 11.93 mg/dL
Slope	1.0063	y Intercept	-0.0102
Correlation Coefficient	0.9973	Regression Equation	Y = 1.0063*X – 0.0102

Imprecision (CLSI, EP5-A2)
Duplicate measurements of each of three levels of QC material were tested twice a day for 20 days. Both within-run precision and total precision were determined from these data.

Within run imprecision:

QC Level mg/dL	Within Run SD mg/dL	Within Run CV %
9.70	0.07	0.7
4.37	0.04	0.9
4.16	0.05	1.3

Total Imprecision:

QC Level mg/dL	Total Imprecision SD mg/dL	Total Imprecision CV %
9.70	0.23	2.4
4.37	0.19	4.4
4.16	0.18	4.4

Linearity (CLSI, EP6-A)
Linear from 0.11 to 12 mg/dL, based on the linear regression Y = 1.0336*X – 0.173.

Limit of Blank (LOB):	0.065 mg/dL	(CLSI, EP17-A)
Limit of Detection (LOD):	0.11 mg/dL	(CLSI, EP17-A)

Interfering Substances (CLSI, EP7-A)
Less than 10% interference was classified as “no significant interference”.
There is significant positive interference to hemoglobin above 50 mg/dL. Do not use hemolyzed samples.
No significant interference was found in levels up to 25 mg/dL of bilirubin.
No significant interference was found in levels up to 400 mg/dL of triglycerides using a lipid-clearing agent (Lipoclear™).
No significant interference was found in levels up to 50 mg/dL of N-acetyl-L-cysteine (NAC).
Samples from patients with Waldenstrom’s Macroglobulinemia has a high potential for interference and may produce unreliable results.

Young provides a list of drugs and other substances that interfere with clinical chemistry tests [6,7].

REFERENCES

1. Burtis, C.A., Ashwood, E.R. editors, Tietz Textbook of Clinical Chemistry, 2nd ed. WB Saunders and Co., Philadelphia, PA, 1994.
2. Jung, D.H., and Parekh, A.C., Clin Chem.(1970) 16: 247.
3. Fossati P, Prencipe L, and Berti G. Clin Chem. (1980) 26: 227-231.
4. Tietz NW. Editor, Clinical Guide to Laboratory Tests, 2nd ed. WB Saunders and Co., Philadelphia, PA, 1990.

5. Data on file at Medica.
6. Young DS. *Effects of Drugs on Clinical Laboratory Tests* 4th ed. Washington, DC: AACC Press; 1995.
7. Young DS. *Effects of Preanalytical Variables on Clinical Laboratory Tests*. 2nd ed. Washington, DC. AACC Press; 1997.

EasyRA Assay Parameters (URIC)

Primary Wavelength (nm)	520
Secondary Wavelength	600
Reaction Type	End Point (2)
Reaction Direction	Increase
Reagent Blank	Yes (with each calibration)
Sample Blank	No
Reaction Time	10 min
Calibration interval (maximum)	30 days
Reagent on-board stability	21 days

Serum/Plasma

Sample volume (µl)	4.0
Diluent volume (µl)	20
Reagent volume (µl)	200
Decimal Places (default values)	2
Units (default values)	mg/dL
Dilution Factor	1:1 (to extend measuring range)
Linearity	0.11 to 12.00 mg/dL

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