ENVOY® 500 URIC ACID REAGENT KIT

Product no. 55450

For *in vitro* diagnostic use

☛CAUTION : Federal Law restricts this device to sale by or on the order of a licensed healthcare practitioner (Rx ONLY)

☛INTENDED USE

Envoy® 500 Uric Acid Reagent is for the quantitative determination of uric acid in serum and plasma on Envoy 500 Series Analysers.

SUMMARY

Uric acid is the major breakdown product of the purine nucleosides. Elevated uric acid levels are usually caused by increased synthesis or dietary intake of purines, or by reduced excretion through the kidneys or gastrointestinal tract. Gout occurs when monosodium urate crystals form in supersaturated body fluids resulting in gouty arthritis and renal disease. Hypouricemia is less common and usually associated with reduced purine synthesis or reduced reabsorption of uric acid in the kidney.[1]

Early methods for detecting uric acid, which were based on the reduction of phosphotungstic acid, have been largely replaced by enzymatic methods, which offer greater specificity. These methods utilize uricase to oxidize uric acid. This reaction can be monitored directly at 290 nm or coupled to various indicator reactions. The Envoy 500 method uses the hydrogen peroxide produced in the oxidation step to drive a Trinder indicator reaction producing an intensely colored red dye.

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

$$2\,H_2O_2 + \text{4-AAP} + \text{TOOS} \xrightarrow{\text{POD}} \text{Indamine} + 3\,H_2O$$

Uric acid is oxidized in the presence of oxygen and uricase. The resulting hydrogen peroxide reacts with 4-aminoantipyrine (4-AAP) and N-ethyl-N-(hydroxy-3-sulfopropyl)-toluidine (TOOS) to form an indamine dye that absorbs strongly at 546 nm. The increase in absorbance is proportional to the concentration of uric acid in the sample. Potassium ferrocyanide and ascorbic oxidase are added to the reagent to reduce interference from bilirubin and ascorbic acid.

REAGENTS

COMPOSITION

The Envoy 500 Uric Acid Reagent 1 contains: 100 mmol/L Phosphate buffer, pH 7.0, 1.25 mmol/L N-ethyl-N-(hydroxy-3-sulfopropyl)-toluidine (TOOS), ≥ 1.2 kU/L Ascorbate oxidase.

Uric Acid Reagent 2 contains:100 mmol/L Phosphate buffer, pH 7.0, 1.5 mmol/L 4-Aminoantipyrine, 50 µmol/L Potassium ferrocyanide, ≥ 5kU/L Peroxidase (POD), ≥ 250 U/L Uricase (microbial).

☛WARNINGS AND PRECAUTIONS

- This reagent is for professional *in vitro* diagnostic use only.
- Take normal precautions and adhere to good laboratory practice.
- Use clean or single use laboratory equipment only to avoid contaminations.
- These reagents contains sodium azide, which may react with lead or copper plumbing to form potentially explosive metal azides. When disposing of these reagent always flush with copious amounts of water to prevent azide buildup.
- Dispose of contents in accordance with all local, state and federal regulations.
- For more information, Safety Data Sheet (SDS) is available on request for professional user.

PREPARATION

Both Uric Acid Reagent 1 and Uric Acid Reagent 2 are ready for use on the Envoy 500 Analyzer as packaged.

STORAGE AND STABILITY

Store these reagents at 2 to 8 °C and protected from light. Do not freeze. Unopened reagents are stable to the expiration dates on the bottle labels. The working reagent is stable for 21 days onboard the Envoy 500 Analyzer.

☛SPECIMENS

COLLECTION AND STORAGE

- Fresh unhemolyzed serum and heparinized plasma are acceptable specimens. Do not analyze whole blood. Collect specimens by venipuncture according to accepted clinical protocol.[1]

- Venipuncture should be performed prior to the administration of drugs. Of particular note, venipuncture performed during an acetaminophen overdose situation, when N-acetyl-p-benzoquinone imine (NAPQI) an atypical metabolic breakdown product of acetaminophen, may be present, may lead to erroneously low uric acid results. Venipuncture performed during or immediately after administration of N-acetylcysteine (NAC), a drug used to treat acetaminophen overdose, or Metamizole may lead to erroneously low uric acid results.

- For best results, use only fresh specimens. Uric acid in serum and plasma is stable for at least 3 to 5 days at 2 to 6 °C or for at least six months at -20 °C.[3]

COMPATIBLE ADDITIVES

Acceptable chemical preservatives are sodium, lithium, and ammonium heparin. Do not use any other chemical additives.

PROCEDURE

☛MATERIALS PROVIDED

The Envoy 500 Uric Acid Reagent Kit includes the following components:

8 x 31.5 mL boats of Envoy 500 Uric Acid Reagent 1
8 x 9.6 mL bottles of Envoy 500 Uric Acid Reagent 2

MATERIALS REQUIRED BUT NOT PROVIDED

Envoy Serum Calibrator (product no. 55111)
Envoy Serum Controls (product no. 55131)
Normal Saline

REAGENT INSTALLATION AND USE

Program the instrument using the application parameters and programming instructions provided at the end of this Instructions For Use.

Refer to the Operator Manual for additional information on installing reagents and programming and running samples, calibrators, and controls.

The Envoy 500 Uric Acid Reagent is pre-assembled and ready to use as packaged. Small bottles may become separated from large boats during shipping. If this occurs, snap the small bottles back onto the large reagent boats before continuing.

Do not remove the caps from the bottles until you are ready to install the reagent on the analyzer. Before installing, mix the reagent by inverting the reagent boat several times. Record the installation date on the label and insert the unit into the designated position on the reagent tray. Let the reagent equilibrate on the instrument for at least 30 minutes before use.

CALIBRATION

Calibrate the instrument after loading new reagent, after maintenance, and whenever quality control results fall outside established limits. Under typical use conditions, calibration factors for this test are valid for 21 days. Refer to the Operator Manual for calibration procedures.

QUALITY CONTROL

Quality control requirements should be established in accordance with local, state and/or federal regulations or accreditation requirements.

.../...

ELITech Clinical Systems SAS
Zone Industrielle
61500 SEES
France

For Technical questions, Please call or contact
(855) 354-8324 - www.elitechgroup.com
27 Wellington Road
Lincoln, Rhode Island 02865 - U.S.A.

(10/2015)
FTEVY-AUVD-v2

Assay at least two levels of serum control daily in serum controls for Envoy 500 level 1 and level 2 may be used. Controls should also be assayed after performing a reagent blank, calibrating, maintaining the instrument, and after loading a new reagent. Controls may be assayed more frequently based on laboratory workflow and the discretion of the user.

CALCULATIONS

All calculations are performed by the instrument.

☛LIMITATIONS / INTERFERING SUBSTANCES

- Do not report results outside of the usable range.
- The results of this assay should only be interpreted in conjunction with other diagnostic test results, clinical findings and the patient's medical history.
- Lipemia bilirubin, and ascorbic acid interfere with this test.
- Effects of icterus, hemolysis, and lipemia are shown through the assay of pools spiked with ditaurobilirubin, red blood cell hemolysate and Intralipid®, 20% solution. Ascorbic acid was also tested as an interferant. Observed biases are shown below.

Effects of Common Substances on Uric Acid Recoveries

Interferant	Concentration	Changes in Recoveries
Ascorbic acid	1.8 mg/dL	-0.36 at 5.3 mg/dL
	3.0 mg/dL	-1.12 at 5.3 mg/dL
Ditaurobilirubin	16 mg/dL*	-0.55 at 5.5 mg/dL
	32 mg/dL*	-1.27 at 5.5 mg/dL
RBC hemolysate	200 mg/dL*	not significant†
Intralipid, 20% solution	800 mg/dL*	-0.69 at 4.6 mg/dL
	1200 mg/dL*	-2.1 at 4.6 mg/dL

* Refers to bilirubin, hemoglobin, and/or triglyceride concentration

† No change greater than 0.3 mg/dL was observed

- Results may be falsely low when the sample is taken while levels of NAC, NAPQI (a metabolite of acetaminophen (paracetamol)) or Metamizole are significant.
- Many other substances can affect uric acid results. For additional information, refer to *Effects of Drugs on Clinical Laboratory Tests*[4] and *Effects of Preanalytical Variables on Clinical Laboratory Tests.*[5]

PERFORMANCE CHARACTERISTICS

USABLE RANGE

The linear range of this assay is listed below. Specimens that exceed the upper limit of this range should be diluted with normal saline and reanalyzed. Multiply the results of diluted specimens by the appropriate dilution factors.

Conventional Units	SI Units
0.1 to 25.0 mg/dL	0.006 to 1.48 mmol/L

EXPECTED VALUES

Published uric acid reference ranges for adults are listed below. Use these ranges only as guides. Each laboratory should establish its own reference ranges.

Reference Range[1]	Conventional Units	SI Units
Male	3.5 to 7.2 mg/dL	0.21 to 0.42 mmol/L
Female	2.6 to 6.0 mg/dL	0.15 to 0.35 mmol/L

DETECTION LIMIT AND SENSITIVITY

The detection limit for this application is rounded up to 0.1 mg/dL (0.006 mmol/L). This limit was established by assaying normal saline thirty times on an Envoy 500 Analyzer in a single analytical run. The detection limit was calculated as the mean value plus two times the standard deviation, which were 0.0 and 0.03 mg/dL respectively.

An absorbance change of 0.0015 A on the Envoy 500 Analyzer corresponds to a change in uric acid concentration of approximately 0.1 mg/dL (0.006 mmol/L).

METHOD COMPARISON

Sixty serum and 60 plasma specimens were collected from individual adult patients and assayed for uric acid using an Envoy 500 Analyzer and another commercially available method. Results were compared by least squares and Passing - Bablok regression and the following statistics were obtained.

Serum/Plasma Comparison

n = 120 range = 2.3 to 11.1 mg/dL

Least Squares Regression
- Envoy 500 = -0.06 mg/dL + 1.003 x Competitive Method
- 95% CI slope: 0.995 to 1.011
- 95% CI y-intercept: -0.107 to -0.015
- $s_{y.x}$ = 0.086 mg/dL r = 0.999

Passing - Bablok Regression
- Envoy 500 = -0.10 mg/dL + 1.000 x Competitive Method
- 95% CI slope: 1.000 to 1.000
- 95% CI y-intercept: -0.100 to -0.100

PRECISION

Three serum controls were each assayed in triplicate twice per day over 10 days on an Envoy 500 Analyzer. Estimates of within run and total imprecision are calculated as described in NCCLS publication EP3-T.[3]

Precision of URIC ACID Recoveries in mg/dL

			Within Run		Total	
Sample	n	mean	1SD	%CV	1SD	%CV
Serum 1	60	2.3	0.03	1.3%	0.05	2.0%
Serum 2	60	6.7	0.05	0.7%	0.07	1.1%
Serum 3	60	11.2	0.06	0.5%	0.13	1.1%

☛REFERENCES

1. Burtis C A, Ashwood E R, Eds. *Tietz Textbook of Clinical Chemistry, Third Edition* W.B. Saunders Company: Philadelphia, PA, 1999
2. Kaplan L A, Pesce A J, Eds. *Methods in Clinical Chemistry; Theory Analysis and Correlation, Third Edition Mosby Inc.* St. Louis, MO. 1996
3. *Tentative Guidelines for Manufacturers for Establishing Performance Claims for Clinical Chemical Methods, Replication Experiment* NCCLS Publication: Vol. 2 No. 20. Villanova, PA, 1982
4. Young D S, *Effects of Drugs on Clinical Laboratory Tests: Fifth Edition* AACC Press: Washington, DC, 2000
5. Young D S, *Effects of Preanalytical Variables on Clinical Laboratory Tests: Second Edition* AACC Press: Washington, DC, 1997.

☛GLOSSARY OF SYMBOLS

CONT	Contents		Manufacturer	REF	Catalog No.
LOT	Batch Code		See instruction for use		Use by
OPENED	Date opened / Installation date	IVD	*In vitro* diagnostic device		Temperature Limitation
STAB DAYS	Number of days onboard stability	R1	Reagent 1	R2	Reagent 2

☛ : Modification from previous version

.../...

ELITech Clinical Systems SAS
Zone Industrielle
61500 SEES
France

For Technical questions, Please call or contact
(855) 354-8324 - www.elitechgroup.com
27 Wellington Road
Lincoln, Rhode Island 02865 - U.S.A.

(10/2015)
FTEVY-AUVD-v2

ELITechGroup
CLINICAL SYSTEMS

ENVOY® 500 URIC ACID REAGENT KIT

APPLICATION PARAMETERS

PRIMARY PARAMETERS

Code	URIC
Bar-Code	Active
Code for Bar-Code	323
Test Methodology	Uricase Colorimetric
Method	Sample Blank (A)
Kind of Process	Linear
1st Filter	546
2nd Filter	700
Reaction direction	Increasing

REAGENTS

Number of reagents	2
Reagent 1 Volume µL	280
Concentrated	Inactive
Reagent 2 Volume µL	70
Concentrated	Inactive

SAMPLE

	Serum	Urine
Name	Uric Acid	
Sample µL	6	N/A
Pre-Dilution 1:	1	N/A
Post-Dilution 1:	1	N/A

TIMES

Sample Starter	Inactive
Delay Time	0
Reading Time	60
Reagent 1 Incubation Time	300
Reagent 2 Incubation Time	240

CHECK PARAMETERS

Reagent Limit (mABS)	500
Curve Acceptance (%)	100

RE-RUN SERUM

Test Limit (Conc)		25
Low Test Limit (Conc)		0.1
Initial ABS (mABS)		N/A
Final ABS (mABS)		N/A
Max ABS Delta (mABS)		N/A
Prozone Check		Inactive
Normal Range	Min	Max
Man	[User defined]	
Woman	[User defined]	
Child	[User defined]	
Re-run hyperactive		Inactive
Re-run pathological		Inactive

RE-RUN URINE

Test Limit (Conc)		N/A
Low Test Limit		N/A
Initial ABS (mABS)		N/A
Final ABS (mABS)		N/A
Max ABS Delta (mABS)		N/A
Prozone Check		Inactive
Normal Range	Min	Max
Man	N/A	
Woman	N/A	
Child	N/A	
Re-run hyperactive		Inactive
Re-run pathological		Inactive

SECONDARY PARAMETERS

1st Unit Serum	mg/dL
2nd Unit Serum	Inactive
1st Unit Urine	N/A
2nd Unit Urine	Inactive
Dynamic Blank	Active
Needle washes	[From Settings Table]
Cuvette washes	[From Settings Table]
Special Wash	[From Settings Table]
Instrumental Factor	1.000
Shift	0.000
Reagent Blank	Every Day
Decimals	1

STANDARD PARAMETERS

Factor	[Determined by calibration]
Minimum	30
Maximum	130
Number of Samples	1
Max Var. (%)	10
Timed re-run	Inactive
N. replicates	3
Reagents ABS	[Determined by Envoy]
Pos.	[From Settings Table]
Conc.	[From calibrator labeling]
ABS	[Determined by Envoy]
% from last calibration	100

PROGRAMMING INSTRUCTIONS

Detailed instructions for programming reagent parameters are provided in the Envoy 500 Operator Manual and Envoy 500 Settings Table.

If the Envoy 500 Chemistry System is not pre-programmed, an Uric Acid code must first be added before the parameters can be entered. On the menu bar, select «Test → Test Directory.» A new window will open up listing all the codes for the tests that are installed on the instrument. Click on the «New Code» button, type «URIC» into the Code field and select «Save.»

To program the application parameters, check the box next to the code for the Uric Acid test, and select the «Parameters» button located at the bottom of the window. To program standard information, click the «Standards» button located at the bottom of the window.

ELITech Clinical Systems SAS
Zone Industrielle
61500 SEES
France

For Technical questions, Please call or contact
(855) 354-8324 - www.elitechgroup.com
27 Wellington Road
Lincoln, Rhode Island 02865 - U.S.A.

(10/2015)
FTEVY-AUVD-v2