BECKMAN COULTER

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SYNCHRON® System(s) Chemistry Information Sheet

MA Microalbumin

REF 475100

For *In Vitro* Diagnostic Use

ANNUAL REVIEW

Reviewed by	Date	Reviewed by	Date

PRINCIPLE

INTENDED USE

MA reagent, when used in conjunction with UniCel® DxC 600/800 System(s) and SYNCHRON® Systems MA Calibrator, is intended for quantitative determination of Albumin concentration in human urine.

CLINICAL SIGNIFICANCE

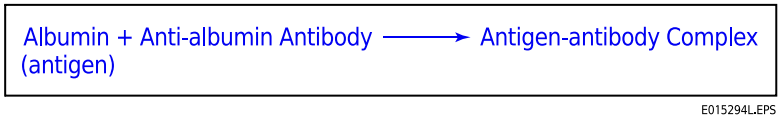
Measurement of albumin in urine aids in the diagnosis of kidney dysfunction, and is recommended by the American Diabetes Association to screen for microalbuminuria.[1]

METHODOLOGY

MA reagent is used to measure the albumin concentration by a turbidimetric method.[2,3] In the reaction, albumin combines with specific antibody to form insoluble antigen-antibody complexes.

The SYNCHRON® System(s) automatically proportions the appropriate sample and reagent volumes into the cuvette. The ratio used is one part sample to 24 parts reagent. The system monitors the change in absorbance at 380 nanometers. This change in absorbance is proportional to the concentration of albumin in the sample and is used by the System to calculate and express albumin concentration based upon a single-point, non-linear calibration curve.

CHEMICAL REACTION SCHEME



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SPECIMEN

TYPE OF SPECIMEN

Biological fluid samples should be collected in the same manner routinely used for any laboratory test.[4,5] Urine is the only sample type recommended for MA.

Urine samples should be collected without a preservative. The type of sample collection depends on how results are to be reported.[1,4] If the samples are turbid or contain particulate matter, clarify by centrifugation (3000 x g for 10 minutes).

SPECIMEN STORAGE AND STABILITY

Urine samples may be stored at +2°C to +8°C for up to 72 hours. Frozen samples are not recommended.

Additional specimen storage and stability conditions as designated by this laboratory:

SAMPLE VOLUME

A filled 0.5 mL sample cup is the optimum volume. For optimum primary sample tube volumes in primary tube samples and minimum volumes, refer to the Primary Tube Sample Template for your system.

CRITERIA FOR UNACCEPTABLE SPECIMENS

Refer to the PROCEDURAL NOTES section of this chemistry information sheet for information on unacceptable specimens.

Criteria for sample rejection as designated by this laboratory:

PATIENT PREPARATION

Special instructions for patient preparation as designated by this laboratory:

SPECIMEN HANDLING

Special instructions for specimen handling as designated by this laboratory:

REAGENTS

CONTENTS

Each kit contains the following items:

Two MA Reagent Cartridges (2 x 100 tests)
One lot-specific Parameter Card

VOLUMES PER TEST

Sample Volume	10 µL
ORDAC Sample Volume	3 µL
Total Reagent Volume	240 µL
Cartridge Volumes	
A	215 µL
B	25 µL
C	– –

REACTIVE INGREDIENTS

REAGENT CONSTITUENTS

Reagent Buffer	33.0 mL
MA antibody specific for human albumin (goat)	7.2 mL

Also non-reactive chemicals necessary for optimal system performance.

> ⚠ CAUTION
>
> **Sodium azide preservative may form explosive compounds in metal drain lines. See National Institute for Occupational Safety and Health Bulletin: Explosive Azide Hazards (8/16/76).**

MATERIALS NEEDED BUT NOT SUPPLIED WITH REAGENT KIT

SYNCHRON® Systems MA Calibrator
At least two levels of control material
Saline

REAGENT PREPARATION

No preparation is required.

ACCEPTABLE REAGENT PERFORMANCE

The acceptability of a reagent is determined by successful calibration and by ensuring that quality control results are within your facility's acceptance criteria.

REAGENT STORAGE AND STABILITY

MA reagent, when stored unopened at +2°C to +8°C, will remain stable until the expiration date printed on the cartridge label. Once opened, the reagent is stable for 60 days unless the expiration date is exceeded. DO NOT FREEZE.

Reagent storage location:

CALIBRATION

CALIBRATOR REQUIRED

SYNCHRON® Systems MA Calibrator

CALIBRATOR PREPARATION

No preparation is required.

CALIBRATOR STORAGE AND STABILITY

SYNCHRON® Systems MA Calibrator is stable until the expiration date printed on the calibrator bottle if capped and stored in the original container at +2°C to +8°C.

> ⚠ CAUTION
>
> Because this product is of human origin, it should be handled as though capable of transmitting infectious diseases. Each serum or plasma donor unit used in the preparation of this material was tested by United States Food and Drug Administration (FDA) approved methods and found to be negative for antibodies to HIV and HCV and nonreactive for HbsAg. Because no test method can offer complete assurance that HIV, hepatitis B virus, and hepatitis C virus or other infectious agents are absent, this material should be handled as though capable of transmitting infectious diseases. This product may also contain other human source material for which there is no approved test. The FDA recommends such samples to be handled as specified in Centers for Disease Control's Biosafety Level 2 guidelines.[6]

Calibrator storage location:

CALIBRATION INFORMATION

1. The system must have a lot-specific parameter card and a valid calibration adjustment in memory before controls or patient samples can be run.
2. Under typical operating conditions the MA reagent cartridge must be calibrated every 30 days and also with certain parts replacements or maintenance procedures, as defined in UniCel DxC 600/800 System *Instructions For Use* (IFU) manual. This assay has within-lot calibration available. Refer to the UniCel DxC 600/800 System *Instructions For Use* (IFU) manual for information on this feature.
3. For detailed calibration instructions, refer to the UniCel DxC 600/800 System *Instructions For Use* (IFU) manual.

4. The system will automatically perform checks on the calibration and produce data at the end of calibration. In the event of a failed calibration, the data will be printed with error codes and the system will alert the operator of the failure. For information on error codes, refer to the UniCel DxC 600/800 System *Instructions For Use* (IFU) manual.

TRACEABILITY

For Traceability information refer to the Calibrator instructions for use.

QUALITY CONTROL

At least two levels of control material should be analyzed daily. In addition, these controls should be run with each new calibration, with each new reagent cartridge, and after specific maintenance or troubleshooting procedures as detailed in the appropriate system manual. More frequent use of controls or the use of additional controls is left to the discretion of the user based on good laboratory practices or laboratory accreditation requirements and applicable laws.

The following controls should be prepared and used in accordance with the package inserts. Discrepant quality control results should be evaluated by your facility.

Table 1.0 Quality Control Material

CONTROL NAME	SAMPLE TYPE	STORAGE

TESTING PROCEDURE(S)

1. Load the reagent onto the system. A lot-specific parameter card must be loaded one time for each lot.
2. After reagent load is completed, calibration may be required.
3. Program samples and controls for analysis.
4. After loading samples and controls onto the system, follow the protocols for system operations.

For detailed testing procedures, refer to the UniCel DxC 600/800 System *Instructions For Use* (IFU) manual.

CALCULATIONS

The SYNCHRON® System(s) performs all calculations internally to produce the final reported result. The system will calculate the final result for sample dilutions made by the operator when the dilution factor is entered into the system during sample programming.

Urine samples for MA testing can include 24-hour collections, timed collections, and spot or random collections. Each sample type may require a separate calculation:

24-hour collection:

$$\text{MA result in mg/dL} \times \text{Urine volume, mL} \times \frac{\text{dL}}{100\text{mL}} = \text{mg/24 hours}$$

Timed collection (albumin excretion rate):

$$\text{MA result in mg/dL} \times \text{Urine volume, mL} \times \frac{1}{\text{Time,min.}} \times \frac{1000\ \mu\text{g}}{\text{mg}} \times \frac{\text{dL}}{100\ \text{mL}} = \mu\text{g/minute}$$

Spot collection (albumin/creatinine ratio):

$$\text{MA result in mg/dL} \times \frac{1}{\text{Creatinine, mg/dL}} \times \frac{1000\ \mu\text{g}}{\text{mg}} = \mu\text{g/mg creatinine}$$

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REPORTING RESULTS

Equivalency between the SYNCHRON LX and UniCel DxC 600/800 Systems has been established. Chemistry results between these systems are in agreement and data from representative systems may be shown.

REFERENCE INTERVALS

Each laboratory should establish its own reference intervals based upon its patient population. The following reference intervals were taken from literature and a study performed on SYNCHRON Systems.[1]

Table 2.0 Reference intervals

INTERVALS	SAMPLE TYPE	CONVENTIONAL UNITS	S.I. UNITS
SYNCHRON	Random Urine	<1.9 mg/dL	<19.0 mg/L

Table 3.0 American Diabetes Association Definition of Microalbuminuria

CATEGORY	24-HOUR COLLECTION	TIMED COLLECTION	SPOT COLLECTION
Normal	<30 mg/24 hrs	<20 µg/min	<30 µg/mg creatinine
Microalbuminuria	30 – 300 mg/24 hrs	20 – 200 µg/min	30 – 300 µg/mg creatinine
Clinical albuminuria	>300 mg/24 hrs	>200 µg/min	>300 µg/mg creatinine

INTERVALS	SAMPLE TYPE	CONVENTIONAL UNITS	S.I. UNITS
Laboratory			

Refer to References (7, 8, 9) for guidelines on establishing laboratory-specific reference intervals.

Additional reporting information as designated by this laboratory:

PROCEDURAL NOTES

LIMITATIONS

1. An effort should be made to keep pipetted samples free from gross debris. It is recommended that highly turbid specimens be centrifuged before analysis.
2. Urine samples contaminated with blood are not recommended.
3. If serum protein carryover is suspected, a saline cup should be assayed prior to analysis of microalbumin samples.

INTERFERENCES

1. The following substances were tested for interference with this methodology:

Table 4.0 Interferences

SUBSTANCE	SOURCE	MAXIMUM LEVEL TESTED	OBSERVED EFFECT
Ascorbic Acid	NA[a]	500 mg/dL	NSI[b]
Calcium	NA	130 mg/dL	NSI
Citrate	NA	50 mg/dL	NSI
Creatinine	NA	160 mg/dL	NSI
Glucose	NA	200 mg/dL	NSI
Magnesium	NA	400 mg/dL	NSI
Oxalate	NA	30 mg/dL	NSI
Urea	NA	140 mg/dL	NSI

a NA = Not applicable.
b NSI = No Significant Interference (within ±0.25 mg/dL or 10.8%).

2. Refer to References (10,11,12) for other interferences caused by drugs, disease and preanalytical variables.

PERFORMANCE CHARACTERISTICS

ANALYTIC RANGE

The SYNCHRON® System(s) method for the determination of this analyte provides the following analytical ranges:

Table 5.0 Analytical Range

SAMPLE TYPE	CONVENTIONAL UNITS	S.I. UNITS
Urine	0.2 – 30 mg/dL	2 – 300 mg/L
Urine (ORDAC)	24 – 97 mg/dL	240 – 970 mg/L

Samples with concentrations exceeding the high end of the analytical range should be diluted with saline and reanalyzed.

REPORTABLE RANGE (AS DETERMINED ON SITE):

Table 6.0 Reportable Range

SAMPLE TYPE	CONVENTIONAL UNITS	S.I. UNITS

SENSITIVITY

Sensitivity is defined as the lowest measurable concentration which can be distinguished from zero with 95% confidence. Sensitivity for MA determination is 0.2 mg/dL (2.0 mg/L).

EQUIVALENCY

Equivalency was assessed by Deming regression analysis of patient samples to accepted clinical methods.

Urine (in the range of 0.4 to 26.1 mg/dL):

Y (SYNCHRON LX Systems)	= 0.968X - 0.06
N	= 111
MEAN (SYNCHRON LX Systems)	= 3.97
MEAN (Nephelometric Immunochemistry Analyzer)	= 4.16
CORRELATION COEFFICIENT (r)	= 0.993

Refer to References (13) for guidelines on performing equivalency testing.

PRECISION

A properly operating SYNCHRON® System(s) should exhibit precision values less than or equal to the following:

Table 7.0 Precision Values

TYPE OF PRECISION	SAMPLE TYPE	1 SD		CHANGEOVER VALUE[a]		% CV
		mg/dL	mg/L	mg/dL	mg/L	
Within-run	Urine	0.125	1.25	2.3	23	5.4
	Urine (ORDAC)	NA[b]	NA	NA	NA	5.4
Total	Urine	0.187	1.87	2.3	23	8.0
	Urine (ORDAC)	NA	NA	NA	NA	8.0

a When the mean of the test precision data is less than or equal to the changeover value, compare the test SD to the SD guideline given above to determine the acceptability of the precision testing. When the mean of the test precision data is greater than the changeover value, compare the test % CV to the guideline given above to determine acceptability. Changeover value = (SD guideline/CV guideline) x 100.

b NA = Not applicable.

Refer to References (14) for guidelines on performing precision testing.

Comparative performance data for the SYNCHRON LX System evaluated using the NCCLS Approved Guideline EP5-A appears in the table below.[14] Each laboratory should characterize their own instrument performance for comparison purposes.

Table 8.0 NCCLS EP5-A Precision Estimate Method

TYPE OF IMPRECISION	SAMPLE TYPE		No. Systems	No. Data Points[a]	Test Mean Value (mg/dL)	EP5-A Calculated Point Estimates	
						SD	%CV
Within-run	Urine	Control 1	1	80	1.0	0.09	8.7
	Urine	Control 2	1	80	3.0	0.11	3.7
	Urine	Control 3	1	80	39.3	0.62	1.6
Total	Urine	Control 1	1	80	1.0	0.12	12.2
	Urine	Control 2	1	80	3.0	0.15	5.1
	Urine	Control 3	1	80	39.3	0.72	1.8

a The point estimate is based on the pooled data from one system, run for twenty days, two runs per day, two observations per run on an instrument operated and maintained according to the manufacturer's instructions.

NOTICE

These degrees of precision and equivalency were obtained in typical testing procedures on a SYNCHRON LX® System and are not intended to represent the performance specifications for this reagent.

ADDITIONAL INFORMATION

For more detailed information on UniCel DxC Systems, refer to the appropriate system manual.

SHIPPING DAMAGE

If damaged product is received, notify your Beckman Coulter Clinical Support Center.

REVISION HISTORY

Revision AE
Revised Quality Control section.

Revision AF
Updated corporate address.

Revision AG
Added Revision History.

Revision AH
Added new language requirement: Czech, and Korean.

Revision AJ
Removed references to CX and LX systems as they are discontinued effective 12/2013.

Added Beckman Coulter trademark statement and disclaimer.

REFERENCES

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3. Hellsing, K., "The Effects of Different Polymers for Enhancement of the Antigen-Antibody Reaction as Measured with Nephelometry", *Protides of the Biological Fluids*, 23:579 (1973).

4. Tietz, N. W., "Specimen Collection and Processing; Sources of Biological Variation", *Textbook of Clinical Chemistry*, 5th Edition, W. B. Saunders, Philadelphia, PA (2005).

5. National Committee for Clinical Laboratory Standards, *Routine Urinalysis and Collection, Transportation and Preservation of Urine Specimens* Tentative Guideline, NCCLS publication GP16-T, Villanova, PA (1992).

6. CDC-NIH, *Biosafety in Microbiological and Biomedical Laboratories,* 5th Edition, (Washington, D.C.: U.S. Government Printing Office, 2009). (CDC 21-1112)

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11. Friedman, R. B., Young, D. S., *Effects of Disease on Clinical Laboratory Tests*, 2nd Edition, AACC Press, Washington, D.C. (1989).

12. Young, D. S., *Effects of Preanalytical Variables on Clinical Laboratory Tests*, AACC Press, Washington, D.C. (1993).

13. National Committee for Clinical Laboratory Standards, *Method Comparison and Bias Estimation Using Patient Samples* Approved Guideline, NCCLS publication EP9-A, Villanova, PA (1995).

14. National Committee for Clinical Laboratory Standards, *Evaluation of Precision Performance of Clinical Chemistry Devices*, Approved Guideline, Vol. 19, No. 2, NCCLS publication EP5-A, Villanova, PA (1999).

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