DXC (ACTM) ACETAMINOPHEN

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PURPOSE

To provide instructions for the quantitative determination of acetaminophen on the DXC 600/800.

PRINCIPLE

ACTM reagent, when used in conjunction with UniCel® DxC 600/800 System(s) and SYNCHRON® Systems Drug Calibrator 2 set, is intended for quantitative determination of Acetaminophen concentration in human serum or plasma.

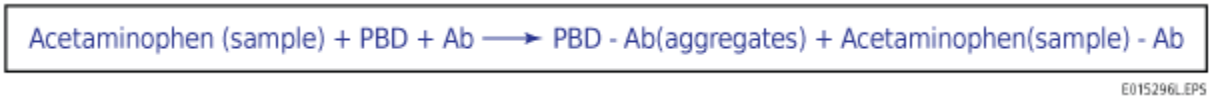
BACKGROUND

Clinical Significance

Acetaminophen (paracetamol) is a common drug which is used as an analgesic and an antipyretic agent. Excessive doses of acetaminophen can have toxic effects with the most common being hepatotoxicity. The drug may also cause acute tubular necrosis, pancreatitis, and myocardial necrosis. Diagnosis of acetaminophen overdose can be determined by measuring the circulating levels of acetaminophen in order that treatment can be initiated.

Methodology

ACTM reagent is used to measure analyte concentration by a particle enhanced turbidimetric inhibition immunoassay method.[3] Particle-bound drug (PBD) binds to the analyte specific antibody (Ab) resulting in the formation of insoluble aggregates causing light scatter. Non-particle-bound analyte in the patient sample competes with the PBD for the antibody binding sites, inhibiting the formation of insoluble aggregates. The rate and amount of particle aggregation is inversely proportional to the concentration of analyte in the sample. The SYNCHRON® System(s) automatically proportions the appropriate sample and reagent volumes into a cuvette. The ratio used is one part sample to 60 parts reagent. The system monitors the aggregate formation by measuring the change in absorbance at 340 nanometers. This change in absorbance is inversely proportional to the concentration of ACTM in the sample and is used by the System to calculate and express the ACTM concentration based upon a multi-point calibration curve.



RELATED DOCUMENTS

R-PO-CH0810	Quality Control Program General Laboratory
R-PO-CH0809	Quality Control Westgard Rules Statistics
R-PR-AD0540	Specimen Rejection/Cancellation Protocol
J-F-CH0820	DXC 800 Controls
M-F-CH0820	Chemistry Controls
J-F-CH0826	DXC 800 Calibrators
M-F-CH0826	Chemistry Calibrators

SPECIMEN

Type of Specimen

Biological fluid samples should be collected in the same manner routinely used for any laboratory test. Freshly drawn serum or plasma are the preferred specimens. Acceptable anticoagulants are listed in the PROCEDURAL NOTES section of this chemistry information sheet. Whole blood or urine are not recommended for use as a sample. Serial samples should be collected using the same sample type (i.e., serum or plasma).

Specimen Storage and Stability

1. Tubes of blood are to be kept closed at all times and in a vertical position. It is recommended that the serum or plasma be physically separated from contact with cells within two hours from the time of collection.

2. Separated serum or plasma should not remain at room temperature longer than 8 hours. If assays are not completed within 8 hours, serum or plasma should be stored at +2°C to +8°C. If assays are not completed within 48 hours, or the separated sample is to be stored beyond 48 hours, samples should be frozen at -15°C to -20°C. Frozen samples should be thawed only once. Analyte deterioration may occur in samples that are repeatedly frozen and thawed.

Sample Type	Volume	Sample Stability
Plasma/Serum	0.5mL	• Separate serum from cells within 2 hours • Room Temp 8 hours • Refrigerated 48 hours • Frozen 3 months

Criteria for Unacceptable Specimens

See Specimen Rejection/Cancellation Protocol

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.

REAGENTS

Contents

Each kit contains the following items:
One ACTM Reagent Cartridge (1 x 100 tests)

Volume per Test	
Sample Volume	5 uL
Total Reagent Volume	302uL
Cartridge Volumes	A 230uL B 40uL C 32uL

Reactive Ingredients	
Acetaminophen Particle Reagent	4.8mL
Monoclonal anti-Acetaminophen Antibody (mouse)	7mL
Acetaminophen Reaction Buffer	80mL

Also non-reactive chemicals necessary for optimal system performance

Reagent Preparation

No preparation is required. Do not mix.

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

ACTM 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 42 days at +2°C to +8°C unless the expiration date is exceeded. DO NOT FREEZE. Do not expose reagent to temperatures above +35°C or to direct sunlight.

CALIBRATION

Calibrator Required

SYNCHRON® Systems Drug Calibrator 2 set

Calibrator Preparation

No preparation is required.

Calibrator Storage and Stability

SYNCHRON® Systems Drug Calibrator 2 set 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.

Calibration Information

1. The system must have a valid calibration in memory before controls or patient samples can be run.

2. Under typical operating conditions the ACTM assay must be calibrated every 14 days or with each new bottle of reagent and also with certain parts replacements or maintenance procedures, as defined in the UniCel DxC 600/800 Systems *Instructions for Use* (IFU) manual.

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

See DXC 600/800 controls

STEPS

1. If necessary, load the reagent onto the system.

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 operation. To load samples manually refer to the FHS DXC Series Manual Sample Programming procedure. .For detailed testing procedures, refer to the UniCel DxC 600/800 System *Instructions For Use* (IFU) manual.

CALCULATIONS

SYNCHRON® System(s) perform 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.

ANTICOAGULANT TEST RESULTS

The following anticoagulants were assessed by Deming regression analysis with a minimum of 50 paired serum and plasma samples. Values of serum (X) ranging from 23 to 280 µg/mL were compared with the values from plasma (Y) yielding the following results:

Anticoagulant	Level Tested for In Vitro Interference
Lithium Heparin	14 Units/mL
Sodium Heparin	14 Units/mL

PERFORMANCE CHARACTERISTICS

Reference Range

Sample Type	Range	Interval
Serum/ Plasma	10 -25 ug/mL	Therapeutic
Serum/ Plasma	>50 ug/mL	Critical
Serum/Plasma	>150 ug/mL	Toxic

Analytic Range

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

Sample Type	Conventional Units (Urea Nitrogen)
Serum or Plasma	10 – 300 µg/mL

Samples with concentrations outside of the analytical range will be reported as "<10 µg/mL" ("<66 µmol/L") . Samples reported out as greater than the analytical range may be confirmed by diluting with saline and reanalyzing. The appropriate dilution factor should be applied to the reported result.

Reporting results outside of analytical range

Lower limit of detection	10 ug/mL	Results <10; Report as <10
Upper limit of range	300 ug/mL	Result >300, Dilute with 0.9% saline starting at 1:2; Reanalyze and multiply by dilution factor

Sensitivity

Sensitivity is defined as the lowest measurable concentration which can be distinguished from zero with 95% confidence. Sensitivity for ACTM determination is 2.5 µg/mL (16 µmol/L).

LIMITATIONS

None identified.

Interferences

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

Substance	Source	Level Tested	Observed Effect
Hemoglobin	RBC hemolysate	500 mg/dL	No significant interference (within ± 4 µg/mL or 8%)
Bilirubin	Porcine	30 mg/dL	No significant interference within 8%
Rheumatoid Factor	Human	300 IU/mL	No significant interference (within ± 4 µg/mL or 8%)
Lipemia	Human	4+	No significant interference (within ± 4 µg/mL or 8%)
Paraprotein (IgM)	Human	500 mg/dL	NSI No significant interference (within ± 4 µg/mL or 8%)

2. Refer to References (12,13,14) for other interferences caused by drugs, disease and preanalytical variables.

3. For assays employing mouse antibodies, the possibility exists for interference by human anti-mouse antibodies (HAMA) in the sample. Human anti-mouse antibodies may be present in samples from patients who have received immunotherapy or diagnostic procedures utilizing monoclonal antibodies or in individuals who have been regularly exposed to animals. Additionally, other heterophile antibodies, such as human anti-goat antibodies may be present in patient samples. Interpretation of results should be done in the context of the overall clinical presentation of the patient, including symptoms, clinical history, data from additional tests and other appropriate information.

ADDITIONAL INFORMATION

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

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DOCUMENT APPROVAL **Purpose of Document / Reason for Change:**
10/25/12 – New header/format. Changed from R to M document. Added Purpose and Related Doc sections. References to EDTA have been removed. Updated dilution protocol and added reference to using Multiqual control. Subsections for Specificity, Equivalency, Precision sections were removed.
☐ *No significant change to process in above revision. Per CAP, this revision does not require further Medical Director approval.*

Committee Approval Date	☐ Date: ☐ N/A – revision of department-specific document which is used at only one facility	**Medical Director Approval** *(Electronic Signature)*	Linda D. Blankenhardt, MD 6/26/13