CEDIA™ DAU Sample Check Assay

thermo scientific

IVD **For In Vitro Diagnostic Use**

REF 10016443 (Indiko Kit)
1815555 (85 mL Kit)

Intended Use
The CEDIA™ DAU Sample Check Assay is intended for the determination of urine sample integrity when urine samples are subject to CEDIA assays for drugs of abuse screening. In order to determine the specific interfering substance(s), more specific methods should be used. In addition, clinical consideration and professional judgment should be applied to the results of this test particularly when the sample integrity is in question.

For optimal results, a creatinine test should be performed in parallel with the CEDIA DAU Sample Check Assay to enable additional identification of diluted patient samples.

Summary and Explanation of the Test
The CEDIA DAU Sample Check Assay determines if a urine sample contains any compounds that will compromise the ability of the CEDIA assays for drugs of abuse screening. In order to avoid detection of illicit drug use, many compounds such as detergents, bleach, vinegar, chromate, nitrite or golden seal tea have been added to the urine samples by the illicit drug users prior to submitting their urine samples for drug screening test.[1] Successful adulterants can produce a false negative result for abuse drugs by reducing the signal produced by immunoassays thereby avoid detection.

The CEDIA DAU Sample Check Assay uses recombinant DNA technology (US Patent No. 4708929) to produce a unique immunoassay system.[2] This assay is based on the bacterial enzyme β-galactosidase, which has been genetically engineered into two inactive fragments. These fragments spontaneously reassociate to form fully active enzyme that, in the assay format, cleaves a substrate, generating a color change that can be measured spectrophotometrically.

In the assay, any compound that (a) interferes with the ability of the fragments to reassociate and form active enzyme, (b) affects the ability of active enzyme to cleave substrate by denaturing the enzyme or blocking the active site, or (c) prevents the color change of the cleaved substrate by destroying either the substrate or the product, will be identified by a reduction in assay signal. The amount of signal reduction is dependent on the amount and composition of the interfering compound present. If the sample does not contain an interfering substance then the signal generation system will not be impacted and will fall within a normal range.

Reagents
1 ***EA Reconstitution Buffer:*** Contains 3-(N-morpholino) propanesulfonic acid, stabilizer, buffer salts, and preservative.
1a ***EA Reagent:*** Contains 0.171 g/L Enzyme Acceptor, buffer salts, detergent, and preservative.
2 ***ED Reconstitution Buffer:*** Contains 3-(N-morpholino) propanesulfonic acid, buffer salts, stabilizer, and preservative.
2a ***ED Reagent:*** Contains 12.42 µg/L Enzyme Donor, 1.67 g/L chlorophenol red-β-D-galactopyranoside, stabilizer, and preservative.

Additional Materials Required (but not provided):
CEDIA Negative Calibrator
CEDIA Sample Check Control

⚠ Precautions and Warnings
DANGER: Powder reagent contains ≤56% w/w Bovine serum albumin (BSA), and ≤2% w/w Sodium azide. Liquid reagent contains ≤1.0% Bovine serum, ≤0.3% Sodium azide.
H317 - May cause allergic skin reaction.
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.
EUH032 - Contact with acids liberates very toxic gas.

Avoid breathing dust/mist/vapors/spray. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves/eye protection/face protection. In case of inadequate ventilation wear respiratory protection. If on skin: Wash with plenty of soap and water. IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If skin irritation or rash occurs: Get medical advice/attention. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. Wash contaminated clothing before reuse. Dispose of contents/container to location in accordance with local/regional/national/international regulations.

Reagent Preparation and Storage
See below for preparation of the solutions for Hitachi analyzers. For all other analyzers, refer to the analyzer specific application sheet. Remove the kit from refrigerated storage immediately prior to preparation of the solutions.

Prepare the solutions in the following order to minimize possible contamination.

R2 Enzyme donor solution: Connect Bottle 2a (ED Reagent) to Bottle 2 (ED Reconstitution Buffer) using one of the enclosed adapters. Mix by gentle inversion, ensuring that all the lyophilized material from Bottle 2a is transferred into Bottle 2. Avoid the formation of foam. Detach Bottle 2a and adapter from Bottle 2 and discard. Cap Bottle 2 and let stand approximately 5 minutes at room temperature (15-25°C). Mix again. Record the reconstitution date on the bottle label.

R1 Enzyme acceptor solution: Connect Bottle 1a (EA Reagent) to Bottle 1 (EA Reconstitution Buffer) using one of the enclosed adapters. Mix by gentle inversion, ensuring that all the lyophilized material from Bottle 1a is transferred into Bottle 1. Avoid the formation of foam. Detach Bottle 1a and adapter from Bottle 1 and discard. Cap Bottle 1 and let stand approximately 5 minutes at room temperature (15-25°C). Mix again. Record the reconstitution date on the bottle label.

NOTE 1: The components supplied in this kit are intended for use as an integral unit. Do not mix components from different lots.
NOTE 2: Avoid cross-contamination of reagents by matching reagent stoppers to the proper reagent bottle. The R2 Solution should be yellow-orange in color. A dark red or purple-red color indicates that the reagent has been contaminated and must be discarded.
NOTE 3: The R1 and R2 Solutions must be at the reagent compartment storage temperature of the analyzer before performing the assay. Refer to the analyzer specific application sheet for additional information.
NOTE 4: To ensure reconstituted EA reagent stability, protect from prolonged, continuous exposure to bright light.

Store reagents at 2-8°C. **DO NOT FREEZE.** For stability of the unopened components, refer to the box or bottle labels for the expiration date.

R1 Solution: 60 days refrigerated on analyzer or at 2-8°C.
R2 Solution: 60 days refrigerated on analyzer or at 2-8°C.

Specimen Collection and Handling
Collect urine samples in clean glass or plastic containers. Centrifuge specimens with high turbidity before testing. Treat human urine as potentially infectious material.

The Mandatory Guidelines for Federal Workplace Drug Testing Programs; Final Guidelines; Notice recommends that specimens that do not receive an initial test within 7 days of arrival at the laboratory should be placed into secure refrigeration units.[3]

Assay Procedure
Chemistry analyzers capable of maintaining a constant temperature, pipetting samples, mixing reagents, measuring enzymatic rates and timing the reaction accurately can be used to perform this assay. Application sheets with specific instruments parameters are available from Microgenics, part of Thermo Fisher Scientific.

Additional barcode labels are provided for semi-quantitative determination with the 85 mL kit only. To use, over label each bottle with the correct label.

For Hitachi analyzers please note:
Catalog No. 1815555-Hitachi 704 analyzer use: Transfer each solution into a clean, unused analyzer bottle and place the bottles directly into the reagent compartment of the analyzer.
Catalog No. 1815563-Hitachi 747 analyzer use: Use the funnel provided to transfer a portion of the R2 Solution into the appropriately labeled empty R2 Solution bottle provided.
Hitachi 747 Analyzer: The CEDIA DAU Sample Check Assay must be performed in the outer reaction cuvettes only. Therefore, the solution bottles must be placed onto the lower shelf of the reagent compartment of the analyzer. The Hitachi 747 analyzer requires a reagent line cooling modification and priming prior to running the CEDIA DAU Sample Check Assay. Refer to the application protocol for further details.
Hitachi 747 Analyzer (not in U.S.A.): If necessary, use the application disk to read in the instrument settings.
Hitachi 911, 912, and 917 analyzers (not in U.S.A.): If necessary, use the application disk to read in the instrument settings.
Hitachi 911, 912, and 917 analyzers: If the bar code cannot be read into the analyzer, the numerical sequence on the bar code label can be entered manually via the keyboard.

Quality Control and Calibration
Good laboratory practice suggests that the control be tested each day patient samples are tested and each time calibration is performed. For the CEDIA DAU Sample Check Assay, it is recommended that one level of control be run. Assessment of quality control should be based on the values obtained for the control, which should fall within specified limits. If any trends or sudden shifts in values are detected, all operating parameters should be reviewed. Contact Customer Technical Support for further assistance. All quality control requirements should be performed in conformance with local, state and/or federal regulations or accreditation requirements.

For analysis of samples, use the CEDIA Negative Calibrator to analyze results. For the Hitachi analyzers, place the CEDIA Negative Calibrator into the appropriate standard position selected by the user. Enter in the Calibration List the S1 ABS as zero and the K factor as 1,000. For all other analyzers, see the analyzer specific application sheet.

Results and Expected Values

The following recommended result reporting scheme can be used to report results for the CEDIA DAU Sample Check Assay.

For CEDIA assays screen-negative samples:

1) If the specimen results in a creatinine of ≥ 20 mg/dL and a negative Sample Check result, it will be reported as 'Negative'.
2) If the specimen results in a creatinine < 20 mg/dL and a negative Sample Check result, it will be reported as: low creatinine and 'negative' Sample Check.
3) If the specimen results in a creatinine > 20 mg/dL and a positive Sample Check result, it will be reported as: normal creatinine with 'positive' Sample Check.
4) If the specimen results in a creatinine < 20 mg/dL and a positive Sample Check result, it will be reported as: low creatinine and 'positive' Sample Check.

For CEDIA assays screen-positive samples:

1) If a specimen is positive for any CEDIA drugs of abuse assay, regardless of the CEDIA Sample Check result, treat the specimen as a typical positive specimen.

The CEDIA DAU Sample Check Assay has been formulated to be more sensitive to specimen variation than other CEDIA assays. Because of the increased sensitivity to sample variation, the expected value range for a sample with no loss in integrity is 85-105%. Laboratories may narrow or expand their expected value range based on local sample population characteristics.

Limitations

1. The CEDIA DAU Sample Check Assay is for use with human urine only.
2. A low or high test result indicates the presence of an interferent; it does not measure the interfering substance, or identify the interfering substance.
3. Other substances and/or factors not listed may interfere with the test and cause false results (e.g. technical or procedural errors).

Specific Performance Characteristics

Typical performance results obtained on the Hitachi 717 analyzer are shown below.[4] The results obtained in your laboratory may differ.

Precision

Measured precision studies, using packaged reagents, calibrator, and control (low), yielded the following results in mA/min with a Hitachi 717 analyzer using NCCLS modified replication experiment guideline.

Within-run imprecision		
	Control	Calibrator
n	126.0	126.0
x̄ (% of normal)	73.7	100.0
SD (% of normal)	0.4	0.7
% C V	0.6	0.7

Total imprecision		
	Control	Calibrator
n	126.0	126.0
x̄ (% of normal)	73.7	100.0
SD (% of normal)	0.8	1.1
% C V	1.1	1.1

Normal Range Study

A total of two thousand six hundred and thirty-seven urine samples were assayed with the CEDIA DAU Sample Check Assay on the Hitachi 717 analyzer. Results were as follows:

Normal Range Study			
	Study 1	Study 2	Study 3
n	1084.0	556.0	997.0
x̄ (%)	97.0	97.0	97.0
SD (%)	3.1	3.7	3.9

Specificity

No interference was observed from the following substances added to the normal endogenous concentrations found in urine when tested using the CEDIA DAU Sample Check Assay:

Substance	Concentration	Substance	Concentration
Acetone	≤ 1.0 g/dL	Hemoglobin	≤ 0.3 g/dL
Ascorbic acid	≤ 1.5 g/dL	Human serum albumin	≤ 0.5 g/dL
Creatinine	≤ 0.5 g/dL	Oxalic acid	≤ 0.1 g/dL
Ethanol	≤ 1.0 g/dL	Riboflavin	≤ 7.5 mg/dL
Galactose	≤ 10 mg/dL	Sodium chloride	≤ 6.0 g/dL
γ-globulin	≤ 0.5 g/dL	Urea	≤ 6.0 g/dL
Glucose	≤ 3.0 g/dL		

References

1. Liu RH, Goldberger BA, eds. Handbook of Workplace Drug Testing. Washington DC: AACC Press, 1995
2. Henderson DR, Friedman, SB Harris, JD, et al. CEDIA, A New Homogeneous Immunoassay System. *Clin. Chem.* 1986; **32**; 1637-1641
3. Notice of Mandatory Guidelines for Federal Workplace Drug Testing Program: Final Guidelines. Federal Register. 1988; **69** (Apr 11): 11983.
4. Data on file at Microgenics Corporation, part of Thermo Fisher Scientific.
5. Data on traceability are on file at Microgenics Corporation, part of Thermo Fisher Scientific.

Glossary:

http://www.thermofisher.com/symbols-glossary

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