Name of Procedure:

Use of the Dade Behring Viva Jr. EMIT Analyzer as a Drug Screen

Suggested Uses:

This procedure does not cover every aspect of the instrument used. The operator of the instrument should read the manual for the instrument before using this procedure.

The EMIT analyzer can be used to screen blood, serum, and urine samples for the presence of the following classes of compounds: cocaine and its metabolites, benzodiazepines, barbiturates, opiates, methadone, and metabolites of delta-9-THC.

The EMIT analyzer is designed to analyze urine, but can test blood / serum extracts.

This is only a screening test. Samples that test positive for one or more classes of drugs by this test must have the drugs confirmed by mass spectrometry to be reported as an identification. There are some cases of uncommon substances causing false positives using this test, which must be kept in mind when evaluating the results of this test.

Items Needed to Perform Procedure:

Test tubes
Stoppers or caps
Vortexer
Centrifuge
Reservoir Filters
Glass boiling beads
Zymark TurboVap LV or other evaporator
Dade Behring Viva Jr. EMIT Analyzer
2 mL analyzer cups and caps
Appropriate EMIT Reagent kits for the Viva Jr. EMIT Analyzer
Appropriate EMIT calibrators
Automatic pipets, 1mL, 250 uL, 0.010 - 5 mL adjustable

Reagents Used in Procedure:

Phenobarbital, 1 mg/mL
Nordiazepam, 1 mg/mL
Morphine, 1 mg/mL
Benzoylecgonine, 1 mg/mL
Methadone, 1 mg/mL
Delta-9-carboxy-11-nor-delta-9-tetrahydrocannabinol (THC-COOH), 5 µg/mL
Deionized water
Acetone
Methanol

Stock Calibration Solution:

1. To a 10 mL volumetric flask, add the following:
   0.5 mL Phenobarbital (1 mg/mL),
   0.025 mL Nordiazepam (1 mg/mL),
   0.025 mL Morphine (1 mg/mL),
   0.025 mL Benzoylecgonine (1 mg/mL),
   0.025 mL Methadone (1 mg/mL),
   2.5 mL Delta-9-carboxy-11-nor-delta-9-tetrahydrocannabinol (5 µg/mL),
   dilute the flask to volume with methanol.

Stock Verification Solution:

Prepare a second solution identical to the stock calibrator solution and label this solution the “Stock Verification Solution”.

Calibration Sample:

1. Add 0.100 mL of the stock calibration solution to the test tube.

2. Add 4.9 mL of a drug free matrix equivalent to the analyte(s) (water, blood, etc.) to the test tube.

3. Cap and vortex the test tube.
4. The concentration of the calibration sample is 1000 ng/mL phenobarbital, 50 ng/mL nordiazepam, 50 ng/mL morphine, 50 ng/mL benzoylecgonine, 50 ng/ml methadone, 25 ng/mL THC-COOH.

Verification Sample:

Prepare a verification sample(s) identical to the calibrator sample using the stock verification solution.

Reagents:

1. Fill the appropriate reagent bottles. Mark bottles with the appropriate expiration dates and lot numbers.

2. When the instrument is not in use cap the bottles.

Instrument Set Up:

1. Check fluid levels of the system solution bottle in the instrument's cabinet and refill as needed. Ensure that the waste bottle is empty.

2. Check the paper and add paper if needed.

Calibration of Instrument:

1. Order Calibration/QC.
2. Choose the appropriate calibration/control method.
3, Place the appropriate calibrators/controls in the proper location.
4. Start Measurement.

Sample Preparation:

1. Urine samples and clear liquid samples:

   a. Pipet at least 0.250 mL of sample into appropriate sample cup.

2. Whole blood and Serum extraction

   Extract calibration samples, blanks, and verification sample(s) with case samples.

a. Pipet 2.5 mL of acetone into a disposable glass test tube (preferably 16 x 125 mm).
b. Pipet 1 mL of whole blood (case, std., or control) into the appropriate tube. Add the blood directly to the acetone. Do not run the blood down the side of the tube.
c. Cap the tube with a stopper and vortex for approximately 10 seconds.
d. Allow the tubes to stand for approximately 10 minutes and repeat the vortex step.
e. Centrifuge the tubes for ten minutes at a minimum of 2500 rpm.
f. If the supernatant contains particulate then place a 4 mL reservoir containing a frit into a clean test tube. If the supernatant does not contain significant particulate then decant the supernatant directly into a clean test tube, add a glass boiling bead to each test tube, and skip to step j.
g. Decant the supernatant from the previous step into the reservoir and allow it to completely drain into the test tube.
h. Add 0.5 mL acetone to each reservoir and allow it to drain into the tube.
i. If a reservoir was used then remove the reservoir and add a glass boiling bead to each tube.
j. Ensure that water level is adequate in the TurboVap LV. Place the tubes in the TurboVap LV set at 50 ^{o}C and evaporate the liquids until the tubes are completely dry.
k. If the specimens are not going to be analyzed that day, they can be sealed and placed in the refrigerator.
l. Immediately prior to analysis, reconstitute the residues with 0.25 mL of methanol.
m. Vortex each tube.
n. Centrifuge the tubes for 10 minutes and transfer the supernatant to an EMIT analyzer cup with a disposable glass Pasteur pipet.
o. Cap the cups until the rack is placed on the analyzer to prevent evaporation of the methanol.

Application of Procedure on Evidence:

1. Sample Programming:

   a. Create a Sample List by ordering the appropriate samples.
   b. Place the samples in the appropriate tray location.
   c. Start Measurement.

2. Quality Control:

At least one blank and one verifier must be run during the analysis.

3. Data Record Keeping:

   Ensure that the following data are documented.
   a. Lot numbers of reagents and calibrators.
   b. Expiration dates of reagents and calibrators.
   c. Results of the calibrators, verification samples, blanks, and samples.

   Original calibration, control, or case data that is transcribed to a worksheet will be reviewed by another chemist.

   The data produced from calibration standards and quality control samples are reference materials and shall be stored in the toxicology section object repository of FLAIRS with a file name made of "EMITQC" and the date in yyyymmdd format with no space between them. (example: EMITQC20080818) Original calibration, control, or case data that is transcribed to a worksheet will be reviewed by another chemist.

4. Reporting Criteria

   An immunoassay result that is at or above the cutoff control minus 0.015 dAbs/m (0.005 for the opiate assay) will be considered positive. An immunoassay result that is not at least 0.015 dAbs/m (0.005 dAbs/m for the opiate assay) above the negative control will be considered negative for the analyte tested for that assay. An immunoassay result that is at least 0.015 dAbs/m (0.005 dAbs/m for the opiate assay) above the negative control, but less than 0.015 dAbs/m (0.005 dAbs/m for the opiate assay) below the cutoff control will be considered elevated.

Safety Concerns:

Insure that the instrument cover is in the down position when the instrument is in use.

When working with biohazardous samples use protective measures, such as gloves, eye protection, and work with the samples in a biosafety hood.

Maintenance:

The EMIT maintenance log book will be filled out at the completion of any set of EMIT runs. Any other maintenance or service performed on this instrument will be documented in the log book.

Literature References:

Viva Jr. Operator's Manual.

Blood extraction procedure acquired from Georgia Bureau of Investigation.