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THC ULTRA

ELISA KIT INSTRUCTIONS PRODUCT # 182319 & 182315
FORENSIC USE ONLY

INTENDED USE: For the determination of trace quantities of Parent THC and THC metabolite in human oral fluid. This assay was designed to be compatible with the Neogen NeoSal® Oral Fluid Collection Device.

DESCRIPTION

Neogen Corporation's THC Ultra ELISA (Enzyme-Linked ImmunoSorbent Assay) test kit is a qualitative one-step kit designed for use as a screening device for the detection of drugs and/or their metabolites. The kit was designed for screening purposes and is intended for forensic use only. It is recommended that all suspect samples be confirmed by a quantitative method such as gas chromatography/mass spectrometry (GC/MS).

ASSAY PRINCIPLES

Neogen Corporation's test kit operates on the basis of competition between the drug or its metabolite in the sample and the drug-enzyme conjugate for a limited number of antibody binding sites. First, the sample or control is added to the microplate, along with THC Ultra buffer and incubated at room temperature for 60 minutes. Next, the drug-enzyme conjugate is added and the mixture is incubated for 30 minutes at room temperature. During this incubation, the drug in the sample or the drug-enzyme conjugate binds to antibody immobilized in the microplate wells. After incubation, the plate is washed to remove any unbound sample or drug-enzyme conjugate. The presence of bound drug-enzyme conjugate is recognized by the addition of K-Blue® Substrate (TMB). After a 30 minute substrate incubation, the reaction is halted with the addition of an acid stop. The test can be read visually or with a microplate reader equipped with a 450 nm filter. The extent of color development is inversely proportional to the amount of drug in the sample or control. In other words, the absence of the drug in the sample will result in a dark yellow color, whereas the presence of the drug will result in light yellow to no color development.

STORAGE AND STABILITY

This kit can be used until the expiration date on the label when stored refrigerated at 2-8°C.

MATERIALS PROVIDED – SINGLE KIT (96 WELL)

1. **Wash Buffer Concentrate (10X):** 20 mL. Phosphate buffered saline solution with a surfactant. Dilute 10 fold with deionized or ultrapure water before use. Diluted wash buffer is used to wash all unbound conjugate and samples from the plate after the conjugate incubation.
2. **K-Blue Substrate:** 20 mL (ready-to-use). Stabilized 3, 3′, 5, 5′ Tetramethylbenzidine (TMB) plus Hydrogen Peroxide (H_2O_2) in a single bottle. It is used to develop the color in the wells after washing. Light Sensitive.
3. **Drug-Enzyme Conjugate:** 200 µL. Drug-horseradish peroxidase conjugate. Dilute 50X before use.
4. **Drug-Enzyme Diluent:** 15 mL
5. **THC Ultra Buffer:** 3.5 mL (ready-to-use). Buffer solution required for the detection of Δ9-THC in oral fluid samples. Do not dilute.
6. **Antibody Coated Plate:** A 96 well Costar plate, in strips of 8 break-away wells, coated with anti-drug antiserum. The plate is ready for use as is. Do not wash.
7. **Acid Stop Solution:** 14 mL (ready-to-use). 1 N H_2SO_4 used to stop the enzyme reaction.

MATERIALS PROVIDED – BULK KIT (480 WELL)

1. **Wash Buffer Concentrate (10X):** 100 mL. Phosphate buffered saline solution with a surfactant. Dilute 10 fold with deionized or ultrapure water before use. Diluted wash buffer is used to wash all unbound conjugate and samples from the plate after the conjugate incubation.
2. **K-Blue Substrate:** 100 mL (ready-to-use). Stabilized 3, 3′, 5, 5′ Tetramethylbenzidine (TMB) plus Hydrogen Peroxide (H_2O_2) in a single bottle. It is used to develop the color in the wells after washing. Light Sensitive.
3. **Drug-Enzyme Conjugate:** 1 mL. Drug-horseradish peroxidase conjugate. Dilute 50X before use.
4. **Drug-Enzyme Diluent:** 50 mL.
5. **THC Ultra Buffer:** 5 x 3.5 mL (ready-to-use). Buffer solution required for the detection of Δ9-THC in oral fluid samples. Do not dilute.
6. **Antibody Coated Plate:** 5 x 96 well Costar plates, in strips of 8 break-away wells, coated with anti-drug antiserum. The plates are ready for use as is. Do not wash.
7. **Acid Stop Solution:** 90 mL (ready-to-use). 1 N H_2SO_4 used to stop the enzyme reaction.

MATERIALS NEEDED BUT NOT PROVIDED

1. Deionized water.
2. Precision pipettes that range from 10 µL - 1000 µL and disposable tips.
3. Graduated cylinder to dilute and mix wash buffer.
4. Plate cover or plastic film to cover plate during incubation.
5. Microplate reader with a 450 nm filter.

OPTIONAL MATERIALS

1. Microplate shaker.

PRECAUTIONS AND NOTES

1. **DO NOT** use kits or components beyond expiration date.
2. **DO NOT** mix conjugates and plates from different kit lots.
3. **DO NOT** pipette reagents by mouth.
4. Pour K-Blue Substrate out of the bottle into a clean reservoir. To prevent contamination of the substrate, **DO NOT** pipette out of the bottle.
5. Clean glassware (i.e. test tubes) to dilute samples.
6. All specimens should be considered potentially infectious. Exercise proper handling precautions.
7. Keep plate covered except when adding reagents, washing or reading.
8. Kit components should be refrigerated at all times when not in use.
9. Use aseptic technique when opening and removing reagents from vials and bottles.
10. **DO NOT** smoke, eat or drink in areas where specimens or reagents are being handled.
11. **DO NOT** substitute DI water for the wash step of this protocol. Use only Neogen's wash buffer.
12. **DO NOT** reuse wells, they are for one use only.

PROCEDURAL NOTES

1. Desiccant bag must remain in zip-lock with unused strips. Keep zip-lock pouch sealed when not in use to maintain a dry environment.
2. Use clean pipette tips for the buffer, drug-enzyme conjugate, controls and samples.
3. Before pipetting a reagent, rinse the pipette tip three times with that reagent.
4. When pipetting into the wells, **DO NOT** allow the pipette tip to touch the inside of the well or any of the reagent already inside the well. This may result in cross contamination.
5. Controls and samples should be assayed in duplicate.
6. Before substrate addition, wipe the outside bottom of the wells with a lint-free wiper to remove dust and fingerprints.
7. Gently mix specimens and reagents before use. Avoid vigorous agitation.

SAMPLE TREATMENT

This assay was designed to be compatible with the Neogen NeoSal Oral Fluid Collection Device with built-in 1:4 sample dilution. No further dilution is recommended for optimal assay performance.

TEST PROCEDURES

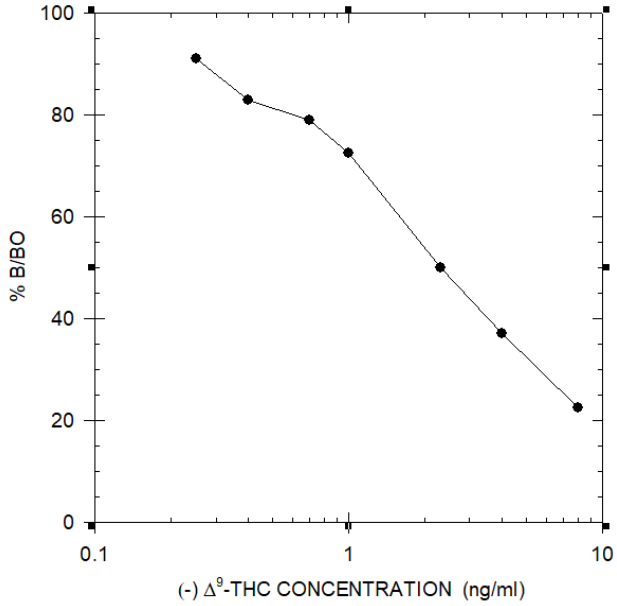
The following test procedures can be run manually or on an automated instrument. Please contact your Neogen representative for assistance with protocols for automated instruments.

1. Determine the number of wells to be used.
2. Prior to use, perform a 50X dilution of the drug-enzyme conjugate using the provided drug-enzyme diluent. The drug-enzyme conjugate is most stable in its concentrated form. Dilute only the volume necessary for the amount of strips currently being used. For example:

# of plates	Volume of Conjugate	Volume of Drug-Enzyme Diluent
1	140 µL	6.86 mL
5	700 µL	34.3 mL

3. Gently mix the diluted drug-enzyme conjugate solution by inversion 10-15 times. Do not vortex. Store unused conjugate at 2-8°C.
4. Add 25 µL of sample or controls to the appropriate wells in duplicate.
5. Add 25 µL of THC Ultra Buffer to each well. For manual runs use 8-channel pipette or 12-channel pipette for rapid addition.
6. Cover plate with plastic film or plate cover and incubate at room temperature for 60 minutes.
7. Add 50 µL of the drug-enzyme conjugate to each well. For manual runs use 8-channel pipette or 12-channel pipette for rapid addition.
8. Cover plate with plastic film or plate cover and incubate at room temperature for 30 minutes.
9. For manual runs, mix by gently shaking plate. A microplate shaker may be used.
10. During the conjugate incubation, dilute concentrated wash buffer 10 fold with deionized water (i.e. 20 mL of concentrated wash buffer plus 180 mL of deionized water). Mix thoroughly. Diluted wash buffer is stable for 5 days at room temperature or 7 days at 2-8°C.
11. Once the incubation is complete, dump or aspirate the liquid from the wells. Tap the plate on a clean lint-free towel to remove any remaining liquid in the wells.
12. Wash each well with 300 µL of diluted wash buffer. Manual Wash: For manual wash procedures repeat for a total of 3 washings, invert and tap dry the plate following each step. After completing the last wash step wipe the bottom of the wells with a lint-free towel to remove any liquid on the outside of the wells. Automated Wash: If an automated plate washer is used wash the plate for a total of 5 washings with 300 µL of diluted wash buffer. It is important for the automated washer to conduct a final aspirate cycle to eliminate residual amounts of wash buffer. Residual amounts of buffer in the wells will affect assay performance. Note: DI water should never be used for the plate wash.
13. Add 100 µL of K-Blue Substrate to each well. For manual runs, use a multi-channel pipette for best results.
14. Cover plate with plastic film or plate cover and incubate at room temperature for 30 minutes.
15. Add 100 µL of Acid Stop (1N H_2SO_4) to each well to stop enzyme reaction. Mix gently before measuring absorbance. For automated systems a 10 second shake is sufficient. Measure the absorbance at a wavelength of 450 nm. Wells should be read within 2 hours of stopping the reaction.

STANDARD CURVE IN ORAL FLUID BUFFER



SENSITIVITY

Compound	**I-50 in Oral Fluid Buffer**
(-)-Δ^9-THC	2.35 ng/mL

The term I-50 is used to define the sensitivity of the test. This number is derived from a standard curve generated with the drug. The drug concentration that shows 50% less color activity than the zero standard is considered to be the I-50.

SPECIFICITY

Compound	**% Cross-Reactivity**
(-)-Δ^9-THC	100
(-)-11-nor-9-Carboxy-Δ^8-THC	1114
(-)-11-nor-9-Carboxy-Δ^9-THC	962
(±)-11-nor-9-Carboxy-Δ^9-THC	741
(±)-11-Hydroxy-Δ^9-THC	211
(-)-Δ^8-THC	83
(6a*R*,9*R*)-Δ^{10}-THC	59
(6a*R*,9*S*)-Δ^{10}-THC	43
Cannabinol (CBN)	31
Δ^9-THC Acetate	2.2
Δ^9-THCA-A	1.96
Cannabidiol (CBD)	0.25
Cannabigerol (CBG)	0.02

The compounds having cross-reactivity below 0.01% did not show any significant reaction up to 10 µg/mL.

ALL THE FOLLOWING HAVE A CROSS-REACTIVITY <0.01%.

Acetaminophen; Acetopromazine; Acetylsalicylic Acid; ε-amino-n-caproic Acid; Amitriptyline; Ascorbic Acid; Benzoic Acid; Caffeine; Chlordiazepoxide; Chlorpromazine; Clenbuterol; Codeine; Cotinine; Dexamethasone; Dextromethorphan; Diclofenac; Dimethyl Sulfoxide; Doxepin; Ephedrine; Erythromycin; Ethyl p-amino benzoate; Fenoprofen; Flunixin; Folic Acid; Folinic Acid; Furosemide; Gemfibrozil; Gentisic Acid; Glipizide; L-Glutamic Acid; Glutethimide; Glycopyrrolate; Heparin; Hippuric Acid; Hordenine; Hydrocortisone; Ibuprofen; Imipramine; Isoxsuprine; Lidocaine; Meperidine; Metaproterenol; Methadone; Methaqualone; Methocarbamol; Methylene Blue; Methylprednisolone; Nalorphine; Naproxen; Niacinamide; Nicotine; Nortriptyline; Orphendarine; Oxyphenbutazone; Penicillin G-Potassium; Penicillin G-Procaine; Pentoxifylline; Phencyclidine; Phenothiazine; Phenylbutazone; Polyethylene Glycol; Prednisolone; Primidone; Procainamide; Procaine; Promazine; Pseduoephedrine; Pyrantel; Pyrilamine; Pyrimethamine; Quinidine; Quinine; Salbutamol; Salicylamide; Salicylic Acid; Sodium Azide; Theophylline; Thiamine; Trimethoprim; Trimipramine; Uric Acid.

RESULTS INTERPRETATION

Positive Result: Samples with an absorbance less than or equal to the laboratory's designated cutoff calibrator should be presumed positive. All positive samples should be confirmed by a quantitative method such as GC/MS.

Negative Result: Samples with an absorbance greater than the laboratory's designated cutoff calibrator should be presumed negative.

Note: The kit was designed for screening purposes only. It is recommended that all suspect samples be confirmed by a quantitative method such as GC/MS or HPLC.

TECHNICAL SUPPORT

For technical assistance, please contact our technical services department at (859) 254-1221 or email at techservice-toxicology@neogen.com. Representatives are available Monday – Friday from 8:00 am – 6:00 pm EST.

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