MAYO CLINIC LABORATORIES

Test Definition: THCX

Delta-8 and Delta-9-Carboxy-Tetrahydrocannabinol (THC) Confirmation, Chain of Custody, Random, Urine

Overview

Useful For

Detection and confirmation of drug use of cannabis/marijuana and to specifically identify and quantify delta-8 carboxy tetrahydrocannabinol (THC-COOH) and delta-9-THC-COOH

Chain of custody is required whenever the results of testing could be used in a court of law. Its purpose is to protect the rights of the individual contributing the specimen by demonstrating that it was always under the control of personnel involved with testing the specimen; this control implies that the opportunity for specimen tampering would be limited.

Additional Tests

Test Id	Reporting Name	Available Separately	Always Performed
COCH	Chain of Custody Processing	No	Yes
ADLTX	Adulterants Survey, CoC, U	Yes	Yes

Testing Algorithm

Testing for adulterants will be performed on all chain-of-custody urine samples per regulatory requirements.

Method Name

Immunoassay/Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

NY State Available

Yes

Specimen

Specimen Type

Urine

Ordering Guidance

This test is for situations that require the chain-of-custody process. For testing **not** requiring chain of custody, order THCU / Delta-8 and Delta-9-Carboxy-Tetrahydrocannabinol (THC) Confirmation, Random, Urine.

Specimen Required

Supplies: Chain of Custody Kit (T282)

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Container/Tube: Chain-of-Custody Kit containing the specimen containers, seals, and required documentation.
Specimen Volume: 5 mL
Collection Instructions: Collect specimen in the container provided, seal, and submit with the associated documentation to satisfy the legal requirements for chain-of-custody testing.

Forms

1. Chain of Custody Request is included in the Chain-of-Custody Kit (T282).
2. If not ordering electronically, complete, print, and send a Therapeutics Test Request (T831) with the specimen.

Specimen Minimum Volume

0.5 mL

Reject Due To

Gross hemolysis	OK
Gross icterus	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated (preferred)	14 days	
	Ambient	72 hours	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information

There are over 100 different cannabinoids in cannabis/marijuana. The main psychoactive cannabinoid is delta-9-tetrahydrocannabinol (delta-9-THC), which is the active agent of the popularly abused street drug, cannabis/marijuana. Delta-8 tetrahydrocannabinol (delta-8-THC) is another psychoactive substance found in the *Cannabis sativa* plant, of which cannabis/marijuana and hemp are 2 varieties. Delta-8 THC is one of over 100 cannabinoids produced naturally by the cannabis plant but is not typically found in significant amounts in the plant itself. As a result, concentrated amounts of delta-8 THC are typically manufactured from hemp-derived cannabidiol.

Following consumption of cannabis/marijuana, delta-9-THC metabolizes to a variety of inactive products, one of them being the carboxy metabolite (delta-9-THC-COOH). In almost all medico-legal cases or when the patient adamantly denies cannabis/marijuana use and the immunoassay test is positive, confirmation of the result by a definitive test is required. This test is a definitive, confirmatory test using liquid chromatography tandem mass spectrometry to identify and quantify delta-8-THC-COOH and delta-9-THC-COOH.

Chain of custody is a record of the disposition of a specimen to document each individual who collected, handled, and performed the analysis. When a specimen is submitted in this manner, analysis will be performed in such a way that it will withstand regular court scrutiny.

Reference Values

Not detected
Positive results are reported with a quantitative result.

Cutoff concentrations:

Immunoassay Screen: 50 ng/mL

Liquid chromatography tandem mass spectrometry:
Delta8- tetrahydrocannabinol (THC): 5.0 ng/mL
Delta-9-THC: 5.0 ng/mL

Interpretation

The presence of delta-8 and/or delta-9 carboxy tetrahydrocannabinol (THC-COOH) in urine is a strong indicator that the patient has used cannabis/marijuana.

Carboxy tetrahydrocannabinol has a long half-life and can be detected in urine for more than 7 days after a single use.

Chronic use causes accumulation of THC and THC-COOH in adipose tissue, such that it is excreted into the urine for as long as 30 to 60 days from the time chronic use is halted.

Cautions

No significant cautionary statements

Clinical Reference

1. Baselt RC. Disposition of Toxic Drugs and Chemicals in Man. 12th ed. Biomedical Publications; 2020
2.Langman LJ, Bechtel LK, Holstege CP. Clinical toxicology. In: Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 43

Performance

Method Description

This test includes immunoassay and confirmation with quantification by liquid chromatography tandem mass spectrometry (LC-MS/MS).

The tetrahydrocannabinol (THC) immunoassay is based on the kinetic interaction of microparticles in a solutio as

measured by changes in light transmission. In the absence of sample drug, soluble drug conjugates bind to antibody-bound microparticles, causing the formation of particle aggregates. As the aggregation reaction proceeds in the absence of sample drug, the absorbance increases. When a urine sample contains the drug in question, this drug competes with the drug derivative conjugate for microparticle-bound antibody. Antibody bound to sample drug is no longer available to promote particle aggregation, and subsequent particle lattice formation is inhibited. The presence of sample drug diminishes the increasing absorbance in proportion to the concentration of drug in the sample. Sample drug content is determined relative to the value obtained for a known cutoff concentration of drug.(Package insert: THC2. Roche Diagnostics; V 4.0, 06/2024)

Carboxy tetrahydrocannabinol (THC-COOH) is extracted from urine by making the urine alkaline to hydrolyze THC-COOH glucuronide. The hydrolyzed samples are diluted for analysis by LC-MS/MS using selected ion monitoring.(Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Monday through Sunday

Report Available
3 to 5 days

Specimen Retention Time
2 weeks

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

Fees & Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification
This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information
G0480

80349 (if appropriate for select payers)
Clinical Toxicology CPT Code Client Guidance

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
THCX	Carboxy-THC Confirmation, CoC, U	102114-6

Result ID	Test Result Name	Result LOINC® Value
2449	Carboxy-THC Immunoassay Screen	19415-9
36238	Delta-9 Carboxy-Tetrahydrocannabinol by LC-MS/MS	20521-1
36239	Carboxy-THC Interpretation	69050-3
36240	Chain of Custody	77202-0
618771	Delta-8 Carboxy-Tetrahydrocannabinol by LC-MS/MS	101249-1