

THC

One Step Marijuana Test Strip Package Insert

A rapid, one step test for the qualitative detection of THC metabolites in human urine.

For healthcare professionals including professionals at point of care sites.

For in vitro diagnostic use only.

INTENDED USE

The **THC One Step Marijuana Test Strip** is a rapid chromatographic immunoassay for the detection of 11-nor- Δ^9 -THC-9 COOH (THC metabolite) in human urine at a cut-off concentration of 50 ng/mL.

This assay provides only a preliminary analytical test result. A more specific alternate chemical method must be used in order to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) is the preferred confirmatory method. Clinical consideration and professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are used.

SUMMARY

THC (Δ^9 -tetrahydrocannabinol) is the primary active ingredient in cannabinoids (marijuana). When smoked or orally administered, it produces euphoric effects. Users have impaired short term memory and slowed learning. They may also experience transient episodes of confusion and anxiety. Long term relatively heavy use may be associated with behavioral disorders. The peak effect of smoking marijuana occurs in 20-30 minutes and the duration is 90-120 minutes after one cigarette. Elevated levels of urinary metabolites are found within hours of exposure and remain detectable for 3-10 days after smoking. The main metabolite excreted in the urine is 11-nor- Δ^9 -tetrahydrocannabinol-9-carboxylic acid (Δ^9 -THC-COOH).

The **THC One Step Marijuana Test Strip** is a rapid urine screening test that can be performed without the use of an instrument. The test utilizes a monoclonal antibody to selectively detect elevated levels of marijuana in urine. The **THC One Step Marijuana Test Strip** yields a positive result when the concentration of marijuana in urine exceeds 50 ng/mL. This is the suggested screening cut-off for positive specimens set by the Substance Abuse and Mental Health Services Administration (SAMHSA, USA).¹

PRINCIPLE

The **THC One Step Marijuana Test Strip** is a rapid chromatographic immunoassay based on the principle of competitive binding. Drugs which may be present in the urine specimen compete against the drug conjugate for binding sites on the antibody. During testing, a urine specimen migrates upward by capillary action. Marijuana, if present in the urine specimen below 50 ng/mL, will not saturate the binding sites of the antibody coated particles in the test strip. The antibody coated particles will then be captured by immobilized marijuana conjugate and a visible colored line will show up in the test line region. The colored line will not form in the test line region if the marijuana level is above 50 ng/mL because it will saturate all the binding sites of anti-marijuana antibodies. A drug-positive urine specimen will not generate a colored line in the test line region because of drug competition, while a drug-negative urine specimen will generate a line in the test line region because of the absence of drug competition.

To serve as a procedural control, a colored line will always appear at the control line region if the test has been performed properly.

REAGENTS

The test strip contains mouse monoclonal anti-Marijuana antibody-coupled particles and Marijuana-protein conjugate. A goat antibody is employed in the control line system.

PRECAUTIONS

- For healthcare professionals including professionals at point of care sites.
- For *in vitro* diagnostic use only. Do not use after the expiration date.
- The test strip should remain in the sealed pouch until use.
- All specimens should be considered potentially hazardous and handled in the same manner as an infectious agent.
- The test strip should be discarded according to federal, state and local regulations.

STORAGE AND STABILITY

Store as packaged in the sealed pouch at 2-30°C (36-86°F). The test strip is stable through the expiration date printed on the sealed pouch. The test strips must remain in the sealed pouch until use. **DO NOT FREEZE.** Do not use beyond the expiration date.

SPECIMEN COLLECTION AND PREPARATION

Urine Assay

The urine specimen must be collected in a clean and dry container. Urine collected at any time of the day may be used. Urine specimens exhibiting visible precipitates should be centrifuged, filtered, or allowed to settle to obtain a clear specimen for testing.

Specimen Storage

Urine specimens may be stored at 2-8°C for up to 48 hours prior to testing. For prolonged storage, specimens may be frozen and stored below -20°C. Frozen specimens should be thawed and mixed before testing.

PROCEDURE

Materials Provided

- Test strips
- Package insert

Materials Required But Not Provided

- Specimen collection container
- External controls
- Timer

DIRECTIONS FOR USE

Allow the test strip, urine specimen, and/or controls to equilibrate to room temperature (15-30°C) prior to testing.

1. Remove the test strip from the sealed pouch and use it as soon as possible.
2. With arrows pointing toward the urine specimen, immerse the test strip vertically in the urine specimen for at least 10-15 seconds. Do not pass the maximum line (MAX) on the test strip when immersing it. See the illustration below.
3. Place the test strip on a non-absorbent flat surface, start the timer and wait for the colored line(s) to appear. The result should be read at 5 minutes. It is important that the background is clear before the result is read. Do not interpret the result after 10 minutes.

INTERPRETATION OF RESULTS

(Please refer to the illustration below)

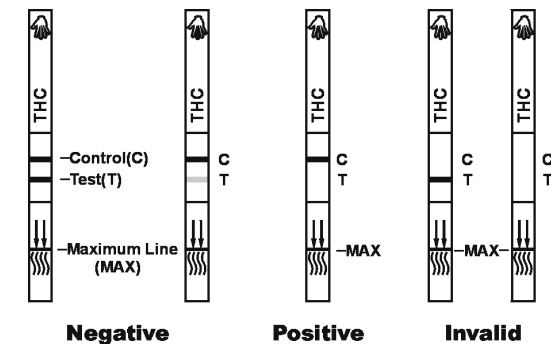
NEGATIVE:* **Two lines appear.** One colored line should be in the Control region (C), and another colored line should be in the Test region (T). This negative result indicates that the marijuana concentration is below the detectable level of 50 ng/mL.

* **NOTE:** The shade of color in the Test region (T) may vary, but it should be considered negative whenever there is even a faint line.

POSITIVE: **One colored line appears in the Control region (C).** No line appears in the Test region (T). This positive result indicates that the marijuana concentration is above the detectable level of 50 ng/mL.

INVALID: **Control line fails to appear.** Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for Control line failure. Review the procedure and repeat the test with a new test strip. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

Test Results



QUALITY CONTROL

A procedural control is included in the test. A colored line appearing in the Control region (C) is the internal procedural control. It confirms sufficient specimen volume, adequate membrane wicking and correct procedural technique. A clear background is also required.

Control standards are not supplied with this kit; however it is recommended that positive and negative controls be tested as good laboratory testing practice to confirm the test procedure and to verify proper test performance.

LIMITATIONS

1. The **THC One Step Marijuana Test Strip** provides only a qualitative, preliminary analytical result. A secondary analytical method must be used to obtain a confirmed result. Gas chromatography/mass spectrometry (GC/MS) is the preferred confirmatory method.^{1,2}
2. It is possible that technical or procedural errors, as well as other interfering substances in the urine specimen may cause erroneous results.
3. Adulterants, such as bleach and/or alum, in urine specimens may produce erroneous results regardless of the analytical method used. If adulteration is suspected, the test should be repeated with another urine specimen.
4. A Positive Result indicates presence of the drug or its metabolites but does not indicate level of intoxication, administration route or concentration in urine.
5. A Negative Result may not necessarily indicate drug-free urine. Negative results can be obtained when drug is present but below the cutoff level of the Test.
6. Test does not distinguish between drugs of abuse and certain medications.

PERFORMANCE CHARACTERISTICS

Accuracy

A three way side-by-side comparison was conducted using the **THC One Step Marijuana Test Strip** and a leading commercially available THC rapid test. Testing was performed on specimens previously collected from subjects

presenting for Drug Screen Testing. Presumptive positive results were confirmed by GC/MS. The following results were tabulated:

Method		Other THC Rapid Test		Total Results
THC One Step Test Strip	Results	Positive	Negative	
		140	0	140
		3	157	160
Total Results		143	157	300

Total Agreement: 99%

When compared to GC/MS at 50 ng/mL, the following results were tabulated:

Method		GC/MS		Total Results
THC One Step Test Strip	Results	Positive	Negative	
		118	22	140
		4	156	160
Total Results		122	178	300

Relative Sensitivity: 97% Relative Specificity: 88% Accuracy: 91%

When compared to GC/MS at 25 ng/mL, the following results were tabulated:

Method		GC/MS		Total Results
THC One Step Test Strip	Results	Positive	Negative	
		135	5	140
		6	154	160
Total Results		141	159	300

Relative Sensitivity: 96% Relative Specificity: 97% Accuracy: 96%

Point of Care Accuracy

A study was conducted using the same clinical specimens with ten percent (10%) distribution at 25% above and below the 50ng/mL cut-off at three geographically distinct point of care sites to determine the accuracy of the **THC One Step Marijuana Test Strip** in the hands of point of care user. Forty (40) positive specimens and forty (40) negative specimens were tested on three (3) different lots of each product.

The difference in sensitivity and specificity results obtained by the laboratory professional for the same clinical specimens compared to the results obtained by the point of care (untrained) user was insignificant. At a ninety-five percent (95%) confidence interval, the odds ratio for the point of care user versus the laboratory professional was 1 to 1 for sensitivity and specificity.

Analytical Sensitivity

A drug-free urine pool was spiked with 11-nor- Δ^9 -Tetrahydrocannabinol-9-carboxylic acid at the following concentrations: 75 ng/mL, 62.5 ng/mL, 37.5 ng/mL, 25 ng/mL, and 0 ng/mL. The result demonstrates >99% accuracy at 50% above and 50% below the cut-off concentration. The data are summarized below:

THC Concentration (ng/mL)	Percent of Cutoff	n	Visual Result	
			Negative	Positive
0	0	30	30	0
25	50%	30	30	0
37.5	75%	30	12	18
50	Cutoff	30	1	29
62.5	125%	30	1	29
75	150%	30	0	30

Specificity

The following table lists compounds and their respective concentrations in urine that yield a positive result in the **THC One Step Marijuana Test Strip** at 5 minutes.

Compound	Concentration (ng/mL)
Cannabinol	20,000
11-nor- Δ^8 -THC-9 COOH	30
11-nor- Δ^8 -THC-9 COOH	50
Δ^8 -THC	15,000
Δ^8 -THC	15,000

Precision

A study was conducted at 3 physician's offices by untrained operators using 3 different lots of product to demonstrate the within run, between run and between operator precision. An identical panel of coded specimens containing, according to GC/MS, no THC, 25% THC above and below the cut-off and 50% THC above and below the 50 ng/mL cut-off was provided to each site. For the specimens below the -25 % cut-off concentration, the 3 sites demonstrated 98% agreement with each other. For the -25% to +25% cut-off specimens, the 3 sites demonstrated 83% agreement with each other. For specimens above the +25% cut-off concentration, the 3 sites demonstrated 94% agreement with each other. For all results, the 3 sites were found to have a 91% agreement with each other.

Effect of Urinary Specific Gravity

Twenty-six (26) urine samples of normal, high, and low specific gravity ranges were spiked with 25 ng/mL and 75 ng/mL of 11-nor- Δ^9 -Tetrahydrocannabinol-9-carboxylic acid, respectively. The **THC One Step Marijuana Test Strip** was tested in duplicate using the twenty-six neat and spiked urine samples. The results demonstrate that varying ranges of urinary specific gravity does not affect the test results.

Effect of the Urinary pH

The pH of an aliquoted negative urine pool was adjusted to a pH range of 5 to 9 in 1 pH unit increments and spiked with 11-nor- Δ^9 -Tetrahydrocannabinol-9-carboxylic acid at 25 ng/mL and 75 ng/mL. The spiked, pH-adjusted urine was tested with the **THC One Step Marijuana Test Strip** in duplicate and interpreted according to the package insert. The results demonstrate that varying ranges of pH does not interfere with the performance of the test.

Cross-Reactivity

A study was conducted to determine the cross-reactivity of the test with compounds in drug free urine. The following compounds show no cross-reactivity when tested with the **THC One Step Marijuana Test Strip** at a concentration of 100 μ g/mL:

Non Cross-Reacting Compounds

4-Acetamidophenol	Fenoprofen	Pentazocine
Acetophenetidin	Furosemide	Pentobarbital
N-Acetylprocainamide	Gentisic acid	Perphenazine
Acetylsalicylic acid	Hemoglobin	Phencyclidine
Aminopyrine	Hydralazine	Phenelzine
Amitriptyline	Hydrochlorothiazide	Phenobarbital
Amobarbital	Hydrocodone	Phentermine
Amoxicillin	Hydrocortisone	l-Phenylephrine
Ampicillin	o-Hydroxyhippuric acid	β -Phenylethylamine
Ascorbic acid	3-Hydroxytyramine	Phenylpropanolamine
d,l-Amphetamine	Ibuprofen	Prednisolone
l-Amphetamine	Imipramine	Prednisone
Apomorphine	Iproniazid	Procaine
Aspartame	(-) Isoproterenol	

Atropine	Isoxsuprine	Promazine
Benzilic acid	Ketamine	Promethazine
Benzoic acid	Ketoprofen	d,l-Propranolol
Benzoylcegonine	Labetalol	d-Propoxyphene
Benzphetamine	Levorphanol	d-Pseudoephedrine
Bilirubin	Loperamide	Quinidine
Brompheniramine	Maprotiline	Quinine
Caffeine	Meprobamate	Ranitidine
Cannabidiol	Methadone	Salicylic acid
Chloral-hydrate	Methoxyphenamine	Secobarbital
Chloramphenicol	(+) 3,4-Methylenedioxy-amphetamine	Serotonin (5-Hydroxytyramine)
Chlordiazepoxide	(+) 3,4-Methylenedioxy-methamphetamine	Sulfamethazine
Chlorothiazide	(\pm) Chlorpheniramine	Sulindac
(\pm) Chlorpheniramine	Chlorpromazine	Temazepam
Chlorpromazine	Chlorquine	Methylphenidate
Cholesterol	Cholesterol	Methyprylon
Clomipramine	Clonidine	Morphine-3- β -D-glucuronide
Clonidine	Cocaine hydrochloride	Nalidixic acid
Cocaine hydrochloride	Codeine	Nalorphine
Codeine	Cortisone	Naloxone
Cortisone	(-) Cotinine	Naltrexone
(-) Cotinine	Creatinine	Naproxen
Creatinine	Deoxycorticosterone	Niacinamide
Deoxycorticosterone	Dextromethorphan	Nifedipine
Dextromethorphan	Diazepam	Norcodein
Diazepam	Diclofenac	Norethindrone
Diclofenac	Diflunisal	d-Norpropoxyphene
Diflunisal	Digoxin	Noscapine
Digoxin	Diphenhydramine	d,l-Octopamine
Diphenhydramine	Doxylamine	Oxalic acid
Doxylamine	Egonine hydrochloride	Oxazepam
Egonine hydrochloride	Ecgonine methylester	Oxolinic acid
Ecgonine methylester	(-) Y Ephedrine	Oxycodone
(-) Y Ephedrine	Erythromycin	Oxymetazoline
Erythromycin	β -Estradiol	p-Hydroxy-methamphetamine
β -Estradiol	Estrone-3-sulfate	Papaverine
Estrone-3-sulfate	Ethyl-p-aminobenzoate	Penicillin-G
Ethyl-p-aminobenzoate		

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- Baselt RC. *Disposition of Toxic Drugs and Chemicals in Man*. 2nd Ed. Biomedical Publ., Davis, CA. 1982; 488

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