### DELTA 8-THC IMPACT ON DRUG TESTING

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The cornerstone for marijuana testing has been the detection of delta 9-THC ( $\Delta$ 9-THC) in oral fluids or its metabolite, delta 9-THCA ( $\Delta$ 9-THCA), in urine. Under federal and non-regulated drug policies,  $\Delta$ 9-THCA metabolite is the only reportable metabolite. Specifically identifying  $\Delta$ 9-THCA as the prohibited cannabinoid has created an opportunity for marijuana chemists to create alternative cannabinoids with similar effects to avoid reporting a positive result in a workplace drug testing situation.

#### What is delta 8-THC?

Delta 8-THC ( $\Delta$ 8-THC) is one of the naturally occurring cannabinoids found in very low levels in cannabis plants. It was never considered a cannabinoid of concern, although the psychological effects are very similar to  $\Delta$ 9-THC. Both  $\Delta$ 8-THC and  $\Delta$ 9-THC interact with a receptor in the brain, which creates the psychological high associated with marijuana use. Another naturally occurring cannabinoid, cannabidiol (CBD), is widely used by the public for its reported benefits for the treatment for chronic pain, anxiety, neurological diseases, GI disorders and many more medical conditions. CBD interacts with a different receptor which primarily affects systems other than the brain

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#### How did $\Delta 8$ -THC come into being?

Marijuana confirmation testing began to change around 2018 when marijuana chemists began creating  $\Delta 8\text{-THC}$ . CBD or  $\Delta 9\text{-}$  THC can be converted into  $\Delta 8\text{-THC}$  by adjusting the substance's chemical structure (see figures below). These new  $\Delta 8\text{-THC}$  products are available as edibles and included in vape pens sold through CBD shops, gas stations and convenience stores.

#### Is Δ8-THC legal?

The legality of  $\Delta 8$ -THC is under review at the federal level. Sellers of  $\Delta 8$ -THC products are claiming that it comes from hemp, which by definition has < 0.3% THC. The federal counter argument to this is that the Hemp Farm Bill does not allow for the conversion of CBD to other cannabinoid products. Both state and federal courts are reviewing the issue.

#### **Δ8-THC** and the workplace

The introduction of  $\Delta 8$ -THC has had a major impact on laboratory testing. Individuals ingesting  $\Delta 8$ -THC products test positive using traditional immunoassay screening tests. In confirmation testing using mass spectrometry,  $\Delta 8$ -THC and  $\Delta 9$ -THC are similar and must be separated from each other to allow the laboratory to make the forensic identification that is required in drug testing. This requires more instrument time and additional tools to make this happen.

In work performed at CRL, individuals using large amounts of  $\Delta 8$ -THC as a replacement for traditional marijuana are identified in the laboratory. The problem for these individuals is that  $\Delta 8$ -THC products are not pure and various amounts of  $\Delta 9$ -THC remain from the chemical conversion, meaning they test positive for both substances.

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## By 2018 around 4% of marijuana positive samples had $\Delta 8$ -THC present, a number which increased to 20% by 2022.

At the beginning of the marijuana legalization movement CRL typically did not see any existence of  $\Delta 8$ -THC in confirmation testing of marijuana screen positives. By 2018 around 4% of marijuana positive samples had  $\Delta 8$ -THC present, a number which increased to 20% by 2022. Some urine samples had thousands of  $\Delta 8$ -THC metabolites with similar rates in oral fluids.

 $\Delta 8$ -THC presents similar challenges for laboratories in both urine and oral fluid samples. Laboratories have had to validate new analytical methods for confirmatory testing in order to report  $\Delta 8$ -THC appropriately in either specimen.

#### Δ8-THC and the future

The national trend to accept  $\Delta 9$ -THC for recreational and medical purposes continues to increase. At the time of this article's writing, the sale of  $\Delta 8$ -THC is approved by most states, but some states have not approved  $\Delta 8$ -THC. Since  $\Delta 8$ -THC has most of the same effects as marijuana, its use is being carefully reviewed to determine whether  $\Delta 8$ -THC products should be prohibited for federal drug testing programs. Although individuals claim slightly less effects when using  $\Delta 8$ -THC, the impairment aspects have not been well studied. It still creates the same risk as traditional marijuana for operators of trucks, planes or cars, meaning employers need to be even more diligent about looking for signs of employees being under the influence.

Changes to the THC molecule did not stop at  $\Delta 8$ -THC. Other variants are now available such as  $\Delta 10$ -THC and HHC (Hexahydrocannbinoid) for the treatment of insomnia and inflammation. Another variant, THCP (Tetrahydocannbiphorol), is 33 times more potent than THC. THC-O-Acetate is three times stronger than THC and claims to provide an introspective effect, much like LSD. THCV (Tetrahydrocannabivarin) is yet another variant, which is proposed for the treatment of Parkinson's and epilepsy, and is also reported to suppress hunger. All of these products are on store shelves as edibles and vapes.

Marijuana use is changing quickly with these alternative products, which are rapidly taking the shelf space that CBD products occupied a couple of years ago. All of these products are detectable at the screening step in the laboratory, which makes their reporting much more efficient. With the general acceptance of marijuana across the country, the federal government is still reviewing the legal status of the marijuana variants created by chemists. That decision will greatly impact the testing for marijuana and perhaps dozens of future products created using marijuana.



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