Delta-8-THC FAQ

What is Delta-8-Tetrahydrocannabinol (Delta-8-THC, Δ^8-THC, or D^8-THC)?

1. *What makes Δ^8-THC different?*

   Δ^8-THC is different from Δ^9-THC and other natural cannabinoids because it is not produced biosynthetically in Δ^9-THC predominant cultivars of cannabis or hemp. It is produced by isomerizing cannabidiol from hemp using various acids or other catalysts. Very low amounts of Δ^8-THC may sometimes be found in cannabis due to isomerization of Δ^9-THC.

   Δ^8-THC binds to the same receptors as Δ^9-THC and produces similar psychoactive effects although purportedly with less intensity than Δ^9-THC. Δ^8-THC is more thermodynamically stable than Δ^9-THC and therefore is sometimes found in low amounts in Δ^9-THC due to isomerization of Δ^9-THC to its more stable isomer.

2. *How does Δ^8-THC interact with the endocannabinoid system?*

   Δ^8-THC binds to cannabinoid receptors CB_1 and CB_2 in mammals. These receptors are the primary receptors in the endocannabinoid system and their activation by endogenous and exogenous substances is responsible for the effects mediated by the endocannabinoid system. The endogenous ligands of the cannabinoid receptors are termed endocannabinoids. They are N-arachidonoylethanolamine (anandamide, AEA) and 2-arachidonoylglycerol (2-AG).

3. *What is its mechanism of action?*

   Δ^8-THC is a partial agonist at the CB_1 and CB_2 receptors in mammals. Activation of the CB_1 receptor, which is found primarily in the central nervous system, decreases the concentration of the second messenger molecule cAMP by inhibiting adenylate cyclase.

4. *What are the effects of Δ^8-THC?*

   The effects of Δ^8-THC are purported to be like those of Δ^9-THC but less intense. Binding of Δ^8-THC to the CB1 receptor in the central nervous system is responsible for producing the psychoactive effects associated with high Δ^9-THC cannabis use.

5. *What else do I need to know about Δ^8-THC?*

   The Δ^8-THC being marketed today is almost certainly obtained by subjecting cannabidiol (CBD) to an acid catalyzed isomerization reaction that must be performed under carefully controlled conditions to obtain Δ^8-THC without contamination from Δ^9-THC and other substances. Some of these other

substances include isomers and degradation molecules that have not been completely characterized with regard to their etiology, effects and potential toxicity when ingested or inhaled. Since certified reference standards for most of these synthetic byproducts do not exist, laboratories with the ability to detect them cannot report findings when they are present in Δ^8-THC. Therefore, it is important to obtain Δ^8-THC from sources that produce and purify their extracts so that it does not contain prohibited amounts of Δ^9-THC, nor impurities with unknown effects.

What are the differences between Δ^8-THC and Δ^9-THC?

1. *What are the molecular and chemical differences?*

Δ^8-THC and Δ^9-THC have the same molecular weight, the same numbers of carbon, hydrogen, and oxygen atoms, and appear nearly the same when their chemical structures are drawn in two dimensions as shown in the figures below.

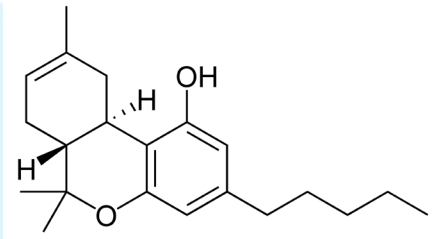

Figure 1. Chemical structure of Δ^8-THC

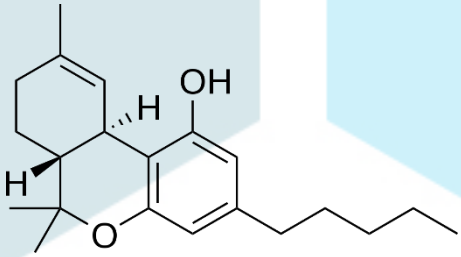

Figure 2. Chemical structure of Δ^9-THC

The only chemical difference between Δ^8-THC and Δ^9-THC is the location of the double bond in the cyclohexene ring of each molecule. In Δ^8-THC (Figure 1) the double bond is between carbon atoms 8 and 9 whereas in Δ^9-THC (Figure 2) the double bond is between carbon atoms 9 and 10. The differences in the names Δ^8-

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THC and Δ^9-THC are solely due to this difference in the location of the double bond because the symbol for delta (*i.e.*, Δ or D) is used to signify that the molecule has a double bond and the superscript (*i.e.*, 8 or 9) indicates the lower number of the two carbon atoms involved in the double bond.

The location of the double bond in the cyclohexene rings of Δ^8-THC and Δ^9-THC causes the ring to assume different conformations. This conformational change results in Δ^8-THC binding less strongly to the CB_1 receptor than Δ^9-THC thereby decreasing its potency relative to that of Δ^9-THC.

2. *Which is "stronger"?*

The potency of Δ^8-THC is less than that of Δ^9-THC because it binds less tightly to the CB_1 receptors. The potency of Δ^8-THC is reported to be approximately half of that of Δ^9-THC.

3. *Does Δ^8-THC affect Δ^9-THC tolerance?*

Tolerance to the psychoactive effects of Δ^8-THC is purported to occur more rapidly than with tolerance to Δ^9-THC. The effects of repeated use of Δ^8-THC on tolerance to Δ^9-THC has not been reported.

4. *Are there different therapeutic benefits of Δ^8-THC?*

Δ^8-THC is purported to produce less anxiety and is a greater appetite stimulant than Δ^9-THC.

5. *What else?*

Beware of producers of Δ^8-THC that do not have the expertise to prepare it from CBD without contamination from Δ^9-THC above the legal limit and synthetic byproducts of unknown effects and toxicities.

Note that Δ^8-THC products that contain substantial amounts of Δ^9-THC may produce effects that are largely due to the Δ^9-THC. The presence of Δ^9-THC in Δ^8-THC products can lead to a positive drug test for Δ^9-THC.

Considerable expertise is required to analyze Δ^8-THC correctly due to the close structural similarities between Δ^8-THC, Δ^9-THC, and the other substances that may be formed when CBD is isomerized. Laboratories that use an HPLC procedure validated to determine cannabinoids in hemp flower and leaves need to demonstrate baseline separation between all reaction products.