

Overview of Cannabis Toxicity and Human Use

Yitong Liu, Ph.D., DABT

ASCCT Seminar

Feb 27, 2026

Presentation Overview



History of cannabis use and regulatory landscape



Introduction to cannabinoids



Adverse health effects of cannabis and cannabinoids



Consumer use of cannabis products



History of cannabis use and regulatory landscape

Historical Context of Cannabis Use

- Cannabis has been cultivated for over 5,000 years, beginning in Central Asia and spreading globally through trade routes.
- In the U.S., cannabis was widely grown and used medicinally in early America but was federally banned in 1937 by the Marihuana Tax Act and later classified as a Schedule I substance under the 1970 Controlled Substances Act.
- It then returned through state legalization for medical use in 1996 (California) and recreational use in 2012 (Colorado and Washington).



Current Legal and Regulatory Landscape

- The Agriculture Improvement Act (Farm Bill) of 2018 removed hemp from regulation by the Drug Enforcement Administration under Schedule I of the Controlled Substances Act.
- The 2018 Farm Bill defined hemp as *Cannabis sativa* L. with delta-9 tetrahydrocannabinol (Δ 9-THC) concentration **not more than 0.3 percent** (on a dry weight basis).
- In November 2025, Congress adopted amendments tightening hemp THC rules (e.g., total THC, cap total THC per product, exclude synthetic cannabinoids, etc.).



Hemp products remain subject to FDA regulations under the Federal Food Drug & Cosmetic Act (FD&C Act), when applicable: drugs, foods, dietary supplements, cosmetics, veterinary products

Current FDA-Approved Cannabis Products

Drug	Active Ingredient	Year Approved	Indication(s)	CSA Schedule
Marinol	Dronabinol (synthetic Δ 9-THC)	1985	Nausea from chemotherapy; AIDS anorexia	Schedule III
Cesamet	Nabilone (synthetic cannabinoid)	1985 (reapproved 2006)	Nausea from chemotherapy	Schedule II
Syndros	Dronabinol (synthetic Δ 9-THC)	2016	Nausea from chemotherapy; AIDS anorexia	Schedule II
Epidiolex	Cannabidiol (CBD)	2018	Childhood seizures; Tuberous Sclerosis Complex	Not controlled (was Schedule V)



Unapproved Cannabis Products - FDA Concerns



FDA STATEMENT

FDA Concludes that Existing Regulatory Frameworks for Foods and Supplements are Not Appropriate for Cannabidiol, Will Work with Congress on a New Way Forward

For Immediate Release: January 26, 2023
Statement From: Janet Woodcock, M.D.
Principal Deputy Commissioner - Office of the Commissioner (February 2022 - February 2024)

Español

Given the growing cannabidiol (CBD) products market, the U.S. Food and Drug Administration convened a high-level internal working group to explore potential regulatory pathways for CBD products. Today we are announcing that after careful review, the FDA has concluded that a new regulatory pathway for CBD is needed that balances individuals' desire for access to CBD products with the regulatory oversight needed to manage risks. The agency is prepared to work with Congress on this matter. Today, we are also denying three citizen petitions that had asked the agency to conduct rulemaking to allow the marketing of CBD products as dietary supplements.

The use of CBD raises various safety concerns, especially with long-term use. Studies have shown the potential for harm to the liver, interactions with certain medications and

FDA NEWS RELEASE

FDA, FTC Warn Six Companies for Illegally Selling Copycat Food Products Containing Delta-8 THC

For Immediate Release: July 05, 2023

Español

Today, the U.S. Food and Drug Administration and the Federal Trade Commission issued warning letters to six companies for illegally selling copycat food products containing Delta-8 tetrahydrocannabinol, also known as delta-8 THC. These products can easily be mistaken for traditional foods like chips, cookies, candy, gummies or other snack food items. The FDA is concerned that these products can be accidentally ingested by consumers, including children, or taken in higher doses than intended. The warning letters

FDA Issues Response to Three Citizen Petitions Related to CBD and Dietary Supplements

Constituent Update

January 26, 2023

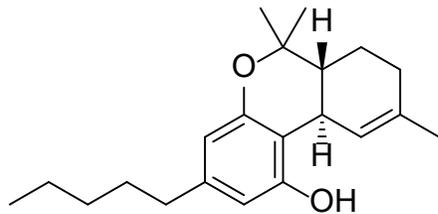
Today, the U.S. Food and Drug Administration (FDA) denied the requests in three citizen petitions, from the Consumer Healthcare Products Association (CHPA), the Council for Responsible Nutrition (CRN), and the Natural Products Association (NPA), that the FDA issue a regulation that would allow cannabidiol (CBD) products to be marketed as dietary supplements. Such a regulation would be needed in order to provide a potential pathway for CBD products to be lawfully marketed as dietary supplements, because a provision in the law prohibits the marketing of certain drug ingredients as dietary supplements. The FDA's responses explain that we do not intend to initiate such a rulemaking, because in light of the available scientific evidence, it is not apparent how CBD products could meet the applicable safety standard for dietary supplements.



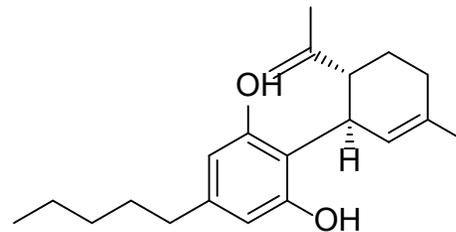
Introduction to cannabinoids

Introduction to Cannabinoids

- Cannabis contains large numbers of secondary metabolites including cannabinoids, which are terpenophenolic compounds accumulated primarily in the female flowers and leaves.
- Major cannabinoids: Δ 9-THC and CBD



Δ 9-THC



CBD

- Minor cannabinoids: >120 others

Sources of Cannabinoids



Cannabis-derived cannabinoids

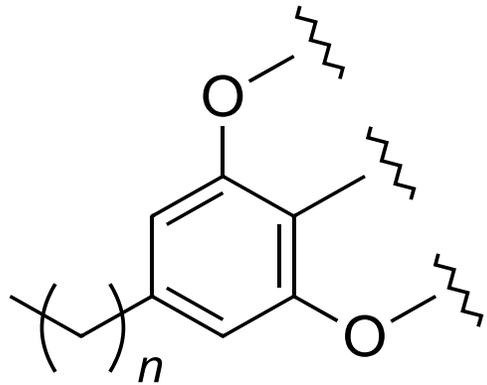
- Occurring naturally in the plant
- Extracted directly from the plant
- Examples: $\Delta 9$ -THC, CBD, cannabigerol (CBG), cannabinol (CBN), cannabichromene (CBC)



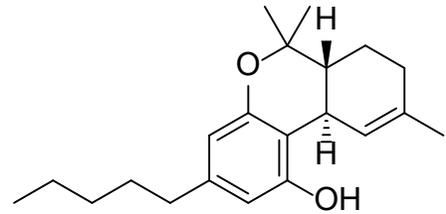
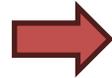
Cannabis-related cannabinoids

- Synthesized in a laboratory
- Some synthetic cannabinoids may also occur naturally in the plant and some may not
- Examples: $\Delta 8$ -THC (synthetically derived and also naturally occurring), nabilone (not naturally occurring)

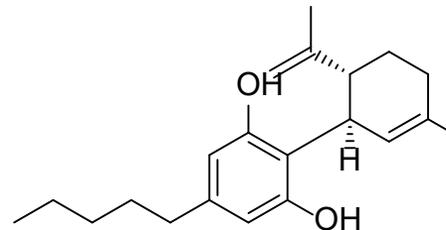
Cannabinoid Types



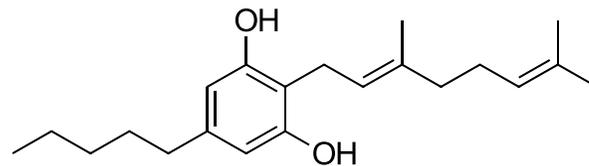
Phytocannabinoids



Δ9-THC



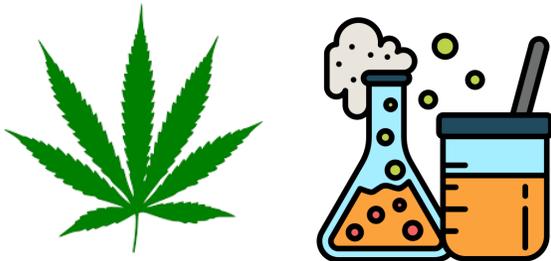
CBD



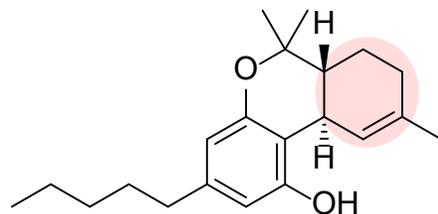
CBG

~8 others

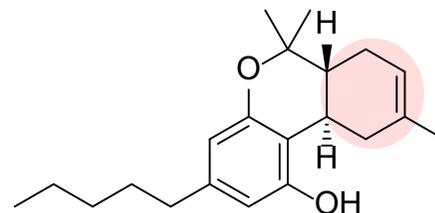
- Carboxylic acid group
- Double bonds
- Ring saturation
- Others (e.g., acetyl group)



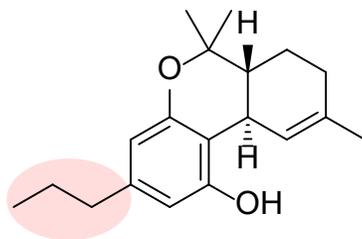
Examples of THC-type Cannabinoids



Δ9-THC

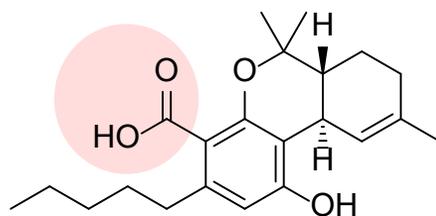


Δ8-THC



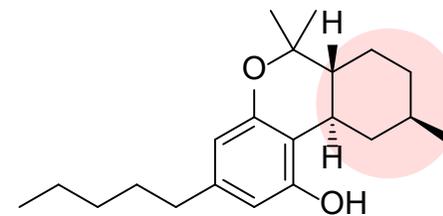
Δ9-THCV

(Δ9-tetrahydrocannabivarin)



Δ9-THCA

(Δ9-tetrahydrocannabinolic acid)



HHC

(hexahydrocannabinol)



Adverse health effects of cannabis and cannabinoids

Adverse Health Effects of Cannabis and Cannabinoids



- Cannabis

- ❖ Marijuana (high $\Delta 9$ -THC) → intoxicating
- ❖ Hemp (low $\Delta 9$ -THC) → minimally intoxicating

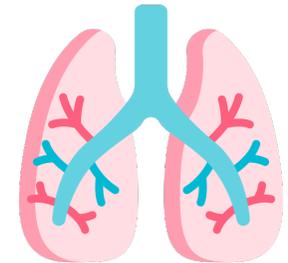
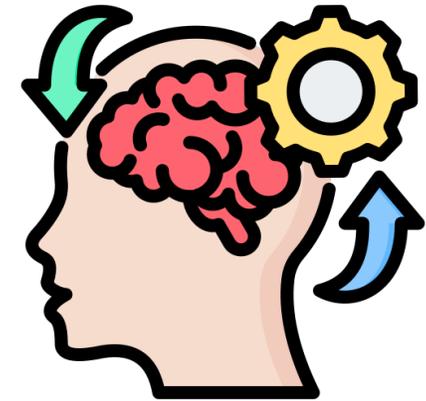
- Cannabinoids

- ❖ THC-type cannabinoids: many cause intoxicating effects
- ❖ CBD: non-intoxicating but cause adverse effects at high doses
- ❖ Minor cannabinoids: safety largely unknown

Intoxicating Cannabinoids	Non-intoxicating Cannabinoids
$\Delta 9$ -THC	CBC
$\Delta 8$ -THC	CBD
$\Delta 9$ -THC-O	CBG
HHC	$\Delta 9$ -THCA
$\Delta 9$ -THCB	
$\Delta 9$ -THCP	

Adverse Health Effects: Δ 9-THC

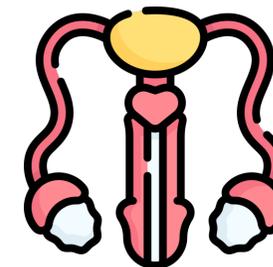
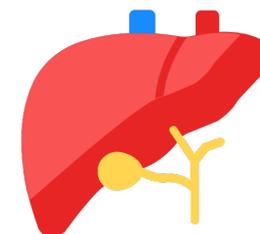
- Cognitive and Neurological
Impaired memory and learning, distorted perception, loss of coordination, drowsiness, anxiety
- Cardiovascular
Increased heart rate, elevated blood pressure
- Respiratory
Throat and lung irritation, coughing



Long term, regular use can lead to physical dependence and withdrawal following discontinuation, as well as psychological addiction or dependence.

Adverse Health Effects: CBD

- Gastrointestinal
Diarrhea, decreased appetite
- Neurological
Drowsiness or sleepiness
- Liver
Elevated liver enzymes
Interact with drugs metabolized by certain liver metabolizing enzymes
- Male reproductive
Damage to fertility in males or male offspring of females who have been exposed has been reported in animal studies.



Adverse Health Effects: Δ 8-THC

5 Things to Know about Delta-8 Tetrahydrocannabinol – Delta-8 THC



Español

Delta-8 tetrahydrocannabinol, also known as delta-8 THC, is a psychoactive substance found in the *Cannabis sativa* plant, of which marijuana and hemp are two varieties. Delta-8 THC is one of over 100 cannabinoids produced naturally by the cannabis plant but is not found in significant amounts in the cannabis plant. As a result, concentrated amounts of delta-8 THC are typically manufactured from hemp-derived cannabidiol (CBD).

Content current as of:
05/04/2022

Regulated Product(s)
Animal & Veterinary
Dietary Supplements
Drugs
Food & Beverages

Δ 8-THC has psychoactive and intoxicating effects.

Adverse Events Linked to Δ 8-THC (2020–2022)

- 104 FDA reports of adverse events: hallucinations, vomiting, tremor, anxiety, dizziness, confusion, loss of consciousness
- 2,362 poison control cases reported, included 1 pediatric death

Vulnerable populations

FDA strongly advises against the use of CBD, THC, and marijuana in any form during pregnancy or while breastfeeding.

- *Higher risk of premature birth and stillbirth*
- *Impaired brain development in fetuses and newborns*
- *Potential reproductive effects in developing male fetuses*

What You Should Know About Using Cannabis, Including CBD, When Pregnant or Breastfeeding

FDA strongly advises against the use of cannabidiol (CBD), tetrahydrocannabinol (THC), and marijuana in any form during pregnancy or while breastfeeding.



Content current as of:
10/16/2019

Regulated Product(s)
Cosmetics
Dietary Supplements
Drugs
Food & Beverages
Tobacco



Consumer use of cannabis products

Consumer Products from Cannabis



Tinctures



Capsules



Topicals



Beauty and Personal Care



Vape Oil and Cartridges



Combustible/Flower



Pet Products



Gummies



Beverages



Other “Edibles”



Approved Drug

Consumer use: CBD

- Market surged after 2018 Farm Bill, but has since declined.
- 2025 forecast by Brightfield Group: \$2.8B total sales (≈\$2.0B non-pharmaceutical products)

Top 3 Reasons Consumers Use CBD in 2025



It is currently illegal to market CBD by adding it to a food or labeling it as a dietary supplement.

All other effects fall below 35%

Source: Brightfield Group's H1 2025 consumer survey H1 2025



<https://www.fda.gov/consumers/consumer-updates/what-you-need-know-and-what-were-working-find-out-about-products-containing-cannabis-or-cannabis>

[CBD in a Hemp-Derived World: From Breakout Star to Daily Staple](#)

Consumer use: Δ8-THC

- In Q2 2024, 5.6% of U.S. adults surveyed by the Brightfield Group reported Δ8-THC use.
- How do people use Δ8-THC?
 - ❖ Edibles such as gummies and brownies
 - ❖ Tinctures
 - ❖ Vaping and smoking
 - ❖ Capsules
 - ❖ Creams, lotions, or patches



Δ8-THC is often referred to as “marijuana lite” or “diet weed”.

FDA NEWS RELEASE

FDA, FTC Continue Joint Effort to Protect Consumers Against Companies Illegally Selling Copycat Delta-8 THC Food Products

FDA, FTC Issue Warning Letters to Companies Selling Food Products Containing Delta-8 THC That Mimic Chips, Candies and Snacks from Popular National Brands

For Immediate Release: July 16, 2024

[Español](#)

Today, the U.S. Food and Drug Administration and the Federal Trade Commission (FTC) issued warning letters to five companies for illegally selling copycat food products containing delta-8 THC and introducing them into the marketplace in violation of the Federal Food, Drug, and Cosmetic Act (FD&C Act). The warning letters were issued to: [Hippy Mood](#), [Earthly Hemps](#), [Shamrockshrooms.com](#), [Mary Janes Bakery Co. LLC](#) and [Life Leaf Medical CBD Center](#). The FDA also issued a warning letter independently to the company [GrowGod LLC](#) for the same FD&C Act violations.

These warnings serve as part of the FDA and FTC’s ongoing joint effort to take action against companies selling illegal copycat food products containing delta-8 THC. In [July 2023](#), the two agencies worked together to warn six other companies for selling edible food products containing delta-8 THC in packaging that could easily be confused for foods sold by popular national brands. All six of those companies no longer have such products in stock.

Content current as of:
07/16/2024

Regulated Product(s)
Food & Beverages

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[FTC Sends Cease and Desist Letters with FDA to Companies Selling Edible Products Containing Delta-8 THC in Packaging Nearly Identical to Food Children Eat | Federal Trade Commission](#)

[FDA, FTC Continue Joint Effort to Protect Consumers Against Companies Illegally Selling Copycat Delta-8 THC Food Products | FDA](#)

[The Rise of Hemp-Derived THC: Consumer Trends and Market Insights](#)

[Delta-8 THC: What You Need to Know About This Cannabinoid](#)

Key Takeaways

- Cannabis-derived products contain a wide array of cannabinoids (naturally occurring or synthetically derived), many of which have limited safety data.
- Cannabis use can cause serious adverse health effects, especially in vulnerable populations.
- More research is needed on safety, chemical composition, and potential interactions with other consumer products.



Roadmap to Reducing Animal Testing in Preclinical Safety Studies

Executive Summary

This roadmap outlines a strategic, stepwise approach for FDA to reduce animal testing in preclinical safety studies with scientifically validated new approach methodologies (NAMs), such as organ-on-a-chip systems, computational modeling, and advanced *in vitro* assays. By partnering with federal agencies like NIH and VA through ICCVAM, FDA can accelerate the validation and adoption of these human-relevant methods, improving predictive accuracy while reducing animal use. This transition will enhance public health by streamlining drug development and ensuring safer therapies reach patients faster, while positioning FDA as a global leader in modern regulatory science and innovation.

*In the following presentations, you will hear FDA's research on the safety of hemp and cannabinoids using various *in silico* and *in vitro* NAMs.*