

# Marijuana and Hemp: The Science and the Law

---

Linda C. Jackson, Director

Amy C. Jenkins, Department Counsel

Department of Forensic Science

July 7, 2022





# Marijuana/Hemp History

---

**2015**

**Chs. 7 and 8** (Effective 2/26/15)

- An affirmative defense was added for simple possession of marijuana for patients utilizing cannabidiol oil or THC-A oil for the treatment of intractable epilepsy
- The patient must have a valid written certification from a medical practitioner

**2015**

**Chs. 158 and 180**

- Permitted the cultivation of industrial hemp by licensed growers as part of a university-managed research program
- Definitions of industrial hemp and hemp products added to the Code
- Industrial hemp possessed, etc., by a licensed grower was exempted from the definition of marijuana in the Drug Control Act

**2016**

**Chs. 61 and 170**

- Broadened the licensed growers' ability to cultivate and manufacture industrial hemp or industrial hemp products outside of research programs



# Marijuana/Hemp History

---

**2017**

**Ch. 613** (Effective 3/16/17)

- Authorized pharmaceutical processors (regulated by the Board of Pharmacy) to cultivate and dispense Cannabidiol oil and THC-A

**2018**

**Chs. 689 and 690**

- Permitted the growing and processing of industrial hemp by *registered* individuals or their agents
- The marijuana definition in the Drug Control Act was amended to exclude industrial hemp that is possessed by a person registered to grow or process industrial hemp or his agent

**2018**

**Chs. 246 and 809**

- Permitted the use of cannabidiol oil and THC-A oil for any diagnosed condition or disease as determined beneficial by the prescriber



## 2018 Agricultural Improvement Act (Federal Farm Bill) (Signed December 20, 2018)

---

- <https://www.congress.gov/bill/115th-congress/house-bill/2>
- Classified hemp as an agricultural product under the regulation of the US Dept. of Agriculture
- Removed hemp from the federal Controlled Substances Act
- Industrial hemp was defined as “the plant *Cannabis sativa L.* and any part of that plant, including the seeds thereof and all derivatives, extracts, cannabinoids, isomers, acids, salts, and salts of isomers, whether growing or not, with a delta-9-tetrahydrocannabinol concentration of not more than 0.3 percent on a dry weight basis”
- The testing procedure established for regulatory purposes was utilizing “post-decarboxylation or other similarly reliable methods to determine the delta-9-tetrahydrocannabinol concentration levels of hemp”



# Marijuana/Hemp History

---

**2019**

**Chs. 653 and 654** (Effective 3/21/19)

- The criminal definition of marijuana (contained in Virginia Code § 18.2-247) was amended to exclude industrial hemp that was in the possession of a registered person or his agent and any “hemp product,” as defined in Virginia Code § 3.2-4112, containing a THC concentration of not greater than 0.3% derived from industrial hemp.
- “Hemp product” was defined as a “finished product that is otherwise lawful and that contains industrial hemp, including rope, building materials, automobile parts, animal bedding, animal feed, cosmetics, oil containing an industrial hemp extract, or food or food additives for human consumption.”
- Exempted from the definition of tetrahydrocannabinols in Schedule I (Virginia Code § 54.1-3446) any tetrahydrocannabinols that are present in (i) industrial hemp, (ii) hemp products, and (iii) marijuana.



# Marijuana/Hemp History

---

## 2020

### Chs. 1285 and 1286

- Decriminalization of simple possession of marijuana
- Removal of hashish oil from Schedule I

### Ch. 406

- Prohibited the sale of hemp products intended for smoking to those under 21 years of age

## 2020 (continued)

### Ch 831 (Effective 4/7/20)

- Amended Virginia Code §§ 18.2-247 and 54.1-3401 to clarify that certain uses of “tetrahydrocannabinol concentration” referred to delta-9-THC.
- Established that the Department of Forensic Science would determine the proper method for detecting the THC concentration for purposes of the criminal code and the Drug Control Act. The testing methodology shall use post-decarboxylation testing or other equivalent method and consider the conversion of THC-A to THC.



# Marijuana/Hemp History

---

## 2020 (continued)

### Chs. 659 and 660 (Effective 4/6/20)

- “Industrial hemp extract” was defined as an extract of the *Cannabis sativa* plant that (i) has a concentration of THC that is no greater than that allowed for hemp by federal law and (ii) is intended for human consumption.
- An industrial hemp extract shall be (i) produced from hemp grown in compliance with applicable law and (ii) have a THC concentration of no greater than 0.3 percent.

## 2021 Special Session I

### Chs. 550 and 551

- Legalized the simple possession of marijuana for those over 21 years of age (no more than an ounce) under Virginia Code § 4.1-1100
- Created the Cannabis Control Act (Virginia Code §§ 4.1-600 *et seq.*)

## 2022 Special Session I

- Budget language



# *Cannabis sativa*



Are these Hemp Products?

Cannabis: Which is hemp? Which is marijuana?

- Forensic Testing: New testing methods were developed to determine the delta-9-THC concentration in plant material and extracts in order to differentiate marijuana from industrial hemp, as defined in the Code of Virginia





# Is it a Cannabinoid or a Tetrahydrocannabinol?

## Cannabinoids

- $\Delta^9$ -tetrahydrocannabinol ( $\Delta^9$ -THC)
- $\Delta^8$ -tetrahydrocannabinol ( $\Delta^8$ -THC)
- cannabinalol (CBN)
- cannabidiol (CBD)
- cannabigerol (CBG)
- cannabichromene (CBC)
- $\Delta^9$ -tetrahydrocannabivarin (THCV)
- cannabivarin (CBV)
- cannabidivarin (CBDV)
- and many others



## Tetrahydrocannabinol(s)

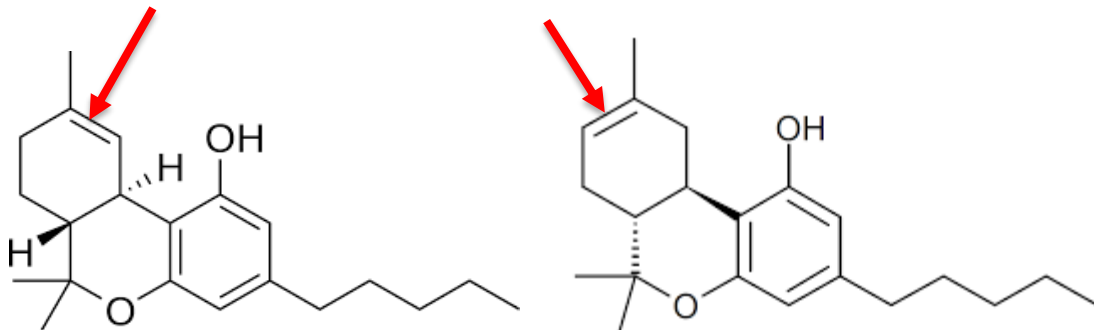
- $\Delta^9$ -tetrahydrocannabinol ( $\Delta^9$ -THC)
- $\Delta^8$ -tetrahydrocannabinol ( $\Delta^8$ -THC)
- $\Delta^{10}$ -tetrahydrocannabinol ( $\Delta^{10}$ -THC)
- $\Delta^{6a,10a}$ -tetrahydrocannabinol ( $\Delta^{6a,10a}$ -THC)
- $\Delta^7$ -tetrahydrocannabinol ( $\Delta^7$ -THC)
- $\Delta^{9,11}$ -tetrahydrocannabinol (exo-THC)

# Isomers v. Derivatives

## Isomers

Something was moved  
(different version of the  
same chemical compound)

- Delta-8-THC, **Delta-9-THC**, Delta-10-THC, Delta-6a,10a-THC



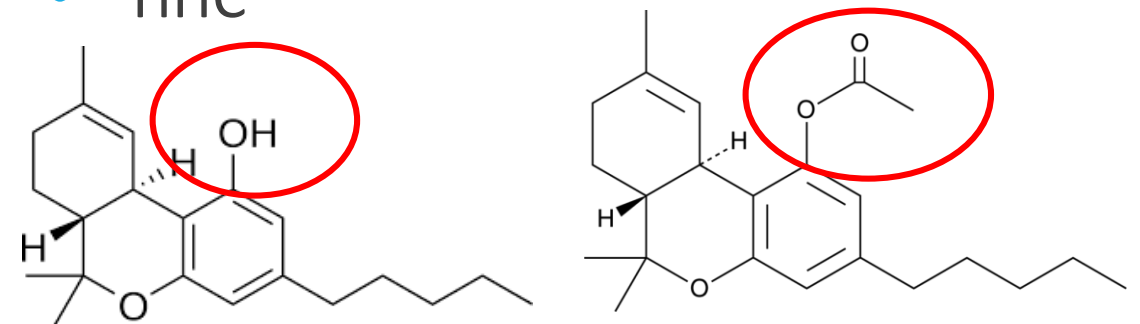
**Delta-9-THC**

Delta-8-THC

## Derivatives

Something was added (a  
different chemical  
compound)

- THC-OAc (THC-O)
- THC-P
- HHC

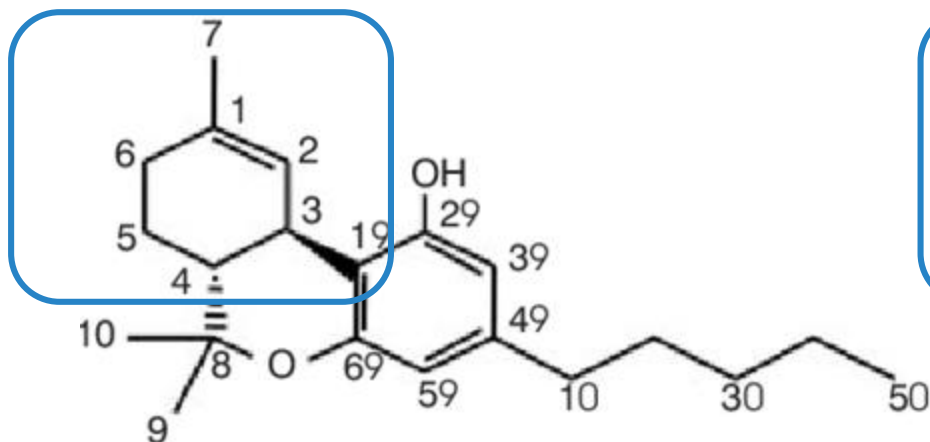


**Delta-9-THC**

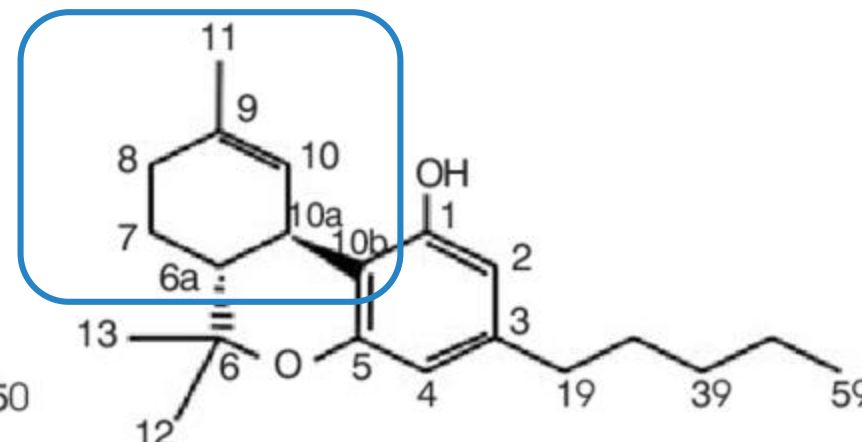
THC-OAc

# THC Isomer Naming

- Two different numbering systems
- Dibenzopyran numbering used in US
- Delta-9-THC is equivalent to Delta-1-THC



Monoterpenoid numbering



Dibenzopyran numbering



# Cannabis

Mature stalks,  
etc. when not  
mixed with other  
parts of the plant

**Industrial hemp**, as  
defined in § [3.2-4112](#), that  
is possessed by a person  
registered pursuant to  
subsection A of § [3.2-  
4115](#) or his agent

**Industrial hemp**, as defined  
in § [3.2-4112](#), that is  
possessed by a person who  
holds a hemp producer  
license issued by the U.S.  
Department of Agriculture  
pursuant to 7 C.F.R. Part 990

**A hemp product**, as defined in § [3.2-  
4112](#), containing a tetrahydrocannabinol  
concentration of no greater than 0.3  
percent that is derived from industrial  
hemp, as defined in § [3.2-4112](#), that is  
grown, dealt, or processed in compliance  
with state or federal law

**"Marijuana,"** as defined in § 54.1-  
3401, means any part of a plant of the  
genus Cannabis whether growing or  
not, its seeds, or its resin; and every  
compound, manufacture, salt,  
derivative, mixture, or preparation of  
such plant, its seeds, its resin, or any  
extract containing one or more  
cannabinoids

§54.1-3408.3  
Cannabis Oil

§54.1-3408.3  
Cannabis Products

# Extract of *Cannabis sativa*



## Plant

- Hemp contains no more than 0.3% delta-9-THC
- Marijuana contains more than 0.3% delta-9-THC



## Crude Hemp Extract

- Contains multiple cannabinoids
- Low delta-9-THC (below 0.3%)



## Processed Hemp Extract

- Cleaned up
- Used in edibles, etc.
- Low delta-9-THC (below 0.3%)



# Delta-8 THC Synthesis

---

- Delta-8-THC is found in low concentrations naturally
- Crude hemp extract generally contains high concentrations of cannabidiol (CBD) that can be converted chemically to delta-8-THC
- There is no laboratory testing that will be able to distinguish “naturally occurring” vs. “synthetic” delta-8-THC (or any other cannabinoids)



## Summary: The Basic Process For Converting CBD to Delta 8 THC

CBD + Acid + Time =  $\Delta$ 8 THC

- 1 Catalyze CBD with an acid
- 2 Neutralize or remove the acid & solvent
- 3 Purify the final product
- 4 Test for purity

Home > Cannabinoids > Delta 8 THC

> How To Make Delta 8 THC: CBD to  $\Delta$ 8 THC Step-By-Step

✓ EVIDENCE BASED

# How To Make Delta 8 THC: CBD to $\Delta$ 8 THC Step-By-Step

Learn how to isomerize or convert CBD into THC (delta 8 or delta 9 THC).



ARTICLE BY

Justin Cooke , last updated on October 19, 2021

§3.2-5145.1 – “Industrial hemp extract” means an extract ((i) of a *Cannabis sativa* plant...

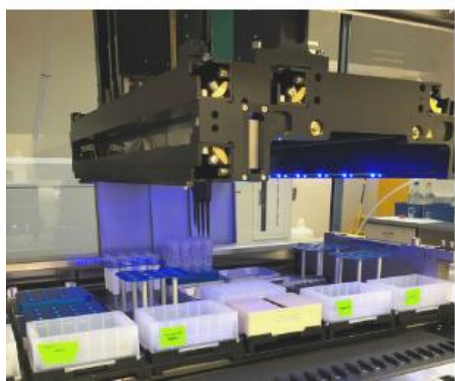
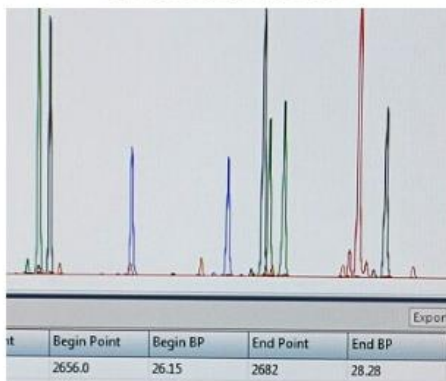
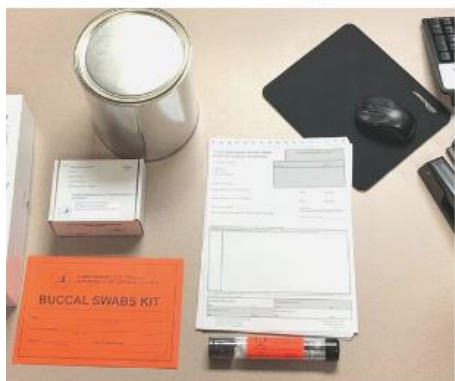




# Important Points to Remember

---

- The criminal code definitions distinguishing industrial hemp from marijuana are tied to the percentage of delta-9-tetrahydrocannabinol.
- Any tetrahydrocannabinol (THC) that is naturally occurring in the *Cannabis sativa* plant is exempted from the definition of tetrahydrocannabinols in Schedule I.
- A scientist can only identify a THC in a product, not determine whether it is natural or synthetic.
- Changes to the definitions of industrial hemp or hemp products can potentially affect multiple Code sections.



**Thank you!**  
linda.jackson@dfs.virginia.gov  
amy.jenkins@dfs.virginia.gov

# Regulation of hemp products in other states

ERIN WILLIAMS  
VIRGINIA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES  
OFFICE OF POLICY, PLANNING, AND RESEARCH

- Colorado, New York, Oregon
  - 
  - Regulator of hemp products
    - Regulated products
    - Product requirements
  - State's response to synthetic cannabinoids or intoxicating hemp products

# Colorado

Colorado Department of Public Health and Environment (CDPHE) oversees the processing of hemp and industrial hemp products intended for human consumption and use.

- ▶ Industrial hemp products:
  - ▶ Are "Finished products"
  - ▶ Are a cosmetic, dietary supplement, food, or food additive
  - ▶ Contain any part of the hemp plant, including naturally occurring cannabinoids, compounds, concentrates, extracts, isolates, resins, or derivatives
  - ▶ Contain a delta-9 THC concentration of no more than 0.3 percent

# Colorado

## Industrial hemp product requirements

- ▶ Industrial hemp must come from an approved source
- ▶ Must be tested by a certified laboratory
- ▶ Must not exceed permissible levels of established contaminants



## Colorado

### Industrial hemp product labeling requirements

- ▶ Labeled in accordance with certain federal regulations;
- ▶ Product Identity Statement that indicates the common or usual name of the food ingredient;
- ▶ Identify in milligrams the total THC content per serving and total THC content per individual finished product package;
- ▶ Manufacturing address or a qualifying phrase which states the firm's relation to the product (e.g., "manufactured for" or "distributed by");
- ▶ Net Weight Statement placed as a distinct item parallel to the base of the package in the bottom third of the principal display panel; and
- ▶ List of ingredients, in descending order of predominance by weight:
  - ▶ Identify industrial hemp as an ingredient; and
  - ▶ Identify each isolated cannabinoid as an ingredient and the amount labeled in milligrams or when using a broad or full spectrum product, label the total amount in milligrams.

## Colorado

### Response to synthetic cannabinoids and intoxicating hemp products

In May 2021, CDPHE issued a statement that chemically modifying or converting any naturally occurring cannabinoids of hemp is non-compliant with the statutory definition of "industrial hemp product."

THC isomers like delta-8 and delta-10 are not allowed in food, dietary supplements, or cosmetics.

2022 legislation authorizes CDPHE to promulgate rules to prohibit synthetic derivation of intoxicating THC isomers or intoxicating THC isomers that originate from hemp.

2022 legislation creates a task force to study intoxicating hemp products and make legislative and regulatory recommendations.

## New York

- ▶ New York State Department of Agriculture and Markets oversees hemp used exclusively for industrial or food purposes.
- ▶ New York State Office of Cannabis Management oversees processors of cannabinoid hemp or cannabidiol.
  - ▶ "Cannabinoid hemp product" means hemp or any product manufactured or derived from hemp, including hemp derived terpenes, in its final form, used for human consumption. Shall not include cosmetics.
  - ▶ "Used for human consumption" means intended by manufacturer to be used in, on, or by the human body for its cannabinoid content.

## New York Cannabinoid Hemp Product Requirements

- ▶ Extract or manufacture using Good Manufacturing Practice standards
- ▶ Program must approve extraction method using solvents that are also approved by program
- ▶ Test statistically significantly number of cannabinoid hemp products per lot or batch

## New York Cannabinoid Hemp Product Requirements

- ▶ May contain no more than 0.3 percent total delta-9 THC.
- ▶ May not exceed established contaminant limits
- ▶ May not be in the form of injectable, inhaler, cigarette, cigar, or pre-roll
- ▶ Must be pre-packaged and not added to food at the point of sale

## New York Cannabinoid Hemp Product Requirements

- ▶ If a food or beverage manufactured under 21 CFR Part 177, it shall not contain more than 25 milligrams of total cannabinoids per individually packaged products.
- ▶ If a supplement manufactured under 21 CFR Part 111, it shall not contain more than 3,000 mg of total cannabinoids per product with no more than 75 milligrams per individual serving
- ▶ If contains multiple servings not individually wrapped, it shall include a measuring device.



## New York Cannabinoid Hemp Product Requirements

- ▶ If inhalable, must be in a closed system with a pre-filled disposable cartridge. Except for hemp-derived terpenes, excipients and ingredients must be pharmaceutical grade unless otherwise approved by the program, and shall not include specific substances including synthetic terpenes and vitamin E acetate. May not have flavors except for hemp-derived terpenes.
- ▶ Inhalable or flower product may not be sold to anyone under 21 years of age

## New York Cannabinoid Hemp Product Requirements

- ▶ Labeling requirements include:
  - ▶ List of all ingredients
  - ▶ Number of servings, including milligrams per serving and milligrams per package of
    - ▶ CBD
    - ▶ Total THC, which includes detectable levels of total delta-8 THC, delta-9 THC, and delta-10
    - ▶ Any other marketed cannabinoid
  - ▶ QR code linked to certificate of analysis
  - ▶ Means for reporting adverse events
  - ▶ Specific warning statements
- ▶ Tamper-evident packaging
- ▶ Must be accompanied by recommended serving and usage instructions

## New York

### Response to synthetic cannabinoids and intoxicating hemp products

- ▶ Extractors or manufacturers may not use synthetic cannabinoids or delta-8 or delta-10 created through isomerization in extracting or manufacturing a cannabinoid hemp product
- ▶ Regulation notes that program may through future regulation cap the total THC (versus total delta-9 THC), including detectable levels of delta-9, delta-8, and delta-10 in milligrams per serving and per package

## Oregon

- ▶ Oregon Department of Agriculture oversees cultivation and processing of hemp and testing requirements for most hemp items.
- ▶ Oregon Liquor and Cannabis Commission administers regulations that pertain to hemp items to sold to consumers in the licensed adult use market and establishes limits on the amount of THC in hemp items
- ▶ Oregon Liquor and Cannabis Commission also administers certain regulations that pertain to industrial hemp products that contain cannabinoids and are intended for human consumption or use that are sold in the general market and establishes limits on the amount of THC in these products.
- ▶ Oregon Health Authority establishes testing requirements for industrial hemp-derived vape products

# Oregon

## Oregon Liquor & Cannabis Control regulation

"Cannabinoid hemp product" means

- ▶ A hemp edible or any other industrial hemp commodity or product intended for human consumption or use, including a hemp topical or hemp transdermal patch, that contains cannabinoids from industrial hemp or the dried leaves or flowers of hemp; or
- ▶ Usable hemp, industrial hemp extracts, and industrial hemp concentrates that have been combined with non-cannabis additives.
- ▶ Cannabinoid hemp product does not include usable hemp by itself, hemp stalk by itself, an industrial hemp concentrate or extract by itself, hemp seed incapable of germination by itself, or other products derived only from hemp seeds incapable of germination that may include other non-hemp ingredients. "Usable hemp" means the flowers and leaves of industrial hemp intended for human consumption or use.

# Oregon

## Response to synthetic cannabinoids and intoxicating hemp products

- ▶ 2021 legislation directing OLCC to set limits on THC and synthetic cannabis derivatives in hemp products and regulate hemp vape products.
- ▶ Effective July 1, 2022:
  - ▶ New limits on THC content in cannabinoid hemp products sold to person 21 or older.
  - ▶ Cannabinoid hemp products cannot contain synthetic cannabis derivatives
  - ▶ Hemp vapes must be labeled and tested by an OLCC-licensed lab

## Oregon (OLCC regulation) THC content for hemp products sold to a person 21 or older.

OAR 845-026-0400  
Table 3

INDUSTRIAL HEMP PRODUCT THC CONCENTRATION AND SERVING SIZE LIMITS			
Type of Industrial Hemp Product	Maximum Amount of Total Delta-9-THC Per Serving	Maximum Amount of Total Delta-9-THC per Container	Maximum Concentration of Total Delta-9-THC
Hemp Edibles	2 mg	20 mg	0.3%
Hemp Topicals	N/A	N/A	0.3%
Hemp Transdermal Patches	2 mg	20 mg	0.3%
Hemp Tinctures	N/A	100 mg	0.3%
Usable Hemp	N/A	N/A	0.3%
Industrial Hemp Concentrates or Extracts	N/A	N/A	0.3%
Cannabinoid Hemp Products Other than Hemp Edibles, Topicals, Tinctures, or Transdermal Patches	2 mg	20 mg	0.3%

\*Hemp products sold to those under 21 must have less than 0.5 mg of THC.

# Regulation of hemp products in other states

ERIN WILLIAMS  
VIRGINIA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES  
OFFICE OF POLICY, PLANNING, AND RESEARCH