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Medicinal Cannabis Dosage Forms in California

An Overview of Cannabis Dosage Forms

Forms of dosage are the specific vehicles by which cannabis, or cannabinoids, are delivered into the body.

The “form” in which THC and other cannabinoids are administered determines how they move and work medicinally inside the body: ie the pharmacokinetics of cannabis.

Both the plant material and the oils yielded through the extraction process influence the performance of the different forms of intake, which each have a particular set of benefits.

Cannabis (drug-containing plant) —>

Extracted Oil (drug substance) —>

Delivery / Intake (drug product)

An Overview of Cannabis Dosage Forms

The medicinal effect experienced by the end-user is a function of the quality of the raw material – the cannabinoid and terpene profile of the cannabis – and of the derived oil yielded during extraction.

The goal is to preserve the fidelity of the volatile medicinal compounds – such as the cannabinoids, terpenes, and flavonoids – throughout the entire chain of custody so that the therapeutic effect is intact and the dose is delivered in the most efficacious means possible.



An Overview of Cannabis Dosage Forms

Each form of intake is formulated to take advantage of the pharmacokinetic pathways as effectively as possible in delivering a therapeutic dose of cannabinoids (e.g. THC or CBD).



An Overview of Cannabis Dosage Forms

Important factors when considering each form of intake:

- Bioavailability – the fraction of the administered dose that reaches systemic circulation
- Accuracy of Dose – the degree to which one can quantify the amount of medicine in each dose
- Time to Onset – the amount of time before the medicinal or pharmacological effects are felt
- Duration of Effect – the length of time the medicinal or pharmacological express themselves
- Quality and Consistency of Effect – the degree to which one can depend on a repeatable experience



Common Routes of Administration of Medical Cannabis

Oral - smoking or inhalation

Smoking

Vaporizing

MDI

Oral Ingestion - eating/swallowing

Edibles

Capsules

Tinctures/Drops

Drinks

Oral Film Strips

Transdermally / Topically - absorbing through the skin

Balms/Creams/Salves

Roll-on

Transdermal patches



Lungs/Inhalation - Smoking

Smoking is one of the quickest ways to feel the effects of medical marijuana and the most familiar form of intake.

Traditionally dried cannabis flowers (buds) or leaves are smoked.

Concentrated oil, Hash and Kief are also widely used.

Inhaled medications are generally absorbed very quickly, and act both locally and systemically in a few minutes



Lungs/Inhalation - Smoking

Smoking

- Dose range: 2-100 mg / day.
- Bioavailability: high
- Dose accuracy: low
- Time to onset: seconds
- Duration of effect: 1-5 hours +/- 1.5-2 hours
- Quality and consistency of effect: high degree of variability



Lungs/Inhalation - Vaporizing

Vaporizing is also one of the quickest ways to feel the effects of medical marijuana and currently the most common form of intake.

Vaporizing is a process whereby the dried cannabis flower or extract or concentrate is slowly subjected to heat at lower and more precise temperature allowing for the therapeutic ingredients cannabinoids such as THC to phase-change into a gas or vapor without burning the plant.

It is safer than inhaling smoke and allows the patient to better control the dose.



Lungs/Inhalation - Vaporizing

Vaporizing

- Dose range: 2-100 mg / day.
- Bioavailability: high
- Dose accuracy: medium
- Time to onset: seconds
- Duration of effect: 1-5 hours +/- 1.5-2 hours
- Quality and consistency of effect: depends on the quality of vaporizing hardware and consistency of material that is vaped (standardized oil and a flow regulator vaporizer can produce accurate dosing)



Lungs/Inhalation - Metered Dose Inhaler (MDI)

MDI

MDI's are known and used for rapid therapeutic drug delivery in the pharmaceutical industry

Like smoking, or vaping this is one of the quickest ways to feel the effects of medical marijuana with the added benefits:

MDI's can deliver non-combusted/decarboxylated cannabinoids (non-psychoactive)

Highly accurate dosing can be achieved

It is safer than inhaling smoke and vaping, and allows the patient to better control the dose.



Lungs/Inhalation - Metered Dose Inhaler (MDI)

MDI

- Dose range: 0.5-200 mg / day.
- Bioavailability: high
- Dose accuracy: high
- Time to onset: seconds
- Duration of effect: 1-5 hours +/- 1.5-2 hours
- Quality and consistency of effect: high



Oral Dosage Forms - Edibles

Infusing cannabis into butter or cooking oil or any other edible fat or sugar alcohol produces edible cannabis in the form of a food, candy, capsule or beverage.

Once blended into a carrier, the mixture can be used to dose final cannabis dosage form.



Oral Dosage Forms - Edibles

- Dose range: 0.5 - 1,000+ mg
- Bioavailability: low/med
- Dose accuracy: low to high (depending on form)
- Time to onset: 20 minutes to hours
- Duration of effect: 4-12 hours
- Quality and consistency of effect: high degree of variability; can be highly accurate



Oral Dosage Forms - Edibles

Patients should take caution with edible cannabis because it can sometimes take up to twenty minutes to an hour to take effect and can last for four hours or more.

Doses can be difficult to judge because absorption rates vary depending on the individual and medicine.

This is partially caused by a chemical change of the molecular structure of THC during digestion and metabolism, a process known as first-pass metabolism.



Oral Dosage Forms - Edibles

The condition of the digestive tract and the pre-intake of other foods and beverages also affect absorption, release and effect.

Side Effects: Eating too much medical cannabis (high in THC) can cause extreme drowsiness, dizziness, inability to concentrate, diminished ability to focus, rapid heartbeat, increases or decreases in blood pressure, need for sleep, and feelings of euphoria.



Oral Dosage Forms - Edibles

Most Common Forms of Edibles

Gummies

Chocolates

Hard Candies (medically termed “lozenges”)

Mints

Chews

Caramels

Beverages



Oral Dosage Forms - Capsules and Tablets

Capsules and Tablets

Familiar Supplement and pharmaceutical
Delivery Form

Small, easy to ingest

Easy to accurately dose



External Dosage Forms - Topical

Topical medicines are applied directly to the skin, most often at a site of injury or over a specific muscle group.

Topical medicines most commonly include lotions, salves, balms, sprays, oils, and creams.



External Dosage Forms - Topical

Dose range: 1 to 1,000 mg

- bioavailability: medium/low
- dose accuracy: variable
- time to onset: 1.25hrs +/- 0.5 hrs.
- duration of effect: 6-8+ hrs.
- quality and consistency of effect:
minimum side effects, medium to low
degree of consistency, less of a high
experienced



External Dosage Forms - Topical

Advantages: Topical medicines act mostly at the site of harm, high levels of patient satisfaction, easy to use, slow but long lasting effect, non-invasive, non-psychoactive.

By delivering drugs almost directly to the site of action, the risk of systemic side effects is minimized.

Disadvantages: slow absorption. The dose of some forms such as creams or lotions, the dosage is difficult to control



External Dosage Forms - Transdermal Patch

A transdermal patch is a self-contained, discrete dosage form which, when applied to intact skin, deliver the drug(s) through the skin at a controlled rate into systemic circulation.



Oral Dosage Forms - Transdermal Patch

Dose range: 1 to 1,000 mg

- bioavailability: medium
- dose accuracy: medium to high
- time to onset: 0.5 hrs - 2 hrs
- duration of effect: 6-8+ hrs.
- quality and consistency of effect:
minimum side effects, high degree of
consistency, less of a high experienced



Oral Dosage Forms - Transdermal Patch

The advantages of transdermal are many. The dose is pre-loaded and is hidden from view – no smell, no ritual, easy to use.

The rate at which the dose is administered is consistent and reliable happening gradually over a set time course.

Transdermal patches are gaining popularity because of their cleanliness and their controlled, time release dosing.



Conclusions

Cannabis can be prepared as a therapeutic agent for delivery through many useful dosage forms

Dosage form dictated by desired effect and/or target



THANK YOU
