



## **Oral Dosing of Cannabis + Its Primary Psychoactive Cannabinoid, THC: Important Considerations for Clinicians + Patients**

### **Smoked or Vaporized Cannabis**

Cannabis is primarily smoked or vaporized in its whole herb form, containing varying levels of its most active cannabinoid, THC, along with other cannabinoids such as CBD and terpenes that can have other effects or moderating effects on THC.

Both medical and adult use cannabis preparations are now offered in various oral dose forms, which are meant to be ingested via the gastrointestinal tract. Patients can consume concentrated cannabis orally in many forms, including capsules, tinctures/oils, chocolates, brownies, ice cream, granolas, and seed mixes. Careful consideration of accidental excess cannabis intake by overeating is a concern with edibles, or medibles.

Responsibly-labeled cannabis edibles indicate the milligram dosing of THC in each serving of the product. Appropriate dosing of edible products varies considerably among individuals. Consumers must practice caution when initiating dosing, starting with the lowest therapeutic amounts until determining how the medication affects them. Start low, go slow!

By contrast, inhaling cannabis smoke or vapor leads to a practical immediate feedback about its psychotropic effects. For smoked or vaporized cannabis, the patient can almost instantly determine how much is sufficient to treat pain, nausea, or anxiety.

Not everyone can smoke or vaporize cannabis effectively, however. Dosing cannabis orally is an alternative for delivering the plant's benefits to individuals treating pain, nausea, lack of appetite, or anxiety.

### **Challenges with Edible Cannabis Preparations**

Absorption of cannabinoids is much slower when ingested orally versus smoking or vaporizing. For some patient populations, variables affecting cannabinoid absorption and distribution make oral dosing crucial to initiate conservatively and to monitor frequently.

Experienced cannabis patients already know that oral cannabis consumption provides longer and stronger-acting effects than smoking or vaporizing. We use this knowledge to help:

- + adjust doses for new users;
- + prevent overconsuming – not lethal, but can lead to hospitalization); and
- + avoid unwanted side effects.



### **Stomach Acid Levels Influence THC Blood Levels**

During the process of digestion, stomach acid de-activates a portion of THC ingested in any oral cannabis product. Patients who have low stomach acidity (such as the elderly) or who take prescription or over-the-counter antacids will metabolize a higher percentage of active THC following oral cannabis consumption, delivering more THC to the bloodstream. Prescription and OTC antacids such as proton-pump inhibitors, histamine blockers, or calcium-based antacids (ie: Tums) are widely-consumed medications in the US. Any patient taking these medications chronically must start with a much lower oral dose of cannabis.

### **Oral Cannabis Dosing Produces More Active Metabolites than Inhaled Cannabis**

When cannabis is ingested orally, the liver converts about half the ingested THC into its primary active metabolite of THC, 11-hydroxy-THC (11-OH-THC). This is a significantly much higher conversion than occurs with smoking or vaporizing cannabis. What's the net-net?: this metabolite of THC (which is equally as psychoactive as THC) stays in the body a lot longer than THC, prolonging its effects.

Moreover, studies have demonstrated that 11-OH-THC crosses the blood-brain barrier more effectively than does THC. As a result, orally dosed cannabis promotes increased psychoactive effects that may last longer than smoked or vaporized cannabis.

### **THC Binds Strongly to Plasma Proteins**

After digestion by the stomach and processing by the liver, the THC that makes it into the bloodstream binds strongly to plasma proteins. Drugs that are bound to plasma proteins by definition, however, are not free to perfuse into tissues and activate receptors. Meaning?: only a small percentage of blood THC can be considered to be "active." Because THC is a lipophilic or, fat-loving compound, it has high affinity to plasma proteins plus high affinity for distribution into fatty tissues of the body including the brain. Clinical pearl: patients with low plasma proteins – such as those with chronic kidney failure or those taking other highly protein-bound drugs – may experience increased effects from oral dosing. THC's primary active metabolite, 11-OH-THC, has also been shown to have less of an affinity for plasma proteins than THC, which contributes to increased perfusion into brain tissue and prolonged psychoactive effect.

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