

# The Cannabinoid Spectrum

This document provides a brief overview of the major cannabinoids present in whole marijuana. All evidence and statements in this document are sourced from the American Herbal Pharmacopoeia's Monograph on Cannabis Inflorescence.

*ElSohly, M., Chandra, S., Lata, H., Williamson, E., Upton, R., Harder, D., Slade, D., Radwan, M., and Li, K. (2013). Cannabis Inflorescence, Cannabis spp., identity, analysis and quality control. American Herbal Pharmacopoeia (AHP)*

## THE MAIN COMPONENTS

Medical marijuana consists of hundreds of chemically distinct components, all of which have unique properties. The main therapeutic components of medical marijuana are cannabinoids, which have been shown to provide patients with therapeutic benefit for indications ranging from pain management to epilepsy. The Cannabis spectrum is the balance of concentrations of the most prevalent and actively researched components of medical marijuana. The best-known and most relevant component of the cannabis spectrum is the balance of  $\Delta^9$ -tetrahydrocannabinol ( $\Delta^9$ -THC) and Cannabidiol (CBD) concentrations within medical marijuana. This variable balance may determine the appropriateness and efficacy of certain strains of marijuana for specific indications / conditions.

It is important to note that no single component of medical marijuana alone has been isolated as the therapeutic agent and that therapeutic benefits result from the symphony of components in the medicine, which is not limited to the cannabinoids.

### $\Delta^9$ -TETRAHYDROCANNABINOL ( $\Delta^9$ -THC)

$\Delta^9$ -THC mimics the action of a naturally occurring endocannabinoid called anandamide.  $\Delta^9$ -THC is the primary psychoactive component of marijuana and has been shown to provide positive therapeutic benefits, as an antiemetic, analgesic, and in the management of glaucoma. Conversely strains of medical marijuana with high proportions of  $\Delta^9$ -THC may cause feelings of anxiety, disorientation and intoxication.

#### **Confirmed clinical indications for the use of $\Delta^9$ -THC include:**

- Stimulation of appetite for AIDS and cancer patients.
- Nausea suppressant for chemotherapy associated nausea.
- Pain associated with cancer, damaged nerves, migraine, spinal cord injury, post-operative, dental and phantom limb pain.
- Multiple sclerosis.
- Glaucoma.

### CANNABIDIOL (CBD)

As the main non-psychoactive component in marijuana, CBD is an agonist to serotonin receptors and can enhance adenosine receptor signaling by inhibiting receptor inactivity. As a result of its biological interaction, CBD has a strong role in therapies for neuropathic pain and

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neural inflammation. As an active component of marijuana, the lone significant side effect of CBD in high doses is variable drowsiness and sedation.

**Confirmed clinical indications for the use of CBD include:**

- Epilepsy and seizures
- Psychosis
- Anxiety
- Movement Disorders including Parkinson's disease, Huntington's disease and amyotrophic lateral sclerosis.
- Alzheimer's disease
- Multiple Sclerosis

**$\Delta^9$ -THC & CBD**

The interplay between these two active components in marijuana is presently being heavily researched, and results to date have indicated that these compounds have an incredibly complex relationship in vivo, along with the over 700 other metabolites in whole bud marijuana. One conclusion that has been confirmed is that CBD as a non-psychoactive component of marijuana in fact tempers and reduces the psychoactive effect of the  $\Delta^9$ -THC.

**SECONDARY COMPONENTS**

Medical Marijuana contains a number of secondary cannabinoids. There is limited evidence about the effects of these cannabinoids, although many are precursors and metabolites of the primary active components  $\Delta^9$ -THC & CBD.

**CANNABIGEROL (CBG)**

Cannabigerolic acid (CBGA) is a precursor for both  $\Delta^9$ -THC & CBD. CBG is commonly present in small amounts in marijuana, although some strains have been bred to increase the proportion of CBG in the plant. CBG is a non-psychoactive cannabinoid and in laboratory settings has demonstrated anti-microbial properties as well as inhibition of proliferation of keratinocytes and cancer cells.

**$\Delta^8$ -TETRAHYDROCANNABINOL ( $\Delta^8$ -THC)**

$\Delta^8$ -THC, not to be confused with  $\Delta^9$ -THC, is present in very small amounts in marijuana.  $\Delta^8$ -THC is less psychoactive than it's counterpart  $\Delta^9$ -THC and at low doses is effective in stimulating appetite.

**ADDITIONAL COMPONENTS**

A number of other cannabinoids have been isolated in the marijuana plant. To date many of the therapeutic benefits of cannabinoids have not been examined. Additional Cannabinoids include:

- Cannabielsoin (CBE)
- Cannabitriol (CBT)
- Cannabichromene (CBC)
- Cannabinol (CBN)
- Cannabicyclol (CBL)
- Cannabinodiol (CBND)

