

Therapeutic Applications and Metabolite Concentrations of Medicinal Cannabis

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DESCRIPTION

Medicinal cannabis has garnered widespread attention due to its potential therapeutic benefits across a range of medical conditions. With evolving research and legislation, the use of cannabis for medicinal purposes is gaining acceptance. The plant contains numerous bioactive compounds, especially cannabinoids, which are central to its therapeutic effects. The concentrations of these metabolites, such as Tetra-Hydro-Cannabinol (THC) and Cannabidiol (CBD), play a significant role in determining the efficacy and safety of medicinal cannabis treatments.

The therapeutic potential of medicinal cannabis

Medicinal cannabis is commonly used for managing pain, reducing inflammation, and alleviating symptoms of neurological and psychiatric disorders. Key cannabinoids like THC and CBD interact with the body's Endo-Cannabinoid-System (ECS), which plays an essential role in regulating pain, mood, appetite, and immune function.

Pain management: Chronic pain, especially neuropathic pain, is a major area where medicinal cannabis has shown promise. Patients with conditions such as fibromyalgia, arthritis, and multiple sclerosis have reported relief with cannabis use. THC, with its psychoactive properties, is effective in modulating pain perception, while CBD is recognized for its anti-inflammatory and analgesic properties.

Neurological disorders: Medicinal cannabis has been explored as a treatment for conditions like epilepsy and multiple sclerosis (MS). Epidiolex, a CBD-based drug, has been approved for treating certain forms of epilepsy, such as Dravet syndrome and Lennox-Gastaut syndrome. CBD has demonstrated anti-seizure effects without the psychoactive effects of THC, making it a preferred cannabinoid for treating neurological disorders.

Psychiatric disorders: Anxiety, depression, and Post-Traumatic Stress Disorder (PTSD) are psychiatric conditions that may benefit from cannabis treatment. CBD, in particular, has been noted for its anxiolytic (anxiety-reducing) properties, offering

potential relief without the intoxicating effects associated with THC. However, careful consideration of dosing and THC levels is critical in these cases, as THC can exacerbate anxiety and paranoia in some individuals.

Cancer and palliative care: Cannabis is increasingly used in palliative care for cancer patients to alleviate pain, nausea, and stimulate appetite. Both THC and CBD have been shown to improve the quality of life for patients undergoing chemotherapy, helping manage side effects such as vomiting and anorexia. There is also emerging research into the anti-tumor properties of cannabinoids, though more studies are needed to confirm these findings.

Autoimmune and inflammatory conditions: Conditions such as Crohn's disease, rheumatoid arthritis, and lupus may benefit from the anti-inflammatory properties of cannabinoids. CBD, in particular, helps regulate immune responses and reduce chronic inflammation, which is a hallmark of many autoimmune diseases.

Concentrations of metabolites in medicinal cannabis

The therapeutic efficacy of medicinal cannabis largely depends on the concentration of its metabolites, primarily cannabinoids and terpenes. The two most studied and used cannabinoids are THC and CBD, but there are other lesser-known cannabinoids like Cannabigerol (CBG) and Cannabinol (CBN) that may also contribute to therapeutic effects.

Tetra-Hydro-Cannabinol (THC): THC is the psychoactive component of cannabis that produces the "high" sensation. Therapeutically, it is effective for pain relief, muscle relaxation, and appetite stimulation. However, the concentration of THC in medicinal cannabis needs to be carefully monitored, as higher levels can lead to unwanted psychoactive effects such as dizziness, anxiety, and cognitive impairment. THC concentrations in medicinal cannabis products can vary significantly, typically ranging from 5% to 30%, depending on the strain and preparation method.

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Cannabidiol (CBD): CBD is non-psychoactive and has been studied for its wide range of medical benefits, from reducing seizures in epilepsy to alleviating anxiety and inflammation. Many medicinal cannabis products, especially those aimed at pediatric or psychiatric patients, are high in CBD and low in THC to minimize any potential psychoactive effects. The concentration of CBD can range from 5% to 20% in medicinal cannabis products, making it ideal for conditions where patients want to avoid the intoxicating effects of THC.

Cannabinol (CBN) and Cannabigerol (CBG): Though less prominent in most cannabis strains, CBN and CBG are gaining interest in medicinal research. CBN, a degradation product of THC, has sedative properties, making it useful in sleep disorders. CBG, on the other hand, is a precursor to both THC and CBD and has shown potential in reducing inflammation and intraocular pressure, which may benefit glaucoma patients. These cannabinoids are typically found in lower concentrations, but selective breeding and extraction methods are being used to increase their presence in certain medicinal products.

Terpenes and the entourage effect: In addition to cannabinoids, cannabis contains terpenes—aromatic compounds

that contribute to the plant's scent and may enhance its therapeutic effects through the "entourage effect." Terpenes like myrcene, limonene, and linalool are thought to work synergistically with cannabinoids to improve outcomes in pain management, anxiety relief, and anti-inflammatory treatments. While terpenes are present in trace amounts, their precise combination with cannabinoids is believed to optimize the overall efficacy of medicinal cannabis.

CONCLUSION

Medicinal cannabis holds significant therapeutic potential, with its effectiveness largely dependent on the concentration and balance of key cannabinoids and other metabolites. THC and CBD are the most well-known and researched compounds, with distinct effects and applications. While medicinal cannabis can offer relief for various conditions, careful consideration of cannabinoid concentrations is essential to maximize benefits while minimizing side effects. As research continues to evolve, the precise formulations and dosing strategies for different therapeutic uses will further enhance the potential of cannabis as a versatile medicinal agent.