

# CANNABIS AND HEMP association

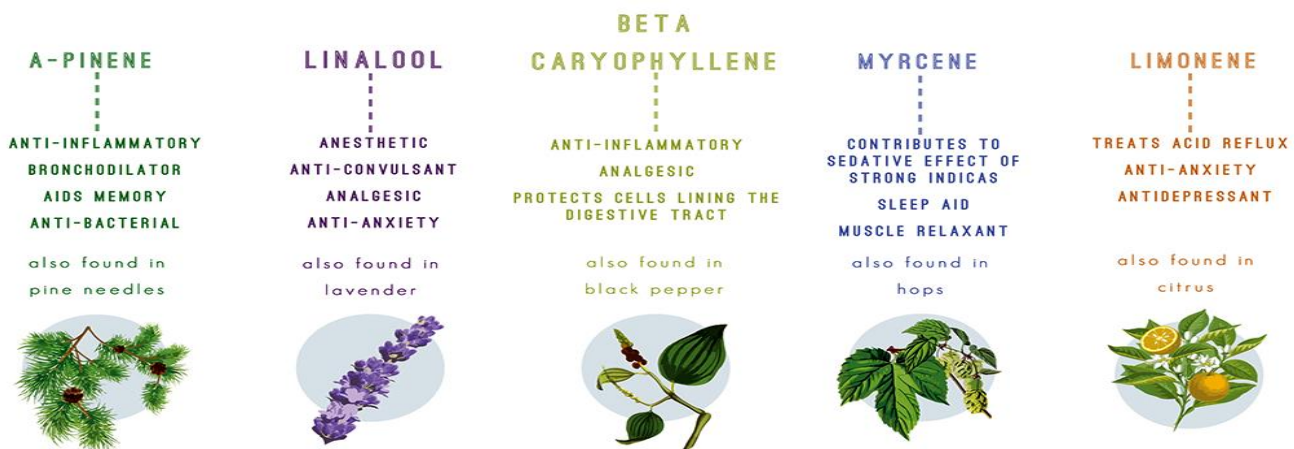


## Cannabis Terpenes

**Terpenes:** Lipid molecules located within the same glands (trichomes) that produce cannabinoids are known as terpenes. Terpenes make up the essential oils in cannabis and are responsible for the fragrances. The basis to all aromatherapy is terpenes, volatile molecules located in millions of plants from fruits, vegetables, herbs, spices, and other botanicals. Scientists have registered upwards of 20,000 terpenes in plants the most prevalent chemical in plants however only a few are detectable by the nose with cannabis. In nature terpenes have (2) basic functions, to encourage certain insects to pollinate with the plant and to act as a natural pesticide other insects that would do harm to the plant.

- Cannabis is known to have by-far the widest variety of terpenes on Earth due to mankind's obsession with hybridization of the plant and selective plant growth, however very .
- There are 100 known terpenes in cannabis and they are widely considered "the next frontier" in medical cannabis after cannabinoids.
- Terpenes represent 1% of all of the chemical compounds in cannabis, thus when you consider the strength of the odor it is quite remarkable how potent they are.
- Terpenes represent the finger-print of the strain, their profile when tested can guarantee the authenticity of a particular strain.

David Watson is the founder of the first super-strain Skunk #1 was the first to identify terpenes and their modifying effect on THC. He discovered that it is the combination of the cannabinoid profile and terpenoid profile of each plant which gave each strain it's unique fragrance.



September 2011 report by Dr. Ethan Russo in the British Journal of Pharmacology that discussed the wide-ranging therapeutic attributes of terpenoids, some of those found in cannabis were highlighted:

**Alpha-pinene (essential pine oil)**, the most common terpene in the plant world and one often found in cannabis, is a bronchodilator potentially helpful for asthmatics. Pinene also promotes alertness and memory retention by inhibiting the metabolic breakdown of acetylcholinesterase, a neurotransmitter in the brain that stimulates these cognitive effects.

**Myrcene**, another terpene present in numerous cannabis varieties, is a sedative, a muscle relaxant, a hypnotic, an analgesic (painkiller) and an anti-inflammatory compound. This musky terpene contributes mightily to the infamous “couch-lock” experience, Russo maintains.

**Limonene**, a major terpene in citrus as well as in cannabis, has been used clinically to dissolve gallstones, improve mood and relieve heartburn and gastrointestinal reflux. Limonene has been shown to destroy breast-cancer cells.

**Linalool**, a terpenoid prominent in lavender as well as in some cannabis strains, is an anxiolytic compound that counters anxiety and mediates stress. In addition, linalool is a strong anticonvulsant, and it also amplifies serotonin-receptor transmission, conferring an antidepressant effect. Applied topically, linalool can heal acne and skin burns without scarring.

**Beta-caryophyllene** is found in the essential oils of black pepper, oregano and other edible herbs, as well as in cannabis and many green, leafy vegetables. It is gastro-protective, good for treating certain ulcers, and shows great promise as a therapeutic compound for inflammatory conditions and autoimmune disorders because of its ability to bind directly to the peripheral cannabinoid receptor known as CB<sub>2</sub>. THC also activates the CB<sub>2</sub> receptor, which regulates immune function and the peripheral nervous system. But this is not the reason people feel stoned when they smoke marijuana; instead, what causes the high is THC binding to the CB<sub>1</sub> receptor, which is concentrated in the brain and the central nervous system.

It's been reported that certain terpenes dilate capillaries in the lungs. Logic tells us that this would be useful in the case of smoked or vaporized cannabis. Dilated capillaries would enable beneficial cannabinoids to enter the bloodstream easier. This certainly could be useful for growers who know how their crops will be ingested, and in the production of cannabis concentrates. In fact, a number of concentrate makers enhance their finished product with pure terpenes, due to the loss of terpenes in the extraction process.

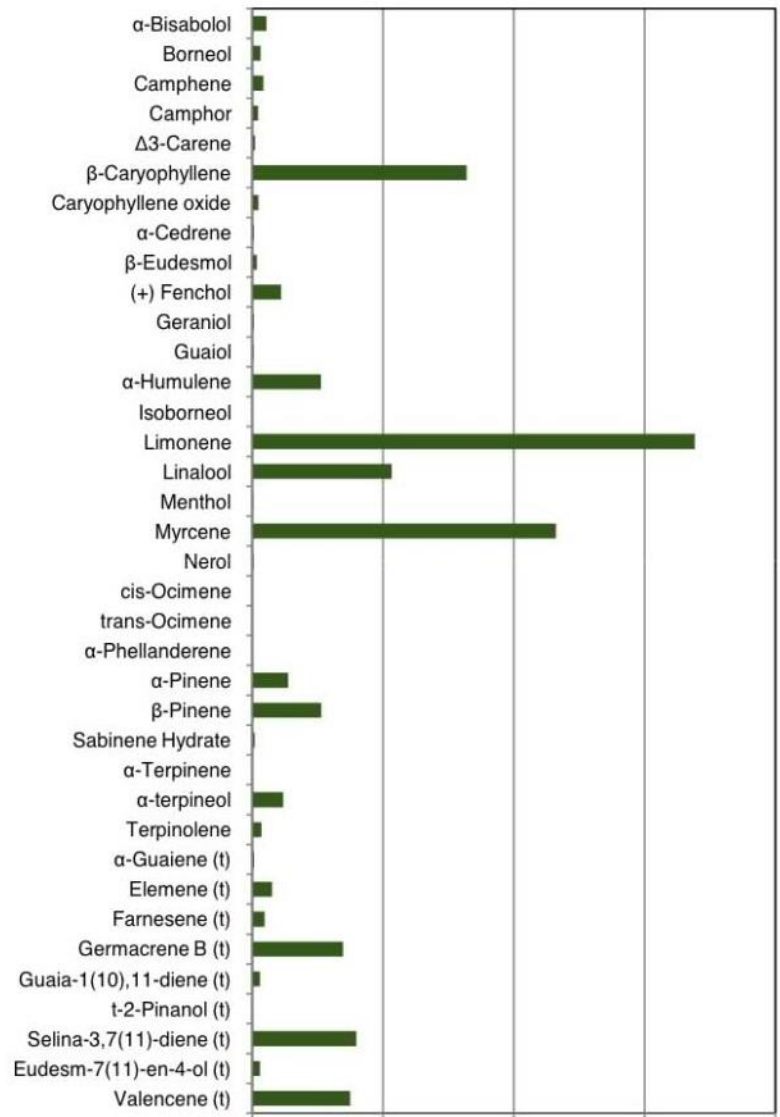
The Werc Shop in Washington is the premier testing facility for cannabis terpenes. They currently provide terpenoid profiles for the 10 most prevalent terpenes in cannabis.

<http://thewercshop.com/services/terpene-profiling-services/>



Certificate of Analysis	
Analysed for	Avalon Wellness Collective
Name	White Fire
Date of analysis	30-Dec-11
Material	Flower
Sativa / Indica	Hybrid
Growing Conditions	Indoor
Additional info	N/A

Terpene	mg/g
α-Bisabolol	0.38
Borneol	0.22
Camphene	0.30
Camphor	0.16
Δ3-Carene	0.07
β-Caryophyllene	5.67
Caryophyllene oxide	0.17
α-Cedrene	0.04
β-Eudesmol	0.13
(+) Fenchol	0.76
Geraniol	0.04
Guaiol	0.03
α-Humulene	1.82
Isoborneol	<LLOQ
Limonene	11.70
Linalool	3.69
Menthol	0.02
Myrcene	8.03
Nerol	0.03
cis-Ocimene	0.01
trans-Ocimene	0.01
α-Phellanderene	0.01
α-Pinene	0.95
β-Pinene	1.83
Sabinene Hydrate	0.06
α-Terpinene	0.01
α-terpineol	0.82
Terpinolene	0.25
α-Guaiene (t)	0.05
Elemene (t)	0.52
Farnesene (t)	0.33
Germacrene B (t)	2.40
Guaia-1(10),11-diene (t)	0.21
t-2-Pinanol (t)	<LLOQ
Selina-3,7(11)-diene (t)	2.76
Eudesm-7(11)-en-4-ol (t)	0.20
Valencene (t)	2.59
<b>Sum of Terpenes</b>	<b>46.27</b>



Sources Used:

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3165946/>

<http://www.leafly.com/knowledge-center/cannabis-101/terpenes-the-flavors-of-cannabis-aromatherapy>

<http://www.hightimes.com/read/talking-terpenes>