

# **TERPENES/TERPENOIDS**

(TUR-*peen*)

- diverse group of organic HydroCarbons (**C<sub>5</sub>H<sub>8</sub>**), produced by a wide variety of plants
- terpenoids are terpenes which have been chemically modified. They are important building blocks for certain odors, hormones, vitamins, pigments, steroids, resins, essential oils, and CANNABINOIDS!
- they are released from plants when temperatures are higher, helping to seed clouds which then cool the plants
- they interact with each other synergistically for a range of different smells/qualities/effects

## **Effects when ingested by an animal can be:**

- anti-microbial, anti-carcinogen, anti-oxidant, analgesic (painkiller), anti-inflammatory, muscle relaxer, anti-depressant, psychoactive (active molecules in Wormwood/absinthe, Salvia, and Cannabis), anti-anxiety, sedative, vasoconstrictor, vasorelaxant, sensory elevator...
- some are poisonous to varying degrees and act as natural pesticides (poison hemlock)

## **In Cannabis:**

- over 120 different terpenes can be manufactured by Cannabis, some only in trace amounts with others in double-digit percentage
- produced in the trichomes, the same glands where THC is produced, comprising between 10 and 20 percent of the total oils produced by the glands
- about 10-29 percent of marijuana smoke resin is composed of terpenes/terpenoids
- age, maturation and time of day can affect the amount and ratios of terpenes. They are constantly being produced but are vaporized by heat and light of the day... so harvest in early morning!
- climate and weather also affect terpene and flavonoid production. The same variety, even genotype, can produce a different terpene profile when grown in different soils or with different fertilizers.
- in addition to many circulatory and muscular effects, some terpenes interact with neurological receptors and modify their chemical output
- a few bind weakly to Cannabinoid receptors
- others seem to alter the permeability of cell membranes and allow in either more or less THC
- others affect serotonin and dopamine chemistry (neurotransmitters)

## **Examples of some common Terpenes found in Cannabis:**

**-Borneol-** menthol, camphor, pine, woody. Can be easily converted into menthol. Found in Cinnamon and Wormwood. It is considered a "calming sedative" in Chinese medicine. It is directed for fatigue, recovery from illness and stress.

**-Caryophyllene** - spicy, sweet, woody, clove, camphor, peppery. Found in black pepper(15-25%), clove(10-20%) and cotton(15-25%). It binds weakly to CB2 receptor. As a topical it is one of the constituents of clove oil, an anti-inflammatory and analgesic treatment for toothache. In high amounts, it's a calcium and potassium ion channel blocker. As a result, it impedes the pressure exerted by heart muscles. Since THC does not have a smell, drug dogs are trained to find one, very smelly molecule called Caryophyllene-epoxide!

**-Cineole/Eucalyptol-** spicy, camphor, refreshing, minty. Found in rosemary, eucalyptus. It is used to increase circulation, pain relief and easily crosses the blood-brain-barrier to trigger fast olfactory reaction. Eucalyptus oil is considered centering, balancing and stimulating. It is possibly the stimulating and thought provoking part of the cannabis smoke stream.

**-Delta3Carene-** sweet, pine, cedar, woody, pungent. A constituent of rosemary, pine and cedar resin. In aroma therapy, cypress oil, high in D-3-carene, is used to dry excess fluids, tears, running noses, excess menstrual flow and perspiration. It may contribute to the dry eye and mouth experienced by some marijuana users.

**-Limonene-** citrus (orange, tangerine, lemon, and grapefruit), rosemary, juniper, peppermint. Repulsive to predators. Found in the rinds of many fruits and flowers. With the presence of other certain terpenes, Limonene can be an anti-bacterial, anti-fungal, anti-depressant and anti-carcinogen. It can synergistically promote the absorption of other terpenes by quickly penetrating cell membranes. The result can be increased systolic blood pressure. Since Limonene is such a potent anti-fungal and anti-cancer agent, it is thought to protect against aspergillus fungi and carcinogens found in cannabis smoke streams!

**-Linalool-** floral (spring flowers), lily, citrus and candied spice. Possesses anti-anxiety and sedative properties (also in lavender).

**-Myrcene** – clove like, earthy, green-vegetative, citrus, fruity with tropical mango and minty nuances. The most prevalent terpene found in most varieties of marijuana, it is also present in high amounts in Mangos, hops, lemon grass, East Indian bay tree, verbena and Mercia. Myrcene is one of the most important chemicals used in the perfumery industry. Because of its pleasant odor, it is occasionally used directly. It's a building block for menthol, citronella, and geraniol. It possesses antimicrobial, antiseptic, analgesic, antioxidant, anti-carcinogen, anti depressant, anti-inflammatory, and muscle relaxing effects. Myrcene affects the permeability of the cell membranes, allowing more THC to reach brain cells.

**-Pinene-** *Alpha*: pine needles, rosemary *Beta*: dill, parsley, rosemary, basil, yarrow, rose, hops, the familiar odor associated with pine trees and their resins. It is the major component in turpentine and is found in many other plant essential oils including rosemary, sage, and eucalyptus. Pinene can increase mental focus and energy, as well as act as an expectorant,

bronchodilator (the smoke seems to expand in your lungs), and topical antiseptic. It easily crosses the blood-brain barrier where it inhibits activity of acetylcholinesterase, which destroys acetylcholine, an information transfer molecule, resulting in better memory. It may counteract THC's activity, which leads to low acetylcholine levels. Largely due to the presence of pinene, rosemary and sage are both considered "memory plants." Concoctions made from their leaves have been used for thousands of years in traditional medicine to retain and restore memory.

**-Pulegone-** mint, camphor, rosemary, candy. It is implicated in liver damage in very high dosages. It is found in tiny quantities in marijuana. Pulegone is an acetylcholinesterase inhibitor. That is, it stops the action of the protein that destroys acetylcholine, which is used by the brain to store memories.

**-Sabinene -** Found in oak trees, tea tree oil, black pepper and is a major constituent of carrot seed oil.

**-Terpineol-** floral, lilac, citrus, apple/orange blossoms, lime. It is a minor constituent of many plant essential oils. It is used in perfumes and soaps for fragrance. It reduces physical motility 45% in lab rat tests... Couch-lock effect?

### **Synthetic Cannabis alternatives:**

-Marinol, synthetic THC, contains no terpenes... hence little medical value

-Sativex maintains a strict ratio of THC and CBD but also maintains a strict ratio of certain terpenes, yet the company doesn't mention what the actual concentrations of terpenoids might be. Probably still not the same profile nor medicinal benefits as the whole cannabis plant.

### **Try at home!**

-Inhale the aromas prior to consumption. Break up the bud, releasing volatile terpenes and INHALE deeply through your nose. Wait 5 minutes and you will maximize the benefits from that bud.

-Eat a Mango 1 hour before consuming Cannabis. Mangos are high in Myrcene which increases the effects of THC. Especially if it's a less potent strain, you should notice more of a "zing"...



This article was compiled and written by Josh Vogeler for informational purposes only, using these sources:

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