

# Shantibabab's

## GROW tips



# Terpenoids

## and the different odors of cannabis

In this article we'd like to briefly introduce terpenoids, which are the primary aromatic compounds found in the essential oil of Cannabis.



### So what are terpenes?

Terpenes are a large and varied class of hydrocarbons and are the primary constituent in the essential oil of many types of plants and flowers.

The etymology of the word "terpene" derives from the Latin word "turpentina", a concrete oleo-resin obtained from particular species of Pinus (Nat. Ord. Coniferae).

Plant terpenoids are used extensively for their aromatic qualities. They play a role in traditional herbal remedies and are under investigation for antibacterial, antineoplastic, and other pharmaceutical functions. Terpenoids contribute to the scent of eucalyptus, the flavors of cinnamon, cloves, citrus and ginger.

Many terpenes are derived commercially from conifer resins, such as those by pine trees.



## Terpenes in Cannabis

Most people don't know that cannabinoids (like THC, CBD, CBG, ect) are odorless.

Terpenoids are responsible for characterizing the aromatic profile of cannabis plants.

The main terpenoids present in cannabis are:

- **Myrcene**: a monoterpene, is actually one of the major constituents of the essential oil of cannabis (did represent up to 60% of the cannabis flower essential oil in some varieties

tested). It has been proven to have analgesic, sedative and muscle relaxant effects.

- **d-Limonene**: a monoterpene, is actually a precursor to the synthesis of other cannabinoids. Has been proven to have anti-depressant and immune stimulator properties in humans.

- **Caryophyllene**: a sesquiterpene, has anti-inflammatory and anti-malarial properties. Has been isolated from a number of plants and spices includ-

ing black pepper, oregano and cinnamon.

- **Pinene**: a monoterpene, gas anti-inflammatory and bronchodilatory properties.

Other known terpenoids of the *cannabis plant* include: *Pinene, delta-3-Carene, phellandrene, cis-Ocimene, trans-Ocimene, Terpinolene, Bergamotene, Humulene, trans-Caryophyllene, Farnesene, Selinene, Caryophyllene oxide* and many others...



## Where can we find terpenoids in Cannabis?

Terpenoids are produced in the same resin glands (called trichomes) that also produce the cannabinoids.

In fact, when the development of trichomes commences, especially in the hairs distributed across the surface of the female inflorescence, the medically important cannabinoids and the associated terpenoids begin to appear.

## What is the cannabis flower essential oil?

The essential oil is obtained by steam distillation from the flowers and upper leaves of the cannabis plant, is a volatile oil that is a mixture of volatile compounds, including monoterpenes, sesquiterpenes, and other terpenoid-like compounds.

A pale yellow liquid, the essential oil is used as a scent in perfumes, cosmetics, soaps and candles. It is also used as a flavoring agent in foods, primarily candies and beverages (for example, cannabis flavored beer). (foto: steam distillation)

The unique smell of each different cannabis strains, that ranges from bubble gum to skunk, from citrus to strawberry and from cheese to burned pine tree, are all created by the differences in the ratios of the various components present in the essential oil. So when we say that we prefer the smell of White Widow to the one of Super Skunk, we are judging mainly the differences in the smell of the terpenoids of those plants.

## Important discovery on *- Caryophyllene...*

In 2008 Dr. Jürg Gertsch, from the Institute of Pharmaceutical Sciences at ETH Zurich, has discovered that the substance beta-caryophyllene activates the cannabinoid receptor 2 (CB2) selectively. It's the first time that a non-cannabinoid compound found in Cannabis is proven to work on a cannabinoid receptor.

This discovery could become instrumental in treating chronic illnesses, such as liver cirrhosis, Morbus Crohn, osteoarthritis and arteriosclerosis. In all of these diseases, the CB2 receptor and the associated endocannabinoid system play a crucial role in our bodies.



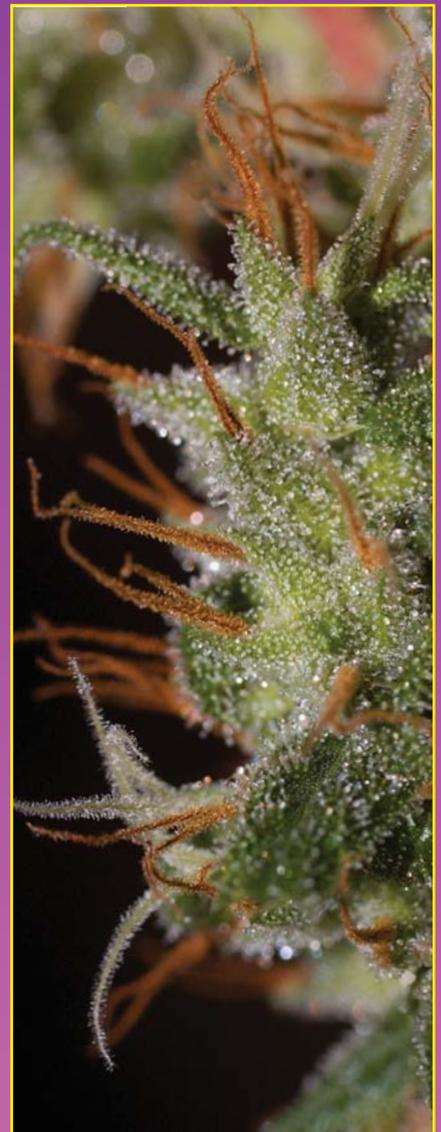
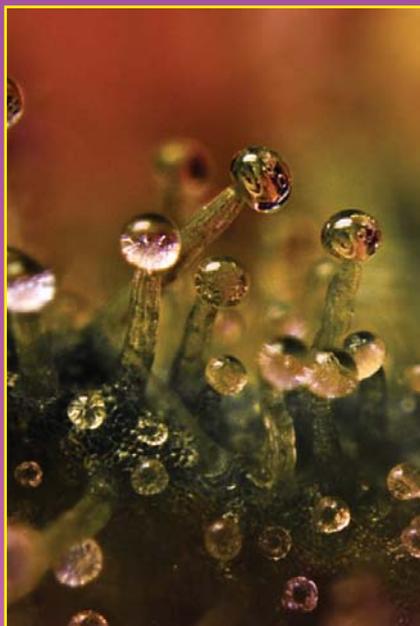
Mango Haze

## Olfaction and behavior

For humans, olfaction is a primitive sense, whereas other mammals, birds and insects rely predominately on their sense of smell for survival. Although smell seems far less meaningful to humans, there is an important link between olfaction and behavior.

Right  
NH macro shot

Below  
Resin glands of microscopic view





Silver Pearl micro



Trichomes

### **Is a sniff of coffee as good as a sip?**

A cup of freshly ground coffee is what it takes to get some people moving in the morning. But, according to a recent study conducted in Japan, it may be the aroma rather than the coffee itself that does the trick.

As reported by the New Scientist magazine in 2008, scientists in Tsukuba, Japan, kept 16 laboratory rats awake for 24 hours, by keeping them in a cage filled with an inch of water, then exposed half of them to the smell of roasted coffee.

After taking samples of the rats' brains, they found that the smell of coffee boosted the activity of key genes that promote cell survival in the body and reduce anxiety.

Professor Yoshinori Masuo, who led the study in Tsukuba, Japan, said that when people drink coffee to stay up all night, just the smell of the coffee could alleviate some of the stress caused by sleeplessness.

They said that chemicals extracted from coffee and pumped into the air may one day be used as a way of reviving tired people.

### **“Entourage effect” on Cannabis**

The clinical contribution of cannabinoids different than THC, terpenoids and flavonoids to clinical cannabis effects has been espoused as an “entourage effect” (Mechoulam and Ben-Shabat 1999). While THC remains the most psychoactive compound found in Cannabis, all other substances present in the plant (in particular cannabinoids, terpenoids and flavonoids) also have unique properties that will ultimately influence the effects that Cannabis has on us.

Many times patients using Cannabis as medicine have reported that a specific plant genetic seems to have better therapeutic properties on them than other ones available. When compared, those Cannabis varieties had similar cannabinoid profile (content of cannabinoids such as THC and CBD). So if the difference is not in the cannabinoid content, we’ll need to investigate the “entourage” of other substances present in the plant to explain the difference perceive by patients. Definitely a long road ahead, especially because the “cocktail” of substances present in Cannabis is so varied and complex.