Terpenes

1. Organic compounds primarily created by plants for a variety of purposes, that we use for a variety of ailments
   1. For the plants
      1. Repel pests
      2. Attract pollinators
      3. Resist diseases
      4. Emitted by forest trees as a reflective cloud to regulate temperature in hot weather
      5. Possibly responsible for plant to plant communication
   2. For us
      1. History of medicinal use with plants
      2. “Terpene” comes from old spelling of turpentine (terpentine)
         1. Pine sap resin
         2. Had been used for thousands of years as a solvent, medicine, cleaner
         3. Plants have uses for us because of what they’re made of
      3. Uses being studied for a variety of illnesses:
         1. Arthritis, gout, fibromyalgia
         2. Diabetes, heart disease
         3. ADHD, behavioral disorders
         4. Cancerous tumors
         5. Epilepsy and convulsions
         6. Much more
      4. Make up essential oils – sometimes called “essential oil components”
         1. Usually percentages of concentration of a terpene in a particular plant is referring to the essential oil
         2. Easiest way to use terpenes and incorporate them into life routine
      5. Usually have strong, pleasant odors
   3. Cannabis
      1. Eight major terpenes:
         1. Myrcene
         2. Limonene
         3. Caryophyllene
         4. Pinene
         5. Terpinolene
         6. Ocimene
         7. Linalool
         8. Humulene
      2. Lots of secondary terpenes, six of which we’ll cover:
         1. Nerolidol
         2. Bisabolol
         3. Geraniol
         4. Carene
         5. Guaiol
         6. Terpinene
2. Classification
   1. Most terpenes exhibit one or more of five basic effect categories:
      1. Soothing /calming
      2. Euphoric/mood-lifting/reduces stress and anxiety
      3. Sedative/sleep aid/muscle relaxer
      4. Energizing
      5. Focused/Attentive
   2. They also have a few of nine basic applications or uses, be them medical, industrial, or persona (The Big Nine Applications (B9Apps):
      1. Anti-inflammation/pain relief
      2. Antibacterial/antifungal/antimicrobial/antiviral
      3. Antioxidant/Prevents oxidative stress
      4. Inhibits cancer cell growth/shrinks tumors/weakens cells to chemo
      5. Pesticide/Insect Repellant
      6. Flavoring: food, candy, gum, soda, etc.
      7. Fragrance in perfumes, creams and lotions, cosmetics, etc.
      8. Fragrance to ease the chemical smell of industrial fluids
      9. Assist with passage through the Blood-Brain-Barrier (BBB)
   3. Most of them have unique traits and uses as well, which we’ll cover one by one
   4. Monoterpenoids and sesquiterpenoids

Note: “terpenes” and “terpenoids” are essentially the same thing, but terpenoid is a special category for those produced especially by plants. Here, we’re going to use them interchangeably.

* + 1. All terpenes are made of Carbon, Hydrogen, and the occasional Oxygen atoms in different arrangements
    2. Refers to the number of Carbon and Hydrogen atoms in the whole molecule
       1. Carbon in multiples of 5
       2. Hydrogen in multiples of 8
    3. Monoterpenoids have 10 Carbon and 16 Hydrogen, Sesquiterpenoids twice that
       1. Some are just bigger than others.

1. Myrcene
   1. Aroma: peppery, earthy, balsam
   2. About:
      1. 1995 study found that is accounts for 65% of terpenoid content in cannabis
      2. Named for the Brazilian shrub *Myrcia sphaerocarpa*
      3. Used to treat diabetes, dysentery, hypertension
      4. Lemongrass tea used for centuries for sleep is high in Myrcene
      5. Mangoes said to increase cannabis high are high in Myrcene
      6. It’s in lots of international food that use certain plants and spices
   3. Effects
      1. Soothing/calming
      2. Sedative/muscle relaxer
   4. B9Apps
      1. Antioxidant/Prevents oxidative stress
      2. Anticancer
      3. Flavoring for food, candy, etc.
      4. Fragrance in cosmetics
      5. Opens BBB
   5. Unique Applications
      1. Favorite of chronic pain patients
      2. Promising studies for inflammation related to osteoarthritis
      3. Enhances transdermal absorption
         1. May also protect against UV light damage
      4. Improved glucose tolerance in rats
      5. Helps the binding process with cannabinoid receptors
   6. Plants found in:
      1. Bay
      2. Hops
      3. Thyme
      4. Verbena
      5. Mango
      6. Lemongrass
      7. Cardamom
      8. Lavender
      9. Frankincense
      10. Juniper
      11. Guavas
      12. Myrcia
      13. Citronella
      14. Menthol
      15. Parsley
      16. Ylang-ylang
   7. Strains found in:
      1. Blueberry
      2. Blue Dream
      3. Head Cheese
      4. Grandaddy Purp
      5. Tangie
      6. Grape Ape
      7. FP OG
      8. OG Kush
      9. Remedy
2. Limonene
   1. Slightly citrusy
   2. About:
      1. From the Italian word *limone*
      2. Steam distilled – peels are boiled, steam is collected and separated
      3. Flammable and toxic to aquatic life
      4. Can be used as biofuel
      5. Solvent – fragrant alternative to turpentine
   3. Effects
      1. Euphoric/mood-lifting
      2. Usually reduces stress and anxiety, can induce anxiety in some
   4. B9Apps
      1. Anti-imflammatory/painreliever
      2. Antibacterial/Antifungal/Antimicrobial
      3. Anticancer
      4. Pesticide/Insect repellant
      5. Flavoring for food, candy, gum, etc.
      6. Fragrance in perfumes/cosmetics
      7. Fragrance in cleaners and industrial fluids
      8. Opens BBB
   5. Unique Applications
      1. Suppresses appetite and supports healthy digestion
      2. Prevents some of the negative side effects of chemo
      3. Lowers blood sugar, triglycerides, cholesterol
      4. Analgesic is large doses
   6. Plants Found In:
      1. citrus fruit peels and juice

orange peel contains up to 97% limonene

* + 1. red and silver maple trees
    2. cottonwoods and apsens
    3. sumac, spruce, douglas fir
    4. juniper
    5. larches, cedars
  1. Strains Found In
     1. Super Lemon Haze
     2. Lemon OG
     3. Banana OG
     4. Berry White
     5. Emerald Jack
     6. Cookies n Cream
     7. Black Cherry Soda
     8. Do-Si-Dos
     9. Purple Hindu Kush
     10. Shining Silver Haze
     11. Liberty Haze
     12. Wedding Cake
     13. White Fire OG

1. Caryophyllene
   1. Aroma: spicy, peppery
   2. About
      1. Only terpene that can bind directly to the cannabinoid receptors
         1. Has the highest cannabinoid activity of any terpene
      2. Oftentimes what dogs smell about cannabis
   3. Effects
      1. Soothing/relaxing/calming
      2. Euphoric/mood-lifting
   4. B9Apps
      1. Anti-inflammatory/pain reliever
      2. Antibacterial/Antifungal/Antimicrobial
      3. Pesticide/insect repellant
      4. Flavoring for food, candy, gum, etc
      5. Fragrance in perfumes/cosmetics
      6. Fragrance in cleaners and industrial fluids
   5. Unique Applications:
      1. Dilates blood vessels and increases blood flow
         1. Improves cold tolerance
      2. Supports the immune system
      3. Improves wound healing
      4. Influences insulin secretion
      5. Could help in treating addiction
   6. Plants Found In
      1. Rosemary
      2. Hops
      3. Black pepper
      4. Oregano
      5. Cinnamon
      6. Basil
      7. Lavender
      8. Cloves
      9. Black caraway
      10. Copaiba oil
      11. Ylang-ylang
   7. Strains Found In
      1. GSC
      2. Original Glue
      3. Purple Punch
      4. Bubba Kush
      5. Sour Diesel
      6. White Widow
      7. Gelato
      8. Master Kush
      9. Candyland
      10. OG Kush
      11. The White
      12. Cookies n Cream
2. Pinene
   1. Aroma: piney, fresh
   2. About
      1. Most abundant terpene in nature
      2. Counteracts negative side effects of THC like memory loss and sleepiness
      3. High levels in turpentine, which has been used as a medicine, solvent, and cleaner for thousands of years
   3. Effects
      1. Energetic
      2. Focused
      3. Euphoric
   4. B9Apps
      1. Anti-inflammatory/pain relief
      2. Antibacterial/antifungal/antimicrobial
      3. Anticancer
      4. Pesticide/insect repellant
      5. Opens BBB
   5. Unique Applications
      1. Topically applied can reduce oil production
      2. Helps memory retention and promising for Alzheimer’s
      3. Bronchodilator – opens air passageways
      4. Inflammation reduction applicable to asthma, bronchitis, MRSA, COPD, Crohn’s, and MS
   6. Plants Found In
      1. Pine
      2. Dill
      3. Basil
      4. Rosemary
      5. Parsley
      6. Eucalyptus
      7. Turpentine
      8. Sage
      9. Ironwort
      10. Conifer trees
   7. Strains Found In
      1. Critical Mass
      2. Snoop’d Dream
      3. Big Smooth
      4. God’s Gift
      5. Grape Ape
      6. Cannatonic
      7. Cotton Candy Kush
      8. Harlequin
      9. Kosher Triangle
      10. Remedy
      11. Chemdawg
      12. Jack Herer
      13. Trainwreck
3. Terpinolene
   1. Aroma: fresh, piney, herbal, slightly floral
   2. About
      1. Seems to have the ability to be a sedating terpene or an energizer depending on what terpenes and cannabinoids surround it.
   3. Effects
      1. Enhances its surrounding terpenes
   4. B9Apps
      1. Antibacterial/Antifungal/Antimicrobial
      2. Antioxidant
      3. Anticancer
      4. Pesticide/Insect Repellant
      5. Fragrance in perfumes/cosmetics
      6. Fragrance in cleaners/industrial fluids
   5. Unique Applications
      1. Could reduce the risk of heart disease
   6. Plants Found In
      1. Parsnips (highest concentration)
      2. Lilac
      3. Sage
      4. Rosemary
      5. Nutmeg
      6. Cumin
      7. Tea tree
      8. Turmeric leaf
      9. Apples
      10. Cardamom
      11. Marjoram
      12. Coriander
      13. Pine
   7. Strains Found In
      1. Dutch Treat
      2. XJ-13
      3. Golden Pineapple
      4. Ghost Train Haze
      5. Chernobyl
      6. Jack Herer
      7. Golden Goat
      8. J1
      9. Orange Cookies
4. Ocimene
   1. Aroma: sweet, herbal, slightly spicy
   2. About
      1. From the Greek *ocimum* for Basil
      2. Natural plant defense
      3. Safe at 5% and below
   3. Effects
      1. Euphoric/mood-lifting
      2. Energetic
   4. B9Apps
      1. Anti-inflammatory/pain relief
      2. Antibacterial/antifungal/antimicrobial
      3. Pesticide/Insect repellant
      4. Fragrance in perfumes/cosmetics
      5. Fragrance in cleaners
   5. Unique Applications
      1. Neutralizes spike proteins that allow viruses into human cells
      2. Vape oil flavoring
      3. May help treat symptoms of diabetes and hypertension
   6. Plants Found In
      1. Orchids
      2. Mint
      3. Parsley
      4. Hops
      5. Kumquats
      6. Mangoes
      7. Bergamot
      8. Lavender
      9. Pepper
      10. Basil
      11. Marjoram
      12. Allspice
      13. Tarragon
      14. Tulsi
   7. Strains Found In
      1. Dutch Treat
      2. Amnesia
      3. Hawaiian Butterscotch
      4. PUDC
      5. Green Crack
      6. Dream Queen
      7. Clementine
      8. Strawberry Shortcake
      9. Golden Pineapple
      10. Holy Grail
5. Linalool
   1. Aroma: distinctly floral with a touch of spice
   2. About
      1. First synthesized by Leopold Ruzicka in 1919
      2. 7% of people are allergic
      3. High levels in food – even non-cannabis users consume 2g of linalool per year in their food
   3. Effects
      1. Soothing/calming
      2. Euphoric/mood-lifting
   4. B9Apps
      1. Antibacterial/antimicrobial/antifungal
      2. Antioxidant
      3. Pesticide/Insect repellant
      4. Fragrance in perfumes/cosmetics
      5. Fragrance in cleaners
   5. Unique Applications
      1. Lowers depression-like behaviors
         1. In mice, when put in stressful situations, mice exposed to linalool tried harder for longer to escape
      2. Strengthens the immune system against stress
      3. Blocks excitable brain activity that can lead to seizures
         1. Also blocks excitable activity in the spinal cord
         2. Increases natural sedatives
      4. Reduces brain degeneration
   6. Plants Found In
      1. Lavender
      2. Jasmine
      3. Rosewood
      4. Basil
      5. Thyme
      6. Coriander
      7. Cinnamon
      8. Mugwort
      9. Sweet orange leaves
      10. Mint
      11. Laurel

Over 200 plant species produce linalool

* 1. Strains Found In
     1. Mazar I Sharif
     2. Do-Si-Dos
     3. Wedding Mintz #13
     4. Scooby Snacks
     5. Zkittlez
     6. Runtz

1. Humulene
   1. Aroma: hoppy, spicy
   2. About
      1. Responsible for the distinct hoppy taste in beer
      2. Often found with caryophyllene
   3. Effects
      1. Soothing/calming
      2. Sedative
   4. B9Apps
      1. Anti-inflammatory/pain reliever
      2. Anticancer
      3. Pesticide/Insect repellant
   5. Unique Applications
      1. Suppresses appetite
   6. Plants Found In
      1. Hops
      2. Marsh elders
      3. Ginseng
      4. Orange tree leaves
      5. Tobacco
      6. Sunflower leaves
      7. Sage
      8. Pine trees
      9. Ginger
      10. Cloves
      11. Basil
      12. Spearmint
      13. Fir trees
   7. Strains Found In
      1. ATF
      2. Fruity Pebbles
      3. GSC
      4. Amnesia
      5. Cinderella 99
      6. Cookies n Cream
      7. Bruce Banner
      8. Bubba Kush
2. Nerolidol
   1. Aroma: woody, like fresh bark
   2. About
      1. Effects similar to Linalool
   3. Effects
      1. Soothing/calming
      2. Euphoric/mood-lifting
   4. B9Apps
      1. Anti-inflammatory/pain relieving
      2. Antibacterial/antifungal/antimicrobial
      3. Antioxidant
      4. Anticancer
      5. Pesticide/Insect repellant
      6. Flavoring for food/gum etc
      7. Fragrance in perfumes/cosmetics
      8. Fragrance in cleaners
      9. Pass BBB
   5. Unique Applications
      1. Increases absorption of topical medications up to 20x
      2. Easily permeates plasma membranes
      3. Helps heal scars and stretch marks when used topically in neroli oil
      4. Shows promising treatment for Parkinson’s
   6. Plants Found In
      1. Jasmine
      2. Lemongrass
      3. Ginger
      4. Tea tree
      5. Lavender
      6. Neroli
      7. Oolong tea
      8. Gingko Biloba
      9. Lady of the Night orchid
   7. Strains Found In
      1. Island Sweet Skunk
      2. Jack Herer
      3. Skywalker OG
      4. Afghan Moon
      5. White Fire
      6. Shishkaberry
      7. GG4
3. Bisabolol
   1. Aroma: light, distinctly floral
   2. About
      1. Had been used for thousands of years in German chamomile and the candeia tree
         1. One of the oldest known herbal treatments
      2. Rare, not found in many plants
   3. Effects
      1. Soothing/calming
      2. sedative
   4. B9Apps
      1. Anti-inflammatory/pain relieving
      2. Anitbacterial/antifungal/antimicrobial
      3. Anticancer
      4. Fragrance in perfumes/cosmetics
   5. Unique Applications
      1. Soothes skin when used topically
         1. Also helps heal skin and wounds
         2. Called the “fountain of youth” in beauty and cosmetics
      2. Gastroprotective, helps with upset stomach
      3. Sleep aid
   6. Plants Found In
      1. German chamomile
      2. Figwort
      3. Leaf buds of some poplar trees
   7. Strains Found In
      1. Harle-Tsu
      2. Pink Kush
      3. Headband
      4. OG Shark
      5. ACDC
      6. Rockstar
      7. Master Kush
      8. Sour Candy
      9. Moonshine Haze
      10. Dolato
      11. Ice Cream Cake
      12. Hawaiian Haze
      13. Killer Queen
      14. Grape Pie
      15. Midnight
      16. Chocolate Thai
4. Geraniol
   1. Aroma: rose-like, slightly citrusy
   2. About
      1. First distilled in India from geranium grass
      2. Produced by the scent glands of honeybees to mark nectar flowers and the entrance to the hive
      3. Extremely strong and fragrant
         1. May cause allergic reactions
   3. Effects
      1. Soothing/calming
   4. B9Apps
      1. Anti-inflammatory/pain relieving
      2. Antibacterial/antimicrobial/antifungal
      3. Anticancer
      4. Pesticide/Insect repellant
      5. Flavoring for food/gum/candy etc.
      6. Fragrance in perfumes/cosmetics
   5. Unique Applications
      1. Could help with food borne illnesses by weakening viruses and bacteria
   6. Plants Found In
      1. Rose
      2. Citronella
      3. Lemongrass
      4. Lavender
   7. Strains Found In
      1. Amnesia Haze
      2. Afghan
      3. Tahoe OG
      4. Fruity Pebbles OG
      5. Black Cherry Soda
      6. Purple Punch
      7. Kimbo Kush
5. Carene
   1. Aroma: pungent, like damp woodlands
   2. About
      1. Believed to be responsible for the dry mouth/red eyes associated with cannabis use
   3. Effects
      1. Euphoric/mood-lifting
      2. Energetic
      3. Focused
   4. B9Apps
      1. Anti-inflammatory/pain relieving
      2. Antibacterial/antifungal/antimicrobial
      3. Fragrance in perfumes/cosmetics
   5. Unique Applications
      1. Increases memory retention
      2. Decongestant/removes and dries up bodily fluids
      3. Helps bones mineralize and take in calcium
         1. Promising treatment for osteoporosis
   6. Plants Found In
      1. Turpentine (up to 42%)
      2. Fir needles
      3. Mango
      4. Allspice
      5. Rosemary
      6. Basil
      7. Cedar
      8. Pine
      9. Juniper
      10. White pepper
      11. Fennel
      12. Lime
   7. Strains Found In
      1. Lemon Shining Silver Haze
      2. Skunk XL
      3. Sunberry
      4. Dragon Fruit
      5. Crescendo
      6. White Runtz
      7. Super Silver Haze
      8. Jack Herer
      9. AK-47
      10. Arjan’s White Haze #2
      11. OG Kush
      12. Cherry Pie
6. Guaiol
   1. Aroma: pine-like with wood and rose
   2. About
      1. Quite rare, only found in three types of plants, including cannabis
      2. Brought back to Spain from Hispaniola in the 1600s in the guaiacum plant
         1. Used to treat syphilis, regulate menstruation, sore throat, gout, arthritis, and constipation
      3. Safe to eat and drink with little dilution
   3. Effects
      1. Soothing/calming
      2. sedative
   4. B9Apps
      1. Anti-inflammatory/pain relieving
      2. Antibacterial/antifungal/antimicrobial
      3. Antioxidant
      4. Anticancer
      5. Pesticide/Insect repellant
   5. Unique Applications
      1. Lowers blood pressure
      2. Diuretic
   6. Plants Found In
      1. Cypress trees
      2. South American Guaiacum tree
   7. Strains Found In
      1. Golden Pineapple
      2. Chernobyl
      3. Agent Orange
      4. ACDC
      5. Plushberry
      6. Jillybean
      7. Pennywise
      8. Cinex
      9. Blackberry
      10. Fruit Loops
7. Terpinene
   1. Aroma: piney, fresh
   2. About
      1. Very close to terpinolene – only one connection is different
   3. Effects
      1. Soothing/calming
      2. sedative
   4. B9Apps
      1. Same as terpinolene
      2. Fragrance in cleaners and industrial fluids
   5. Unique Applications
      1. Used in auto care in waxes and polish
      2. Common in Indian and Mediterranean food due to high levels of cardamom and marjoram
   6. Plants Found In
      1. Tea tree
      2. Peppermint
      3. Cardamom
      4. Marjoram
      5. Eucalyptus
      6. Verbena
      7. Betel leaves
      8. Cumin
      9. Coriander
      10. Meleleuca
      11. Juniper
   7. Strains Found In