



HIP HOP HERBAL CONSTITUENTS

MIMI HERNANDEZ

**AKA
PHLO*EM**

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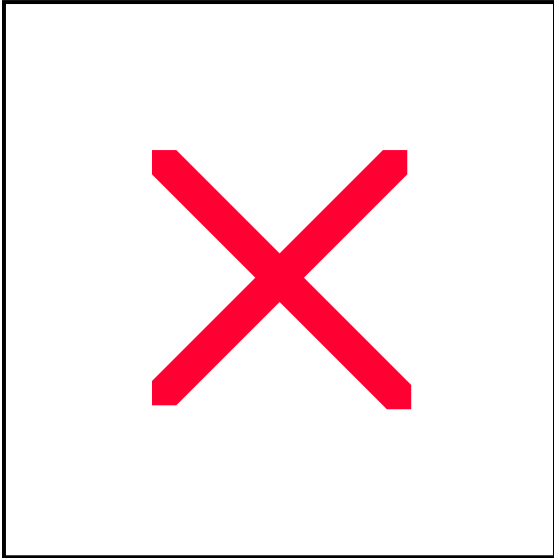
MIMI HERNANDEZ, MS, RH (AHG)

HIP HOP IN EDUCATION

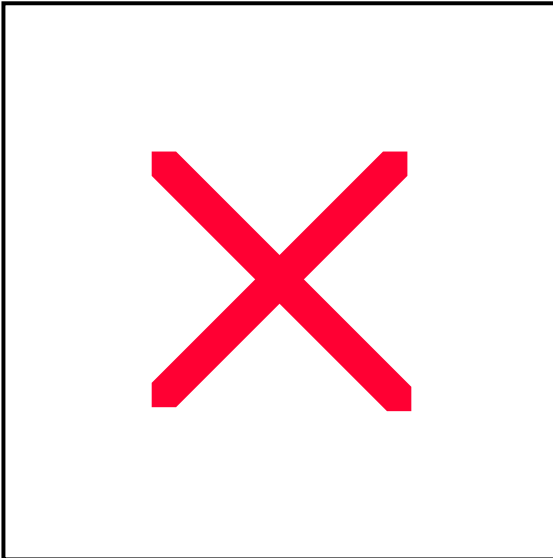
- **HIP-HOP CAN BE USED IN A POWERFUL AND RELEVANT WAY IN CLASSROOMS ACROSS THE ACADEMIC CURRICULUM.**
- **NOT ONLY DOES HIP-HOP ENGAGE STUDENTS BECAUSE OF ITS INHERENT RESONANCE WITH THEIR LIVES, IT CAN ALSO SERVE AS A CASE STUDY TO BE APPLIED FROM A MULTITUDE OF ANGLES.**



**HIP HOP IN
EDUCATION**



3



**HIP HOP IN
EDUCATION**

4

MEDICINAL PLANT CONSTITUENTS

- **AROMATICS**
- **POLYSACCHARIDES**
- **ALKALOIDS**
- **TANNINS**
- **ANTIOXIDANT POLYPHENOLS**

6

AROMATICS

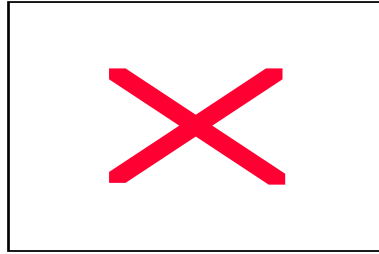
AKA VOLATILE OILS

- **LIPID SOLUBLE**
 - **DIFFER FROM FIXED OILS WHICH ARE HEAVY AT ROOM TEMP**
 - **ESSENTIAL OILS ARE VOLATILE- TEND TO EVAPORATE AS A GAS**

6

ESSENTIAL OILS

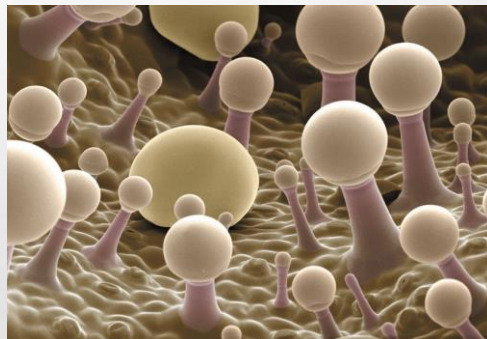
- **EXTRACTION & PROCESSING**
 - **ESSENTIAL OILS ARE EXTRACTED BY STEAM DISTILLATION.**
 - **THEY CAN BE EXTRACTED FROM WHOLE HERB BY ALCOHOL, HOT WATER, OR OILS.**



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ESSENTIAL OILS



Clary Sage- Herbal gram

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ESSENTIAL OILS

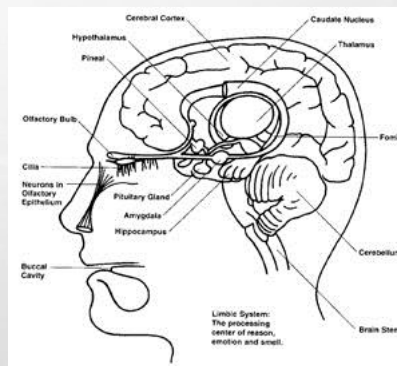
- **THEY STIMULATE THE OLFACTORY SENSES**
- **THE OLFACTORY NERVES CONNECT DIRECTLY TO THE LIMBIC SYSTEM OF THE BRAIN WHICH AFFECTS EMOTION, HUNGER, AND SEX.**
 - **EMOTIONAL CALMING- LAVENDER, ROSE, CHAMOMILE**
 - **EMOTIONAL EXCITABILITY- CLARY SAGE, ROSEMARY.**
 - **APHRODISIAC- VANILLA, CLOVE, CINNAMON**

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AROMATHERAPY

The limbic system processes both odor and emotions, therefore, aroma and emotions are inseparable.



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AROMATICS

- **EASILY CROSS MEMBRANES**
 - **THEY ARE VERY SMALL MOLECULES AND SINCE THEY ARE LIPID SOLUBLE**
 - **THEY ABSORB AND DISTRIBUTE QUICKLY THROUGHOUT THE BODY**
 - **THEY CROSS EASILY INTO THE BLOOD BRAIN BARRIER,**
 - **THEY ARE EASILY TRANSFERRED THROUGH MOTHER'S MILK.**
 - **THEY EASILY CROSS CELL MEMBRANES**

AROMATICS

- **MEDICINAL ACTIONS:**
 - **ANTISEPTIC**
 - **THEY ARE ANTI-VIRAL, ANTI-BACTERIAL, ANTI-FUNGAL BECAUSE THEY EASILY PENETRATE THE MEMBRANES OF PATHOGENS.**
 - **ONCE INSIDE THEY INTERFERE WITH CELLULAR MACHINERY**
 - **THEY ALSO STIMULATE WHITE BLOOD CELL PRODUCTION**
 - **MAKE GOOD INHALANTS FOR SINUS INFECTIONS**

AROMATICS

- **RELAXANT TO NERVOUS TISSUE**
- **ANTISPASMODIC EFFECTS BECAUSE THEY EASILY REACH THE NERVES**
- **BOWEL RELAXING- SPASTIC COLON (PEPPERMINT)**
- **BRONCHIAL RELAXING- (THYME)**
- **STOMACH RELAXATION (CHAMOMILE)**

AROMATICS

- **STRUCTURE- BUILT FROM HYDROCARBONS- THE SIMPLEST BUILDING BLOCK IS THE TERPENE (C₅H₈)**
- **TERPENES ARE ALSO STARTING BLOCKS FOR STEROIDS, CAROTENOIDS, AND RUBBER.**

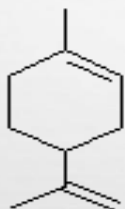
AROMATICA

- **ONLY THE SMALLEST, THE MONOTERPENES AND THE SESQUITERPENES ARE SMALL ENOUGH TO BE VOLATILE:**
 - **MONOTERPENES (C₁₀H₁₆)- VOLATILE!**
 - **SESQUITERPENES (C₁₅H₂₄)- VOLATILE!**
 - **DITERPENES (C₂₀H₃₂)**
 - **SESTERPENES (C₂₅H₄₀)**
 - **TRITERPENES (C₃₀H₄₈)**

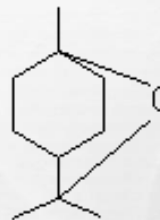
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15

AROMATICS



D-limonene- from Orange and citrus. Essential oil of lemon consists of 90-95% monoterpenes, 55-80% of which are limonene.



1,8 Cineole (eucalyptol) - from eucalyptus, rosemary, bay leaves, mugwort, sweet basil, tea tree, wormwood, sage Camphoric and cool.

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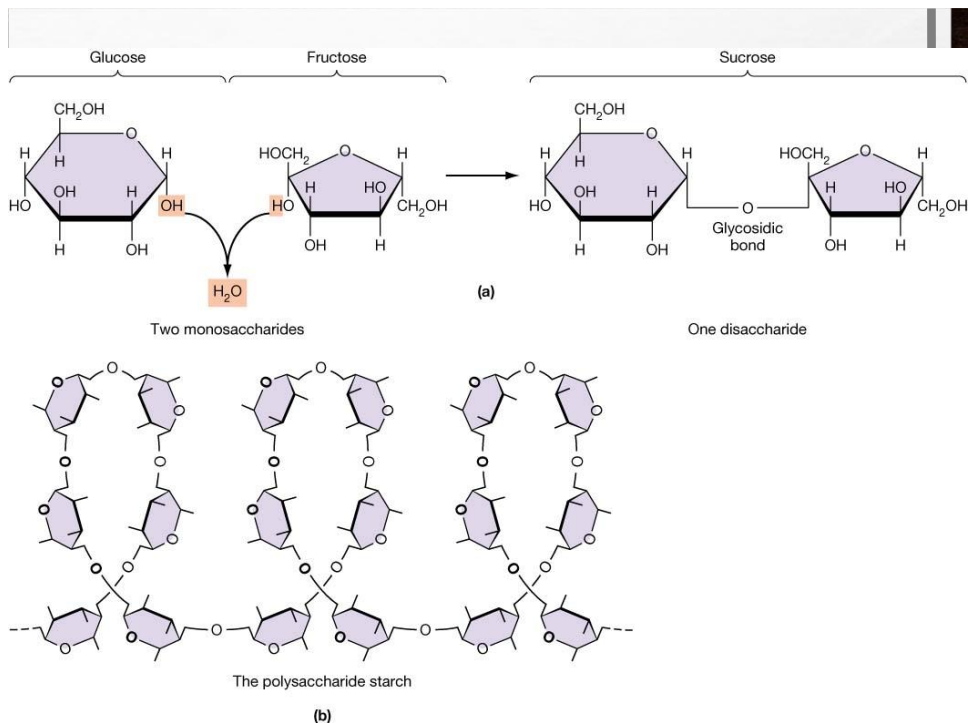
16

POLYSACCHARIDES

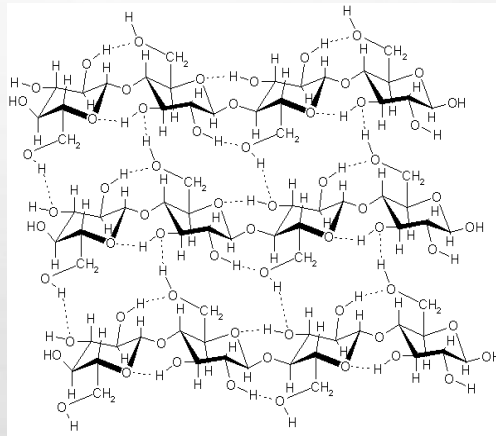
- **OLIGOSACCHARIDES- 2-10 SUGAR UNITS.**
 - **DISACCHARIDES- SUCROSE, MALTOSE, LACTOSE, ETC.**
 - **TRISACCHARIDES- RAFFINOSE**
- **POLYSACCHARIDES- CHAINS MUCH LONGER THAN 10 UNITS WITH THE NUMBER SOMETIMES UNKNOWN.**

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17



CELLULOSE

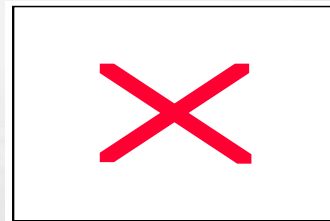


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POLYSACCHARIDES

- POLYSACCHARIDES ARE NOT ALCOHOL SOLUBLE- ANY FORMULA OVER 50% ETHANOL WILL NOT CONTAIN ACTIVE POLYSACCHARIDES.**
 - TRADITIONALLY, POLYSACCHARIDE RICH HERBS ARE BOILED**
 - MUCILAGE LIKE COLD WATER**
 - POLYSACCHARIDES HAVE LOW BIO-AVAILABILITY BECAUSE THEY ARE SO LARGE**



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POLYSACCHARIDES- INULIN

- **PLANT INULINS ARE COMPOSED MAINLY OF 35 FRUCTOSE UNITS.**

PREBIOTIC

- **FOOD SUBSTANCES WHICH PROMOTE THE GROWTH OF BENEFICIAL BACTERIA IN THE INTESTINES.**



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TOP SOURCES OF INULIN

- **DANDELION ROOT**
- **CHICORY ROOT**
- **BURDOCK ROOT**
- **ELECAMPANE ROOT**
- **JICAMA**
- **ONIONS, LEEKS**
- **GARLIC**
- **JERUSELUM ARTICHOKES**
- **SUPPLEMENTS**
- **BEETS**



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POLYSACCHARIDES

MUCILAGE- FORMS A SLIPPERY COLLOIDAL DISPERSION IN WATER.

- **DRAWING**
- **SOOTHING**
- **BULKING**
- **ANTIDIARRHEAL**



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POLYSACCHARIDES

• **MUCILAGE IS PRESENT IN:**

- **PSYLLIUM**
- **SLIPPERY ELM**
- **FLAX SEED**
- **COLTS FOOT**
- **IRISH MOSS**
- **BARLEY & OATS**
- **MARSHMALLOW ROOT**
- **COMFREY**
- **PLANTAIN**



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POLYSACCHARIDES: MUCILAGE

- **HEAVY, COOLING, NOURISHING, TONIFYING, MOIST, SOFT, GROUNDING, RELAXING.**
- **MUCILAGE IS SLIMY.**
- **HYDROPHILIC- WATER LOVING-RETAINS H₂O**
- **PRESENT IN ROOTS-COMFREY, LICORICE**
- **LEAVES- COLTSFOOT**
- **BARK- SLIPPERY ELM**
- **SEEDS-FLAX, PSYLLIUM**

Mucilaginous Herbs:

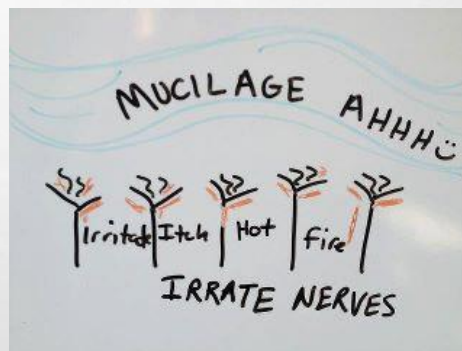
Marshmallow root powder
 Slippery Elm Powder
 Plantain, also astringent
 Comfrey, also astringent
 Oats
 Barley
 Peach leaf
 Sassafras leaf
 Flax Seed
 Aloe Vera
 Licorice Root
 Shatavari Root
 Coltsfoot
 Psyllium seed (plantain)
 Mullein
 Fennel, also aromatic
 Cinnamon, also pungent, aromatic, and astringent

25

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POLYSACCHARIDES: MUCILAGE: TOPICAL

- **LOCAL AND TOPICAL ACTIVITY- MUCILAGE IS SOOTHING AND COMFY- USE ON DERMATITIS, WOUNDS, BURNS**
- **PLANTAIN, COMFREY, ALOE ARE SPECIFIC FOR SKIN HEALING AND COOLING.**
- **OATMEAL BATHS ARE VERY SOOTHING AND RELAXING**



26

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MUCILAGE: GUT SOOTHING

- **SOOTHING TO EXPOSED MUCOSAL SURFACE REDUCING IRRITATION ALL THE WAY DOWN.**
- **COOL AND SOOTHING TO ULCER PAIN (LICORICE).**
- **LAYS DOWN A PROTECTIVE LAYER**
- **IN GASTRO ESOPHAGEAL REFLUX**



MUCILAGE: COLON SUPPORT

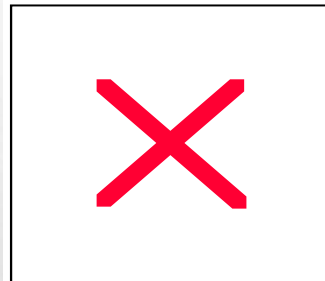
- **IN THE COLON MUCILAGINOUS POWDERS LIKE LICORICE, MARSHMALLOW, SLIPPERY ELM, PSYLLIUM SEED, SHATAVARI, AND FLAX CAN BE BULKING LAXATIVES- PULLS AND BINDS MOISTURE IN COLON FOR DRY CONSTIPATION PATTERN.**
- **THEY ARE SOOTHING TO COLON-IBS AND COLITIS.**
- **THEY WILL ALSO BE ANTIDIARRHEAL- PULL EXCESS FLUID TOWARD THEM TO EASE DIARRHEA**
- **MUCILAGE HELPS ABSORB TOXINS**

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IMMUNOMODULATING POLYSACCHARIDES

- **LARGE , INDIGESTIBLE, EXTENSIVELY BRANCHED MOLECULES OF SUGARS OFTEN OCCURRING IN TRIPLE HELIX FORM.**



30

IMMUNOMODULATING POLYSACCHARIDES



:

- ALOE
- BUPLERUM ROOT
- ASTRAGALUS
- LICORICE
- GINSENG
- ANGELICA SINENSIS
- ELEUTHEROCOCCUS SENTICOSUS
- ECHINACEA SPP
- SERENOA REPENS
- MATRICARIA RECUTITA

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IMMUNOMODULATING POLYSACCHARIDES

- MUSHROOMS HIGH IN MYCOPOLYSACCHARIDES INCLUDE:
 - SHITAKE (*LENTINUS EDODES*)
 - MAITAKE (*GRIFOLA FRONDOSA*)
 - TURKEY TAIL (*CORIOLUS VERSICOLOR*)
 - BUTTON MUSHROOMS (*SCLEROTINA SCLEROTIURUM*)
 - REISHI (*GANODERMA LUCIDUM*)
- THEORIES ABOUT HOW THEY WORK?



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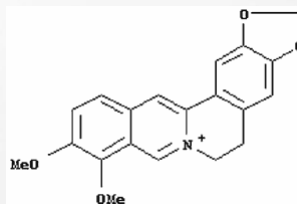
22



**SCIENTIFIC REPORTS VOLUME 6,
ARTICLE NUMBER: 22474 (2016)**

33

ALKALOIDS



- **NITROGEN CONTAINING RING**
- **MOST ALKALOIDS END IN -INE**
- **LET'S NAME SOME!**

ALKALOIDS

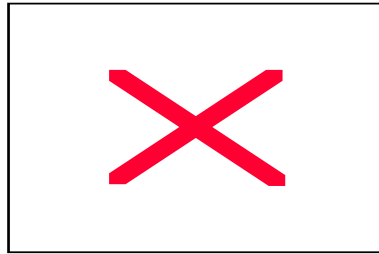
- **CAFFEINE, LOBELINE, NICOTINE, COCAINE, HEROINE, MORPHINE, BERBERINE, HYDRASTINE, EPHEDRINE, RESERPINE, STRYCHNINE, QUININE, VINBLASTINE, ATROPINE (ATROPA BELLADONNA), HYOSCYAMINE (HYOSCYAMUS NIGER), SCOPOLAMINE (DATURA STRAMONIUM), CAPSAICIN, PIPERINE (PEPPER), HARMINE.**

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35

ALKALOIDS

- **NOT VERY SOLUBLE IN WATER**
 - **EPHEDRINE IS AN EXCEPTION.**
 - **ALKALOIDAL SALTS ARE SOLUBLE IN BOTH WATER AND ALCOHOL.**
 - **ALKALOIDAL SALTS "LOOSEN UP" IN VINEGAR**
- **MOST ARE ALKALINE DUE TO NITROGEN CONTENT (HENCE THE TERM "ALKALI")**
- **MOST HAVE A BITTER TASTE**



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36

ALKALOIDS

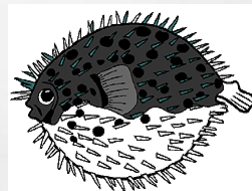
- **DISTRIBUTION:**
 - **OCCUR IN 15-30% OF ALL FLOWERING PARTS**
 - **OVER 10,000 ALKALOIDS FROM OVER 300 FAMILIES**
 - **UNIVERSAL IN PAPAVERACEAE**
 - **NOT PRESENT IN ROSACEAE OR LAMIACEAE**

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ALKALOIDS

- **COMMON IN:**
 - **RUBIACEAE**
 - **RANUNCULACEAE**
 - **SOLANACEAE**
 - **BERBERIDACEAE**
 - **PRESENT IN SOME MUSHROOMS SUCH AS ERGOT (CLAVICEPS) & PSILOCYBE SPP.**
 - **FOUND IN SOME ANIMALS SUCH AS FIRE ANTS & TOADS & POISON PUFFER FISH.**



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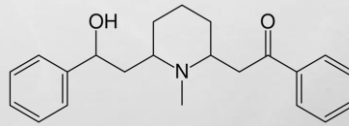
38

ALKALOIDS



PYRROLIDINE & PIPERIDINE ALKALOIDS (5 & 6 SIDED RINGS)

- **LOBELINE PRESENT IN *LOBELIA INFLATA***
- **LOBELIA CONTAINS 14 ALKALOIDS**
- **STIMULATES RESPIRATORY CENTERS & INDUCES COUGHING**
- **DILATES BRONCHIAL TUBES- USEFUL FOR ASTHMA**
- **RELAXANT TO MUSCLES**



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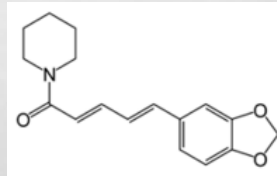
ALKALOIDS

• **PYRROLIDINE & PIPERIDINE ALKALOIDS (5 & 6 SIDED RINGS)**

- **PIPERINE FOUND IN *P. NIGRUM*(BLACK PEPPER) *P. LONGUM*(LONG PEPPER)-**



- **AYURVEDIC USES- HEPATOPROTECTIVE EFFECTS**
- **CLINICAL USES- ENHANCES BIOAVAILABILITY OF NUTRIENTS & HERBS.**



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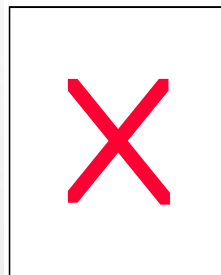
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ALKALOIDS

- **TROPANE ALKALOIDS**-CONDENSED DERIVATIVES OF PYRROLIDINE-PIPERIDINE ALKALOIDS. PRODUCE HALLUCINATIONS &/OR DELIRIUM.
- **SOLANACEOUS SPECIES WITH TROPANE ALKALOIDS (ALL FORMS OF EACH OTHER):**
 - *DATURA STRAMONIUM*-SCOPOLAMINE
 - *HYOSCYAMUS NIGER*-HYOSCYAMINE
 - *ATROPA BELLADONNA*-ATROPINE
 - *MANDRAGORA OFFICINARUM*-MANDRAGORAMINE

ALKALOIDS

- **METHYLATED NITROGEN ATOM N-CH₃ AT ONE END OF THE MOLECULE**
- **THIS CHEMICAL STRUCTURE IS ALSO FOUND IN THE NEUROTRANSMITTER ACETYLCHOLINE, WHICH TRANSMITS IMPULSES BETWEEN NERVES IN THE BRAIN AND NEUROMUSCULAR JUNCTIONS.**



Belladonna



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43

Belladonna



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Datura



Angel's Trumpet Seedpod (*Datura innoxia* var. *quinquecuplata*) Jack Scheper ©2004 FloridaData.com

Datura



Henbane



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European Mandrake



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ALKALOIDS

OTHER SOLANACEOUS ALKALOIDS

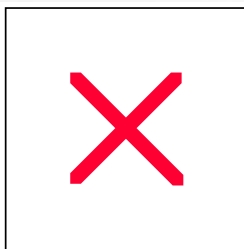
- TOMATOES
- EGGPLANT
- POTATOES
- CHILES
- TOBACCO
- ASHWAGANDA



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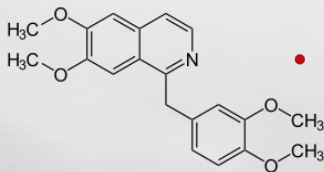
ALKALOIDS



ISOQUINOLINE ALKALOIDS- THE LARGEST GROUP OF ALKALOIDS

PAPAVERACEAE ALKALOIDS-

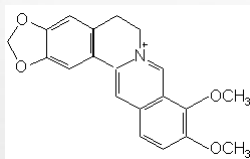
- **POPPY- OPIUM CONTAINS OVER 40 ALKALOIDS: PAPAVERINE, MORPHINE (HEROINE IS A SYNTHETIC DERIVATIVE), CODEINE**
- **BLOODROOT- SANGUINARINE – ANTIVIRAL & ANTIBACTERIAL**
- **CELANDINE- *CHELIDONIUM MAJUS*- CHELIDONINE HAS ANALGESIC ACTIVITY SIMILAR, YET MILDER THAN MORPHINE AND LASTS 4-48 HOURS**



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ALKALOIDS



ISOQUINOLINE ALKALOIDS

BERBERINE- FOUND IN 7 PLANT FAMILIES:

- **BERBERIDACEAE- BERBERIS SPP (BARBERRY), OREGON GRAPE ROOT**
- **RANUNCULACEAE- COPTIS, HYDRASTIS, XANTHORHIZA**
- **PAPAVERACEAE- SANGUNARIA**
- **RUTACEAE- PHELLODENDRON AMURENSIS- CHINESE CORK TREE WELL KNOWN FOR ITS ANTIFUNGAL, ANTIPARASITIC, AND ANTIINFLAMMATORY EFFECTS**

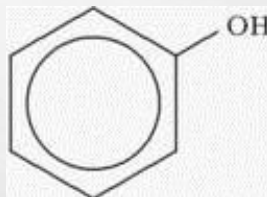


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SIMPLE PHENOL

- **A BENZENE RING ATTACHED TO A HYDROXYL (OH)**

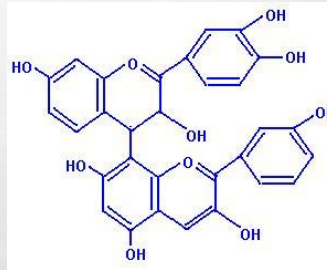


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TANNINS ARE LARGE POLYPHENOLS

- **TANNINS ARE EXTREMELY POLAR AND ABLE TO ATTRACT OTHER NEGATIVELY CHARGED MOLECULES. THIS PROPERTY OF ELECTRONEGATIVITY EXPLAINS TANNIN'S CAPACITY TO BIND TO PRETTY MUCH ANY ORGANIC MOLECULE IN ITS PATH.**



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34

TANNINS



- **OAK BARK**
- **WILLOW BARK**
- **WITCH HAZEL**
- **CINNAMON**
- **FENNEL**
- **WILD GERANIUM**
- **AGRIMONY**
- **BERRY LEAVES, ROOT, & FRUIT**
- **BLACK TEA**
- **COMFREY**
- **PLANTAIN**
- **GOLDENROD**
- **UVA URSI**

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TANNINS- “TIGHTEN THE WEAVE”

TANNINS ARE *ASTRINGENT*, BITTER-TASTING PLANT POLYPHENOLS THAT BIND AND PRECIPITATE PROTEINS.

- **PROTECT INFLAMED MUCUS MEMBRANES OR OPEN WOUNDS- PRODUCES A SEALING 'ESCHAR' THAT PROVIDES ALMOST A TEMPORARY NEW SKIN**

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TANNINS- TIGHTEN THE WEAVE

- **REDUCE HYPERSECRETIONS OF MUCUS MEMBRANES**
- **WHEN TANNINS CROSS LINK WITH PROTEINS MEMBRANES ARE RENDERED LESS PERMEABLE. THIS PROVIDES A PROTECTIVE BARRIER AGAINST BACTERIA.**
- **THIS ALSO HAPPENS ON MUCOSAL SURFACE LINING: EYEWASHES, MOUTHWASHES, VAGINAL DOUCHES, SNUFFS, AND AS TREATMENT FOR RECTAL PROBLEMS.**

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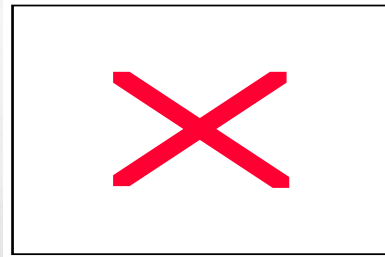
TANNINS- TIGHTEN THE WEAVE

- **PREVENT BLEEDING & REDUCE UTERINE & URINARY BLEEDING**
- **LOCAL VASOCONSTRICTION & POSSIBLE INCREASED COAGULATION.**
- **REMOTE ASTRINGENCY? NO ONE KNOWS EXACTLY WHAT IS GOING ON. TANNINS FORM COMPLEXES THAT ARE TOO LARGE TO ABSORB.**

TANNINS

- **SOLUBLE IN WATER OR ALCOHOL OR GLYCERINE**

**HOT WATER BEST- IN CERTAIN CASES
WHERE WE PREFER NOT TO GET THE
TANNINS WE WOULD DO A COLD WATER
EXTRACTION.**

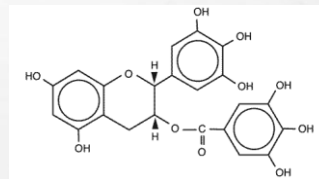
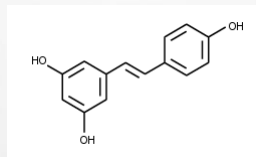


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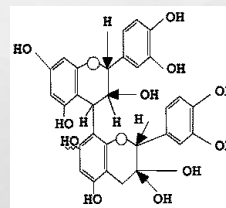
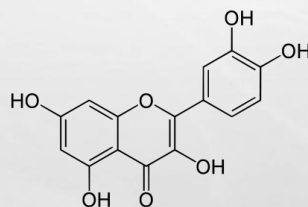
ANTIOXIDANT POLYPHENOLS

resveratrol



EGCG

Quercetin



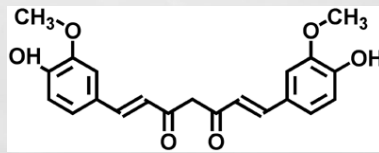
Pycnogenol

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30

ANTIOXIDANTS

- **COMMON POLYPHENOLS IN THE DIET:**
 - BERRIES, GRAPES, TEA, WINE, OLIVE OIL, CHOCOLATE/COCOA, POMEGRANATES, PEANUTS, APPLES, ONIONS, CITRUS
- **HERBAL POLYPHENOLS:**
 - MILK THISTLE, TURMERIC, GINKGO, BILBERRIES, GRAPE SEED, CAYENNE, PAPRIKA, GREEN TEA, HIBISCUS, VIOLETS, PANSIES



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61

Curcumin

POLYPHENOLS- FLAVONOIDS

FLAVONOIDS: WATER SOLUBLE PLANT PIGMENTS

- **YELLOW & ORANGE COLOR (FALL LEAVES IE. GINKGO, QUERCETIN)**
- **REDUCE CAPILLARY PERMEABILITY- BRUISING, EDEMA, VENOUS ISSUES**
- **PROTECT CHOLESTEROL FROM OXIDATIVE DAMAGE**
- **ANTIHISTAMINIC- STABILIZE MAST CELL**

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62

POLYPHENOLS- DARK COLORS

PROANTHOCYANIDINS (OPCS)

THE MAIN FUNCTIONS OF PROANTHOCYANIDINS ARE:

- **ANTIOXIDANT ACTIVITY**
- **STABILIZATION OF COLLAGEN**
- **MAINTENANCE OF ELASTIN IN CONNECTIVE TISSUE, BLOOD VESSELS AND MUSCLE.**
- **REDUCTION OF EDEMA**
- **VISUAL PERFORMANCE**
- **FOUND TO CROSS BLOOD BRAIN BARRIER: ADD. ALZHEIMER'S.**

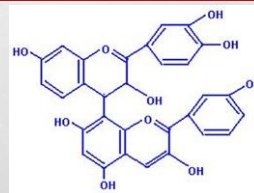
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63

OPCS ARE CONDENSED TANNINS

- **TANNINS ARE ASTRINGENT**
- **ASTRINGENTS "TIGHTEN THE WEAVE" OF A MEMBRANE OR WOUNDED AREA.**
- **TANNINS ARE TOO LARGE TO CROSS INTO THE BLOODSTREAM**
- **CONDENSED TANNINS ARE SMALL ENOUGH TO GO INTO THE BLOODSTREAM.**
- **OPC'S ARE ASTRINGENTS FOR THE INSIDE OF OUR BLOOD VESSELS.**

Tannins are extremely polar and able to attract other negatively charged molecules. This property of electronegativity explains tannin's capacity to bind to pretty much any organic molecule in its path.



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COLOR! = POLYPHENOLS

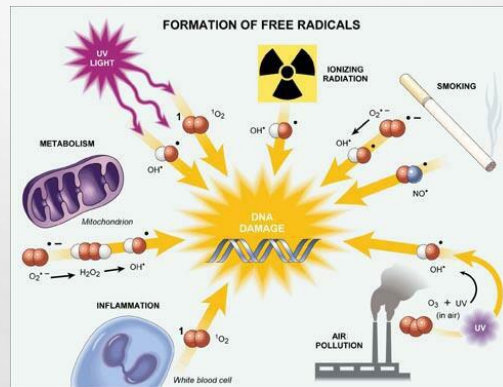
- **WATER SOLUBLE PLANT PIGMENTS**
- **OPCS ARE POLAR MOLECULES, WHICH HAVE VERY LOW SOLUBILITY IN NONPOLAR SOLVENTS SUCH AS OILS.**
- **THE HUMAN BODY CANNOT PRODUCE POLYPHENOLS, SO THEY MUST BE SUPPLIED IN THE DIET.**
- **REDUCE CAPILLARY PERMEABILITY- BRUISING, EDEMA, VENOUS ISSUES**
- **INVERSELY ASSOCIATED WITH CORONARY DISEASE**
- **PROTECT CHOLESTEROL FROM OXIDATIVE DAMAGE**
- **ANTIHISTAMINIC- STABILIZE MAST CELL**

↑ **ANTIOXIDANTS** = ↓ **FREE RADICAL DAMAGE**

"THE HUMAN LIFE SPAN SIMPLY REFLECTS THE LEVEL OF FREE RADICAL OXIDATIVE DAMAGE THAT ACCUMULATES IN CELLS. WHEN ENOUGH DAMAGE ACCUMULATES, CELLS CAN'T SURVIVE PROPERLY ANYMORE AND THEY JUST GIVE UP."

*- E.R. STADTMAN
NIH RESEARCHER ON AGING*

FREE RADICALS = INFLAMMATION
FREE RADICALS = CANCER
FREE RADICALS = CHRONIC DISEASE



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FOODS OF COLOR ARE ANTIOXIDANT!!



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68

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