

Ethnobotany. Lecture 36

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Outline

Pharmacognosy

Plants for musculoskeletal system and skin

Plants for eye, ear, nose and pharynx



Pharmacognosy

Plants for musculoskeletal system and skin



Arthritis, rheumatism and muscle pain

- ▶ Numerous unrelated diseases, from infections to psychological
- ▶ As a result, no general treatment available
- ▶ Main synthetic non-steroidal anti-inflammatory drug (NSAIDs: aspirin, ibuprofen) are cyclo-oxygenases which inhibit prostaglandin synthase enzymes



Willows, *Salix* spp., Salicaceae, Northern Hemisphere

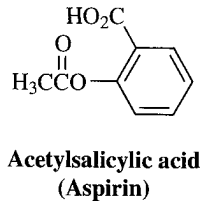
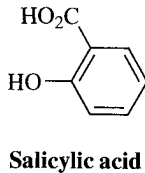
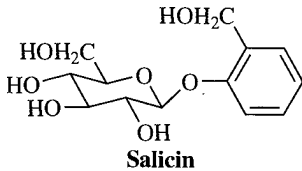
- ▶ *Salicis cortex*
- ▶ Contains salicylic acid
- ▶ Work much better with stomach than pure salicylic or acetylsalicylic acids (aspirin)



Willow



Salicylates



Meadowsweet, *Filipendula ulmaria*, Rosaceae, Eurasia

- ▶ Perennial herb growing in wet places; leaves and flowers are used
- ▶ Contain high amounts of salicylic acid, “aspirin” is a derivative from old name of plant, “spiraea”



Meadowsweet



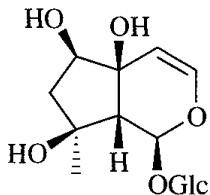
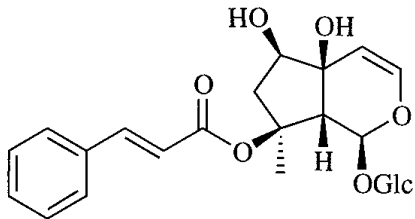
Devil's claw, *Harpagophytum procumbens*, Pedaliaceae, South Africa

- ▶ *Harpagophyti radix*
- ▶ Plant with extremely spiny fruits; roots are collected
- ▶ Contains bitter iridoids harpagide and harpagoside working well in arthritis



Devil's claw



**Harpagide****Harpagoside**

Turmeric, *Curcuma domestica*, Zingiberaceae, South Asia

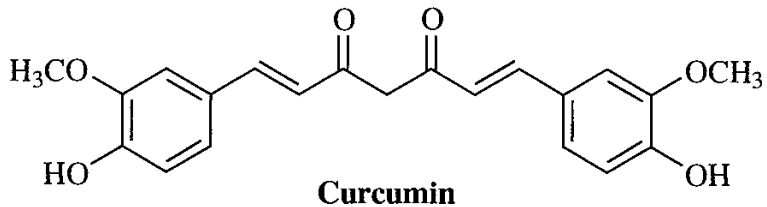
- ▶ *Curcuma domestica* rhizoma
- ▶ Herbaceous plant similar to ginger, rhizomes are used
- ▶ Plant came from Ayurveda and TCM
- ▶ Curcuminoid phenolic compounds are active, antagonist of some inflammatory factors



Turmeric



Cucrumin



Autumn crocus, *Colchicum autumnale*, Colchicaceae, Eurasia

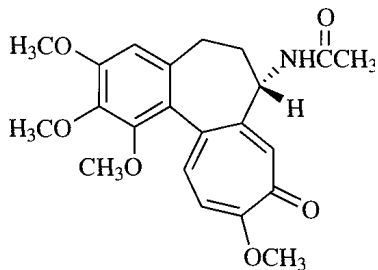
- ▶ Used against gout: severe inflammation of foot joints caused by formation of uric crystals
- ▶ Colchicine is an active compound; extremely toxic!
- ▶ Also, used as anti-cancer



Autumn crocus



Colchicine



Cold and influenza

- ▶ Mixture of diseases, anti-inflammatory, antiviral drugs and immunostimulants are used
- ▶ Demulcents and emollients used for symptomatic treatment



Linden, *Tilia* spp., Malvaceae, North Hemisphere

- ▶ *Tiliae flos*
- ▶ Deciduous trees with insect-pollinated, fragrant flowers
- ▶ Active components are different essential oils, polysaccharides; some are capable to bind with inhibitory GABA receptors



Linden



Coltsfoot, *Tussilago farfara*, Compositae, Eurasia

- ▶ Herb with dimorphic leaves and early flowering (both flowers and leaves are used)
- ▶ Main active components are acidic polysaccharides



Coltsfoot



Common marshmallow, *Althaea officinalis*, Malvaceae, Eurasia

- ▶ *Althaeae radix*
- ▶ High herbaceous perennial plant
- ▶ Tissues are rich of mucilage polysaccharides and flavonoids



Marshmallow



Echinacea, *Echinacea purpurea* and other species, Compositae, North America

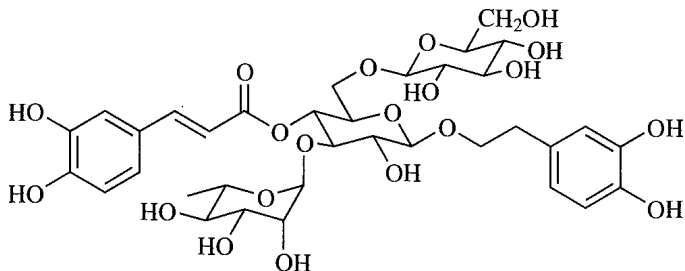
- ▶ Perennial herb, widely used by native tribes
- ▶ Contain numerous glycosides and other compounds, e.g., echinacoside
- ▶ Immunostimulant and anti-allergic plant, often combined with garlic



Echinacea



Echinacoside



Wintergreen, *Gaultheria procumbens*, Ericaceae, North America

- ▶ Leaves and stems contain oils rich of methyl salicylates
- ▶ Often used topically, e.g., for many kinds of muscular pains



Wintergreen



Red pepper, *Capsicum* spp., Solanaceae, Central America

- ▶ (Already covered)
- ▶ Provides the revulsive effect



Skin diseases

- ▶ Eczema, dry skin, infectious diseases, local inflammation etc.
- ▶ Anti-inflammatory, antimicrobial and some specific drugs are used



Yarrow, *Achillea millefolium*, Compositae, Eurasia

- ▶ Perennial plant with dissected leaves, all parts are used
- ▶ Essential oils and tannins are responsible for anti-inflammatory and astringent effects



Yarrow



Arnica, *Arnica montana*, Compositae, Eurasia

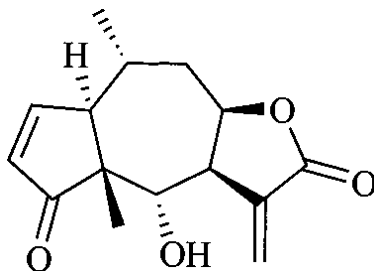
- ▶ Perennial mountainous plant from Alps
- ▶ Contain a rich combination of active compounds: proteins, essential oils, sesquiterpene lactones (e.g., helenalin)



Arnica



Helenalin



Aloë vera, Asparagaceae, Africa

- ▶ African tree with succulent leaves
- ▶ Mixture of different components with antibacterial, anti-inflammatory and other effects



Aloë vera



Calendula, *Calendula officinalis*, Asteraceae, Eurasia

- ▶ Herbaceous plant with bright yellow or orange inflorescences
- ▶ Oils, polysaccharides, saponins (like calenduladiol), carotenes—with anti-inflammatory and antiseptic effects



Calendula



Evening primrose, *Oenothera* spp., Onagraceae, North America

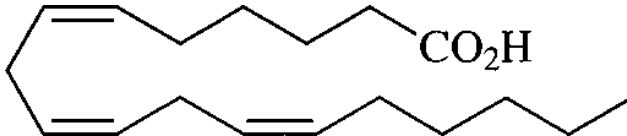
- ▶ Used by local tribes
- ▶ Active is γ -linolenic acid which has topical anti-inflammatory and anti-eczematic effects



Evening primrose



γ -linolenic acid



Witch hazel, *Hamamelis virginiana*, Hamamelidaceae, North America

- ▶ Shrub with hazel-like leaves and extremely early (or late) flowering
- ▶ Leaves and bark contain tannins with positive astringent effects to skin



Witch hazel



Pharmacognosy

Plants for eye, ear, nose and pharynx



Eyebright, *Euphrasia* spp., Orobanchaceae, Eurasia

- ▶ Traditional European plant remedy
- ▶ Active components are iridoid glycosides: aucubin, euphroside etc., lignans and tannins
- ▶ Helps in conjunctivitis



Eyebright



Jaborandi leaf, *Pilocarpus* spp., Rutaceae, South America

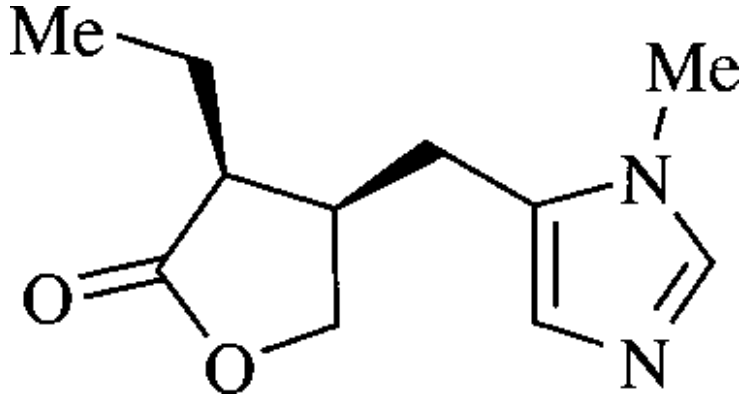
- ▶ Contains alkaloid pilocarpine
- ▶ Stimulating eye muscles, contracting pupils after atropine; used against glaucoma



Jaborandi leaf



Pilocarpine



Deadly nightshade, *Atropa belladonna*, Solanaceae, Mediterranean

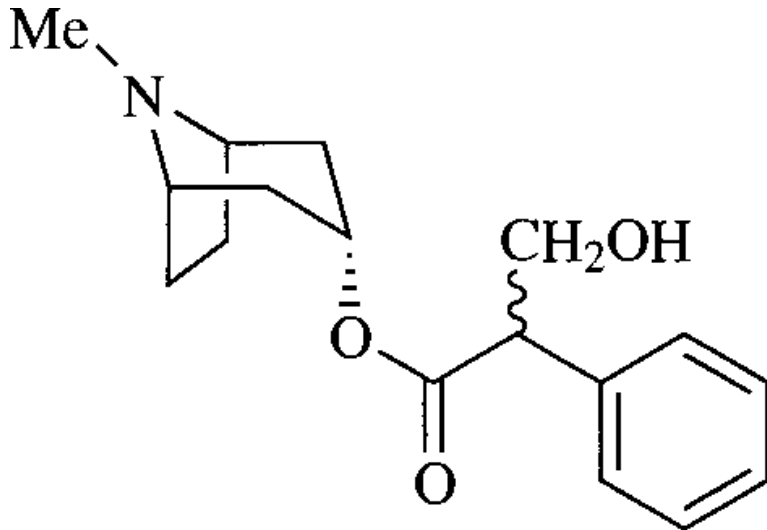
- ▶ Contains alkaloid atropine
- ▶ Used for medical examination to open iris



Deadly nightshade



Atropine



Essential oil plants for nose and orthopharynx

- ▶ Essential oils are using as antiseptic and anti-inflammatory agents
- ▶ Sage (*Salvia officinalis*), eucalyptus (*Eucalyptus* spp.) and peppermint (*Mentha* × *piperita*) are most frequently used



Clove, *Syzygium aromaticum*, Myrtaceae, Southwest Asia

- ▶ *Caryophylli flos*
- ▶ Flower buds extremely rich of eugenol
- ▶ Used also as a culinary spice



Clove



Summary

- ▶ Anti-inflammatory, antibacterial and astringent compounds are most important for treating cold and skin diseases



For Further Reading



A. Shipunov.

Ethnobotany [Electronic resource].

2011—onwards.

Mode of access:

http://ashipunov.info/shipunov/school/biol_310



Heinrich et al. 2012.

Fundamentals of Pharmacognosy and Phytotherapy.

Churchill Livingstone, Edinburgh.

