

Ethnobotany. Lecture 33

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Outline

- 1 Pharmacognosy
 - Plant remedies for infectious and parasitic diseases
 - Plant remedies for endocrine and urinary diseases (the rest)



Pharmacognosy

Plant remedies for infectious and parasitic diseases



Antiprotozoal and antihelminth drugs

- Most of these diseases are restricted to tropics
- Sometimes, control on the transmission is much more effective than any treatments



Cinchona, *Cinchona* spp., Rubiaceae, South America

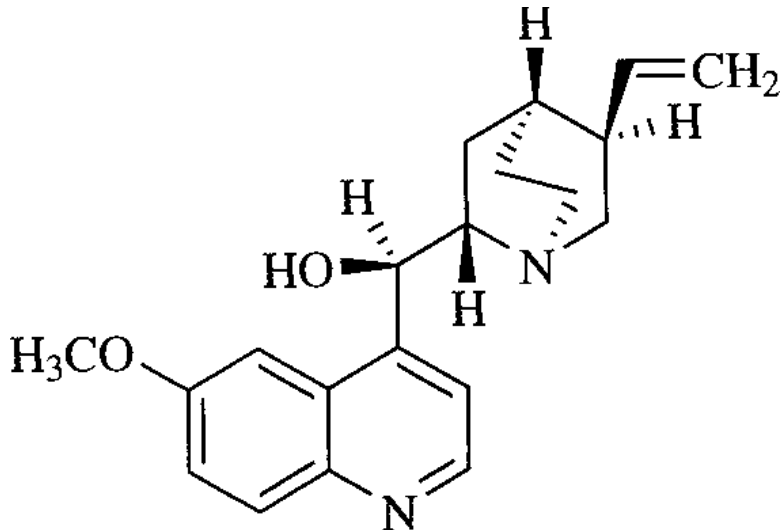
- *Cinchonae cortex*
- Quinoline alkaloids, such as quinine toxic to malarian parasite but in large doses also to humans
- Extremely bitter



Cinchona



Quinine



Lapacho, *Tabebuia* spp., Bignoniaceae, South America

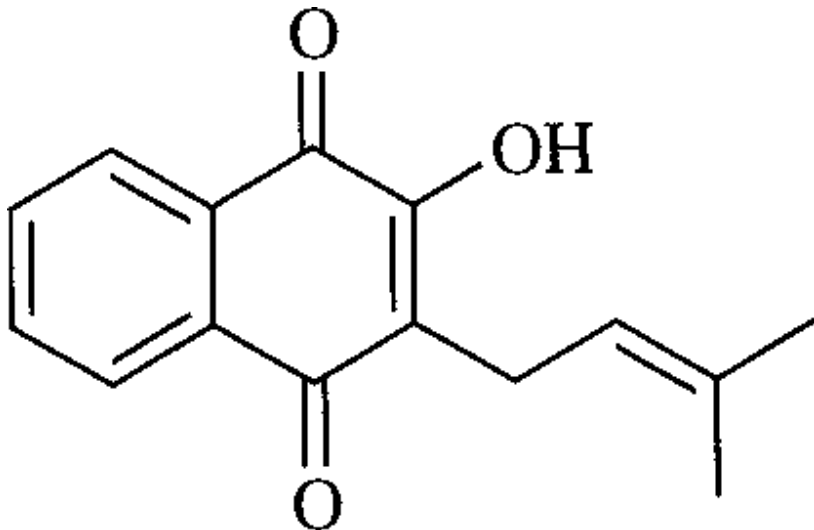
- Large tropical trees, inner bark is used
- Napthoquinones, especially lapachol are active against multiple protozoan diseases and even cancers; cytotoxic in big doses



Tabebuia



Lapachol

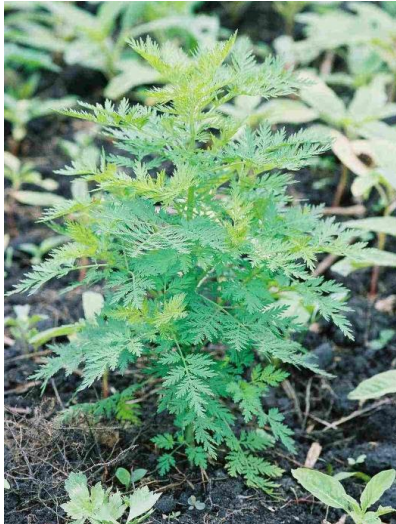


Sweet wormwood, *Artemisia annua*, Compositae, China

- Small annual herb, leaves and stems are used
- Sesquiterpenes like artemisinin are active against malarian parasite, *Plasmodium*
- Non-toxic (!)



Sweet wormwood



Moringa, *Moringa oleifera*, Moringaceae, South Asia

- Large tropical tree with edible leaves and oil-containing seeds
- Contains multiple active compounds like alkaloid spirochin with antibacterial and antihelminth effects



Moringa



Wild bergamot, *Monarda fistulosa*, Labiatae, North America

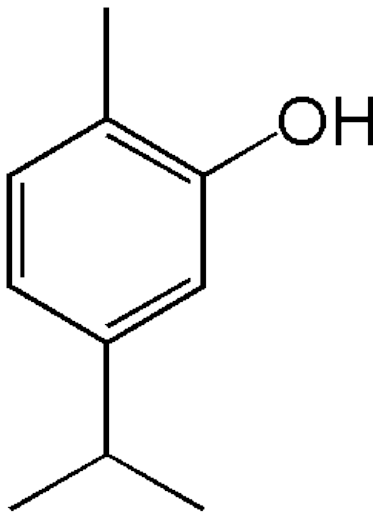
- Prairie herb with large clusters of flowers
- Contains rich set of essential oils: thymol, pinene, carvacrol, antibacterial and antihelminth



Wild bergamot



Carvacrol



Antiviral, antibacterial and antifungal agents

- Unlike antibiotics, have a broad spectrum of activity
- Most can be taken in form of herbal teas (like balm tea from *Melissa*)



Garlic, *Allium sativum*, Amaryllidaceae, Eurasia

- (Covered previously)
- Contains allicin, and different diallyls



Tea tree, *Melaleuca alternifolia*, Myrtaceae, Australia

- *Melaleuca atheroleum*
- Medium-sized tree from north-west coast of Australia
- Oils (in form of tea) are widely used as antiseptics: contain cineole and other essential oil monoterpenes



Melaleuca, tea tree



Urinary tract infections (cystitis)

- Majority of women have some form of this infection
- Plant remedies are often work better because they do not have side effects (however, they are not recommended to patients with blood problems)



Bearberry, *Arctostaphylos uva-ursi*, Ericaceae, North Hemisphere

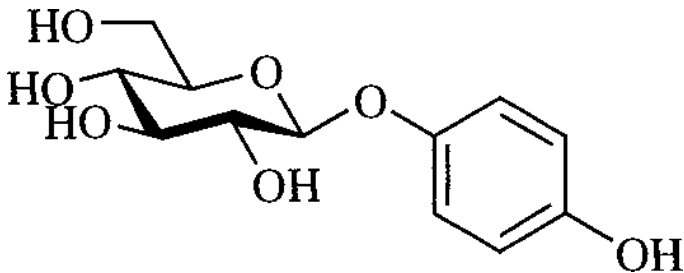
- *Uvae ursi folium*
- Small prostrate evergreen shrub
- Traditionally used in cystitis; glycoside arbutin and its derivatives have stable antimicrobial activity



Bearberry



Arbutin



Cranberry, *Vaccinium macrocarpon*, Ericaceae, North America

- Minuscule shrub from bogs and coasts
- Contains anthocyanins which are suspected to be active compounds: cranberry juice suppresses urinary infections



Insecticidal agents

- Most derived from terpenoids and essential oils
- Alkaloids like veratridine (from *Veratrum* spp.) were used in the past but now abandoned due to toxicity



Pyrethrum, *Chrysanthemum/Tanacetum* spp., Compositae, North America

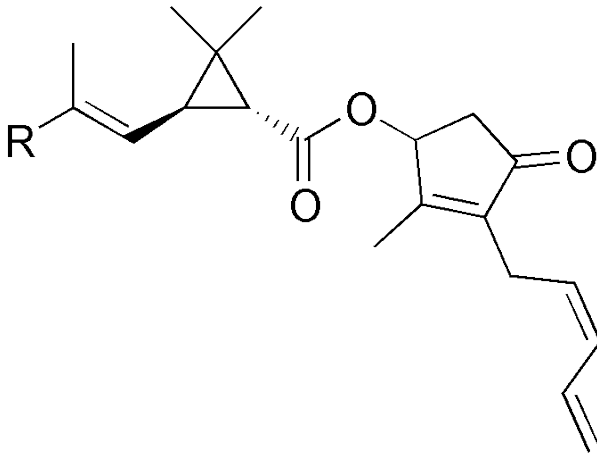
- Multiple herb species, all contain pyrethrin widely used as a spray, for fumigation etc.
- Synthetic pyrethrins are often subjects for increased resistance from insects



Pyrethrum



Pyrethrin



Quassia, *Picrasma excelsa* and *Quassia amara*, Simaroubaceae, Japan and Central America

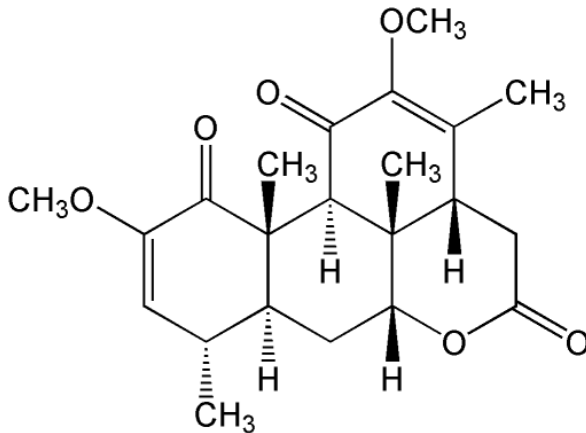
- Wood of these trees is normally used (e.g., for smoke)
- Quassinoids like quassin are not only insecticides but also anthyheminth and antibacterial drugs



Quassia



Quassin



Pharmacognosy

Plant remedies for endocrine and urinary diseases (the rest)



Antidiabetics

- Used for treatment in case of type 2 diabetes (non-insulin-dependent)
- Lower concentration of glucose in blood (hypoglycaemic effects)



Bitter melon, *Momordica charantia*, Cucurbitaceae, South Asia

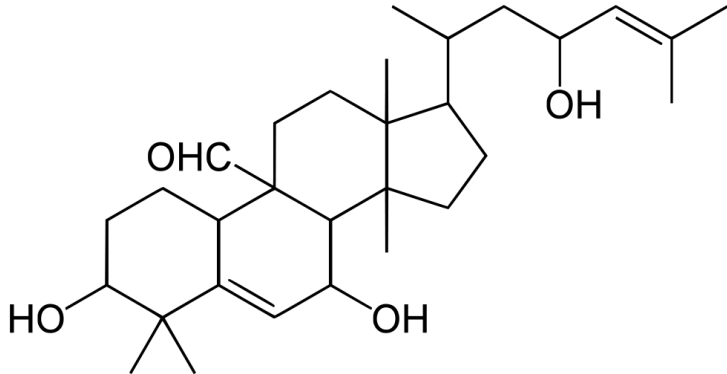
- Leaves and fruits contain triterpene glycosides momordicosides
- Have hypoglycaemic effects



Bitter melon



Momordicin



Guar, *Cyamopsis tetragonolobus*, Leguminosae, Africa

- *Cyamopsidis seminis*
- Seeds are normally used, they contain galactose and mannose polymers which reduce absorption of glucose



Guar



Gymnema, *Gymnema sylvestris*, Apocynaceae, India

- (Covered previously)
- Large vine, leaves chewing results in temporary disappearance of sweet taste



Raspberry, *Rubus idaeus*, Rosaceae, North Hemisphere

- Tea from raspberry leaves was traditionally used to facilitate child birth
- Active components are most probably polypeptides and flavonoids



Raspberry leaves



Summary

- Plant quinones and essential oils tend to be antimicrobial



For Further Reading



A. Shipunov.

Ethnobotany [Electronic resource].

2011—onwards.

Mode of access:

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



M. Heinrich and others.

Fundamentals of pharmacognosy and phytotherapy (selected chapters). [Electronic resource].

Churchill Livingstone, 2004.

Mode of access: http://ashipunov.info/shipunov/school/biol_310/heinrich2004_fund_pharm_part.djvu

Chapters 15, 17–19.

