Anti-infectious Phytotherapy

Phytotherapy

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Infectious diseases

- Plants have been a central part of traditional medicines to cure topical and systemic infections caused by microbes, in particular bacteria.
- Preparations for wound healing: in the developing world the plant is prepared either as:

1- Crude drug, or

2- An extract that is applied topically to improve healing of a wound.

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- 1-These preparations may have antimicrobial properties and remove the microbes by antiseptic or microbicidal effect.

- 2-The other mechanism is that these preparations may promote the ability of the wound to heal itself by stimulating cellular growth.

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- Many plants have antiprotozoal and insecticidal activity.
- The most fundamental reason why plants are valuable for treatment is that:

1. They contain intrinsically antimicrobial compounds.
2. Plants produce these compounds as a defense mechanism against insects or microbial attack.

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1- An example of the first theory is **carvacrol** from *Thymus vulgaris*.

2- An example of the second theory is the formation of **phytoalexins** which are compounds that are produced very fast after the infection of the plant itself by fungus or bacteria, e.g. **lathadoratin**, that is produced by *Lathyrus odoratus* [Sweet pea] , **wyerone** from *Vicia faba* [Broad bean].

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Pelargonium sidoides or Pelargonium reniform: ابرة الراعي

- **Decoction** (Extraction by boiling [water]) of the **root** is used to treat chest infection like tuberculosis.
- **The main active constituents:**

1. Hydrolysable tannins; catechin, gallic acid and methyl gallate.
2. Flavonoids like quercetin.
3. Coumarins like scopoletin.

Pelargonium sidoides effect on resolution of pulmonary lesions

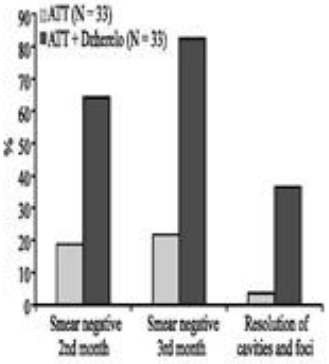

Fig. 1: Effect of ATT and ATT+Dzhercelo on sputum smear conversion and resolution of pulmonary lesions on chest X-ray

Infectious diseases

Pelargonium species:

- Mode of action of the extract from the above plants is by:

1. Inhibition of the **adherence** of bacteria to the mucous membrane, also,
2. It interferes with viral **replication** and **adherence** of virus to mucous membrane.
3. It **loosens** the viscous mucous in the respiratory tract.

- This extract has been postulated to have an **immunomodulatory** effect.

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- Some clinical trials on efficacy of these remedies in reducing the symptoms associated with tonsillitis, particularly among children.

- However, these materials are not a replacement to antibiotics.

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Infectious diseases

- **Lemon balm:** *Melissa officinalis* المليسة المخزنية.
- It contains essential oil, mainly monoterpene compounds.
- It has **antiviral** effect and is used for herpes simplex as topical preparation.
- It is well tolerated but long use may interfere with the thyroid function.
- It is antimicrobial, carminative and sedative.

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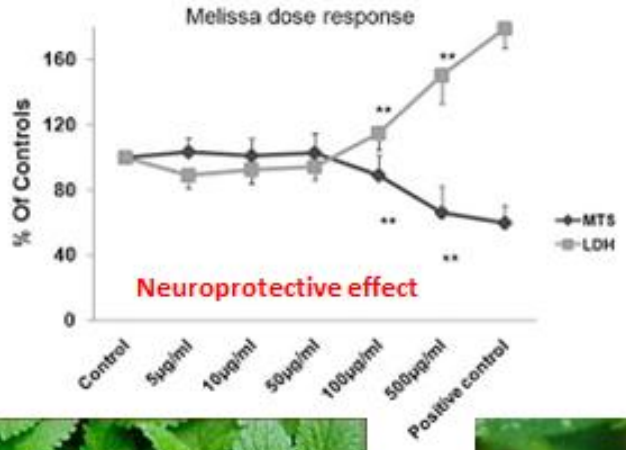
Melissa dose response
% Of Controls
160
120
80
40
0
**
**
**
**
MTS
LDH
Neuroprotective effect
Control
5µg/ml
10µg/ml
50µg/ml
100µg/ml
500µg/ml
Positive control


Miracle Botanicals
Melissa
100% Pure Essential Oil
Bulgaria

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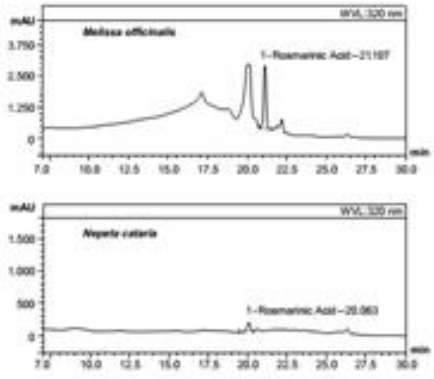
Melissa officinalis
1-Rosmarinic Acid – 21.107
Nepeta cataria
1-Rosmarinic Acid – 20.063


mountain herbs
MELISSA
SKIN CREAM


Lemon Balm
Salve

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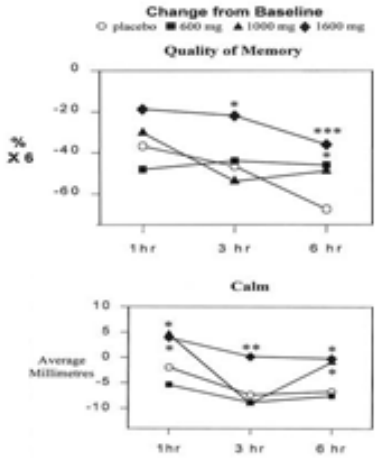
Effect of Melissa on memory and calmness

These results suggest that doses of *Melissa officinalis* at or above the maximum employed here can improve **cognitive performance** and **mood,** and may therefore be a valuable adjunct in the treatment of Alzheimer's disease.



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Garlic: *Allium sativum*:

- Garlic has a very long history as both a topical and systemic material to treat bacterial, viral and fungus infections.
- The main constituents are sulphur compounds typified by **allicin** and **ajoene** (organosulfur compound).
- Garlic has antibiotic, expectorant, anticlotting and antithrombotic properties.

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Infectious diseases

Tea tree: *Melaleuca alternifolia* بلقاء متبادلة الأوراق أو البلقاء المتعاقبة أو شجرة الشاي

- The oil from the **leaves** of the tree has a long history of traditional usage among people of North Australia and New South Wales (in Australia) with eucalyptus (تعرف ببلاد الشام بالكينا وبمصر بالكافور)tree which are used topically as **antimicrobial**.
- Over the last 20 years there has been an explosion of usage of its oil in preparations like creams, lotion, gel , soap, shampoo

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Tea tree: main constituent of the oil:

- Terpinen-4-ol, with concentration of 30%.
- 1,8-cineol.

➢ **Uses:**

1-Skin cream for pimple and acne.

2-Pessaries for vaginal thrush [infection of the mouth and throat by a yeast-like fungus, causing whitish patches].

3- As inhalation for respiratory disorders.

4-In pastilles (lozenges) for sore throats.

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Tea tree: Cont. uses:

5. Lotion for the treatment of lice, scabies, dandruff and other hair and scalp disorders.

➢ The oil has broad spectrum antimicrobial activity against:

- **Bacteria**: Staphylococcus, E. coli.
- **Fungus**: Candida albicans.
- **Protozoa**: Leishmania major and Trypanosoma brucei.

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Tea tree: *Melaleuca alternifolia* containing pharmaceutical preparations

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Uva ursi: *Arctostaphylos uva ursi*

- The leaves of this shrub known as **bearberry** are used to treat cystitis (inflammation of the bladder) and urethritis.
- The main constituent is the hydroquinone glycoside **arbutin** which on hydrolysis yields **hydroquinone** which is very active for urinary tract-infecting bacteria like *E. coli*, *P. aeruginosa*, *S. aureus*.

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Effect of uva ursi:

- **1-**The leaves are **mild diuretic**.
- **2- Antiseptic:** the urine should be alkaline, so acidic food should be avoided like cranberry.
- **3-Astringent**.
- Hydroquinone is cytotoxic and mutagenic, so:

❖Long use should be avoided.

❖Not to be used during pregnancy and for kidney infection.

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Cranberry juice (*Vaccinium macrocarpon aiton*)_ توت بري

- **Use:**
- **1. For urinary tract infection**: it is **diuretic** as well.
- The active constituents are **proanthocyanidins** which have antibacterial, antiseptic properties.
- **Caution:** diabetic patient should use sugar free juice.

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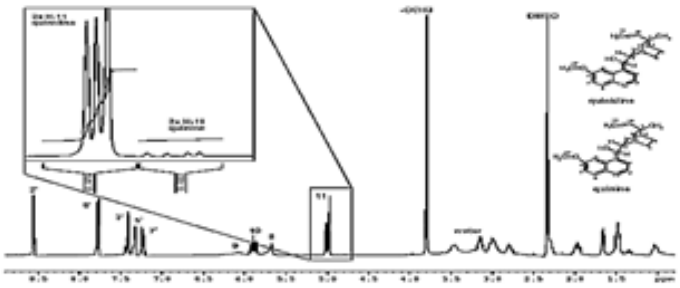
Antiprotozoal agents:

- **1. Cinchona alkaloids:** quinine, quinidine, cinchonine , cinchonidine.



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Synthetic drugs for malaria

1. Mefloquine
2. Chlorquine
3. Primaquine

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2. Sweet wormwood (*Artemisia annua*)

- The herb contains **sesquiterpene** lactones.
- Most important of these is **artimisinin**, also **volatile oil**.

Use:

- **Antimalarial**: as anti-plasmodium compound.;

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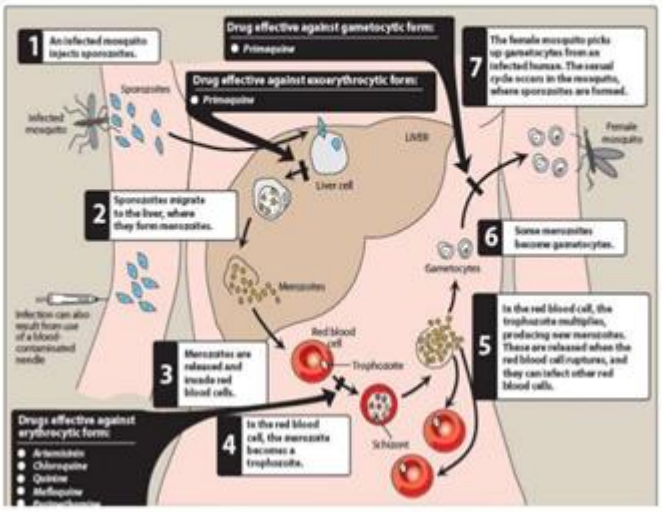
Infected mosquito injects sporozoites and effective drugs like quinine , artemesinin



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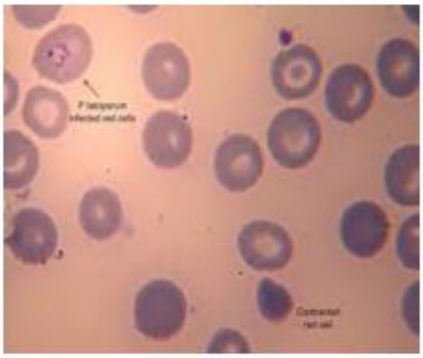
Plasmodium infected red blood cells



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Insecticidal agents:

- Pyrethrum flowers (**chrysanthimum** spp)

Use:

➢ For lice and scabies.

❖ The active material is **pyrethrin,** which is an ester of chrysanthimic acid and pyrethric acid.

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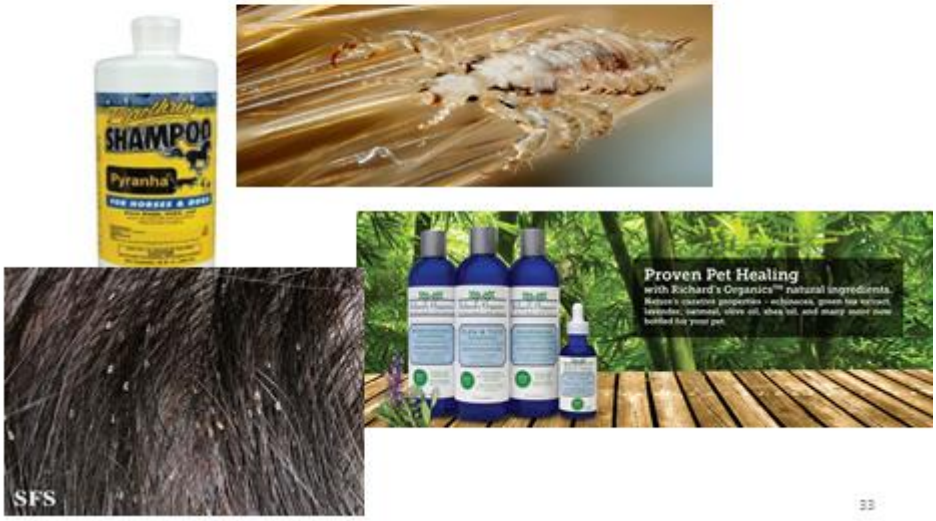
Lice bug and eggs



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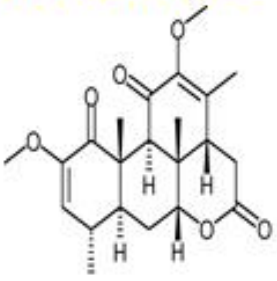
Infectious diseases

Quassia wood (*Picrosma axcelsa*) خشب كواشيا

- The main constituent is **quassin** (amaroid compound =A bitter extractive that does not belong to the class of glycosides, alkaloids, or any of theknown proximate principles of plants)

Use:

- 1-Anthelmintic.
- 2-Insecticidal.
- 3-Cytotoxic.
- 4-Amoebicidal.



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Quassia tree

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Quassia tree

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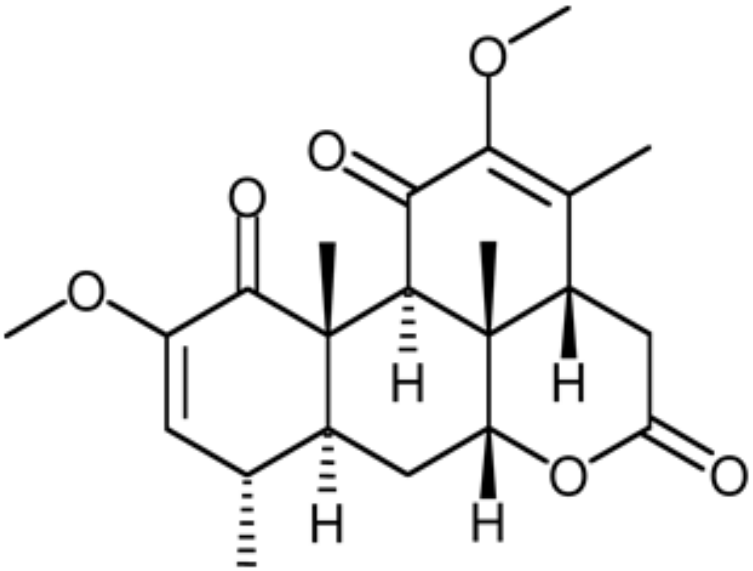
Quassinoids:
Anticancer and Antimalarial



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