Herbal Medication for the Management of ASTHMA

Bachelor of Pharmacy

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Learning Outcomes

At the end of this lesson students will be able to

– Define asthma

– Write the botanical name and family name of plants and herbs useful for the management of asthma

– Outline the different types of plant extracts and their chemical constituents beneficial for the management of asthma and other respiratory disorders

– Explain the mechanism of action, uses and side effects of different types of herbal medications for the management of asthma
Asthma

- Asthma is one of the most significant health problems in the present world which reduces the work efficiency and quality of life remarkably causing immense damage to the national and international economy.
- The clinical hallmarks of asthma are recurrent, episodic bouts of coughing, shortness of breath, chest tightness, and wheezing.
- It is physiologically characterized by hyperresponsiveness of the trachea and bronchi to various stimuli, in which the airway occasionally constricts, becomes inflamed, and is lined with excessive amounts of mucus causing minor wheezing to severe difficulty in breathing.
- In some cases, breathing may be so labored that an asthma attack becomes life-threatening.
- Asthma is a complex chronic inflammatory disease of the airways that involves the activation of many inflammatory and structural cells, all of which release inflammatory mediators that result in typical pathophysiological changes.
Asthma Treatment – Current Status

- Current asthma therapy involves:
  - Relaxation of airway smooth muscle and
  - Inhibition of the underlying pulmonary inflammatory cells.
- However, available antiasthmatic agents such as anticholinergic agents, $\beta_2$ selective adrenergic agonists, methyl xanthines, antihistaminics, mast cell stabilizers, corticosteroids have their own limitations such as:
  - produce both these pharmacological effects inadequately (i.e. bronchodilation and anti-inflammation);
  - some are suitable only for symptomatic relief and
  - most of them possess cardiotonic, CNS stimulatory, diuretic and other undesirable side effects.

- This necessitates further investigations for better drugs.
KUTKI

- It is a perennial herb and tends to grow in the Himalaya region on rocky places within 3500-4800m above sea level.
- **Botanical Name:** *Picrorhiza kurroa*
- **Family:** *Scrophulariaceae*
- **Used part:** Root
- The plant is also known to be **highly bitter** which led to its name (as *picros* is Greek word for 'bitter') and now it is **endangered** due to overharvesting.
- **Composition:**
  - The bitter principle known as **'Kutkin'**, which is a mixture of *picroside I* and *picroside II* (kutkoside). It also contains α-methoxy substituted catechol **Apocynin** and a phenolic glycoside known as **androsin**.

![Chemical structures]

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- Used part: Root
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- It is endangered due to overharvesting.
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KUTKI

• **Uses:**

• The *androsin* appears to be able to **reduce allergic reactions** and **improve symptoms of bronchities** and asthma.

• Picrorhiza is used to **treat disorders of the liver**, jaundice, liver infections caused by a virus (acute viral *hepatitis*).

• It is also used to treat skin conditions including **eczema** and **vitiligo**, a disorder that causes white patches on the skin.

• Some people use picrorhiza for digestion problems including **indigestion**, **constipation**, and ongoing **diarrhea**.

• Other uses include treatment of infection, **scorpion stings**, epilepsy, **malaria**, and **rheumatoid arthritis**.
Boswellia serrata

• It is a plant that produces Indian **frankincense** (an aromatic resin used in incense and perfumes).

• Ayurvedic medicine- **gum resin** and **bark** used.

• Botanical Name: **Boswellia serrata**

• Family: **Burseraceae**

• **Boswellic acids** (triterpene) **inhibit** leukotriene synthesis (anti-inflammatory effect).

• This herb has been used for **arthritis, inflammatory bowel disease (IBS)** and **asthma**.

• In a 6 week study of 40 asthmatics, 70% showed improved lung function.

• Usual dose is 400-800 mg (tid).

• More studies are needed to assess long term safety.
Ephedra (Ma huang)

- The various species of Ephedra are widespread in many lands, native to southwestern North America, southern Europe, northern Africa, and southwest and central Asia, northern China, and western South America. The Chinese name for Ephedra species is mahuang.
- Botanical Name: *Ephedra sinica*
- Family: Ephedraceae
- A wide variety of alkaloid and non-alkaloid compounds have been identified in various species of ephedra. The most common are ephedrine and pseudoephedrine.
- These compounds show thermogenic (increase body heat) effects and stimulate the brain, increase heart rate, constrict blood vessels (increasing blood pressure), and expand bronchial tubes (bronchodilation making breathing easier).
- Treatment of asthma, hay fever and common cold
- Contraindicated in heart disease, hypertension, and glaucoma.
Tylophora

- Tylophora is a genus of **climbing plant or vine**, first described as a genus in 1810. It is native to tropical and subtropical Asia, Africa, and Australia. The name is derived from the Ancient Greek *tylos* means "knot", and *phoros* means "bearing".
- **Botanical Name:** *Tylophora indica*
- **Family:** Apocynaceae
- The alkaloids *Tylophorine* and *tylophorinidine* shows main medicinal use.
- Leaves are used as expectorant and in the **treatment of respiratory infections, bronchitis, whooping cough, asthma, rhinitis, hay fever**.
- A clinical trial on asthmatic patients has found that *Tylophora indica* fresh leaves chewed and swallowed daily with water **in empty stomach** for a week gives complete relief from asthma symptom.
- Its root or leaf powder is indicated in the treatment of amoebic dysentery, diarrhea and **rheumatism**.
The aerial parts of *Ginkgo biloba*

**Family:** Ginkgoaceae

**Habitat:** It is the only living species in the division Ginkgophyta, all others being extinct. It is found in fossils dating back 270 million years. Native to China, the tree is widely cultivated and was introduced early to human history.

The active constituents are **ginkgolide** and **bilobalide**.

**Ginkgolides:** Anti-inflammatory, reduces airway hyper-responsiveness and bronchospasm. An 8 week study showed a 15% improvement in lung function.

The herbal medicine comes in the form of an herbal tea (**LEAF**) and capsule supplement form.

**Other Uses:** It has various uses in traditional medicine. A standardized medicinal extract of Ginkgo biloba **LEAF** is used as anti-oxidant, neuroprotective, for the treatment of cognitive impairment (**dementia**) in Alzheimer’s disease, **anxiety** and **depression**.
Ivy
(Hedera helix; Common ivy; English ivy)

- It is a climbing and widely distributed plant throughout Europe and Asia.
- The used part of plant is the **LEAVES** and it belong to family **Araliaceae**.
- The important constituent are **saponins** involving **triterpene** genins **hederagenin, bayogenin**.
- Other constituents are flavonoids like **rutin, quercetin**.
The leaf extracts have been used traditionally as an **expectorant** for chest conditions such as **bronchitis**, **whooping cough** and **asthma**.

It is also used for **gout** and **rheumatic pain**.

Externally, ivy is used **cosmetically** and for **variety of skin conditions**.

**Antibacterial**, **anti-leishmanial** (protozoan disease transmitted by sand fly) and **molluscicidal** (a type of snails) effect.
Thyme

- **Botanical Name:** *Thymus vulgaris*
- **Family:** Lamiaceae

It is a species of flowering plant in the mint family Lamiaceae, native to southern Europe from the western Mediterranean to southern Italy.

Growing to 15–30 cm (6–12 in) tall by 40 cm (16 in) wide, it is a bushy, woody-based evergreen subshrub with small, highly aromatic, grey-green leaves and clusters of purple or pink flowers in early summer.

**Uses:**

- Thyme is used as **antispasmodic** and for **cough** and **common cold**.
- Locally, it is used to **treat minor wounds**, **analgesic for oral cavity**.
- It also shows the **bactericidal** activity.
Yellow-fruit nightshade

- **Botanical Name:** *Solanum xanthocarpum*
- **Family:** Solanaceae

*Solanum virginianum*, also called yellow-fruit nightshade, yellow-berried nightshade, Thai green eggplant, is a species of nightshade native to Asia (Saudi Arabia, Yemen, Afghanistan, Iran, China, Bangladesh, India, Nepal, Pakistan, Sri Lanka, Myanmar, Thailand, Vietnam, Indonesia, Malaysia).

- It is a medicinal plant used in India.
- It contains carpesteral, solanocarpine and glucoside alkaloids. It also contains solanidine and solamine; sterols, alkaloids, carbohydrates, fatty and amino acids.
- The plant is used to treat a **whitlow** (finger abscess): the finger is inserted into a ripe fruit for a few minutes.
- A decoction of **ROOT** is taken twice a day for seven days to **treat cough, asthma and chest pain.**
REFERENCES

Textbooks:


Supplementary books:


Thank You