Ethnopharmacology

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Definition

- The scientific study of substances used medicinally, especially folk remedies, by different ethnic or cultural groups.
- It is strictly related to plant use, Ethnobotany.
- Inventory by WHO found around 20,000 plant species in use for medicinal in various countries.
- Only 250 of those species are commonly used or have been checked for main active chemical compounds.

A brief idea of EthnoPharmacology

- EthnoVeterinary medicine is an important component of indigenous knowledge system.
- Archeological evidences provide substantial clues that prehistoric people were aware of magical power of plants.
- 60,000 years ago Iraqi people used Ephedra
- Egyptian Eber papyrus documented about garlic and castor oil and their magical power.
- Galen the roman physician wrote books about medicinal plants.
- Indian charak sanhita tells about details of about 350 medicinal plants.

Ethnopharmacology

3500 BCE - India had an extensive pharmacopoeia. Much of that knowledge is still used as part of the Ayurveda medical system

2250 BCE – Egypt and Babylon were trading medicinal plants

900 BCE - Archaeological records demonstrate the use of medicinal and psychoactive plants in the New World

330 BCE - One of the Theophrastus's students, Alexander the Great, sent medicinal plants from Asia back to Greece for cultivation

2000 YA - The first written Chinese records although use is probably as ancient as India's.

Plants and their use

- *Lippia dulcis* – sweetener from Pre-Columbian America -In the 20th century, *L. dulcis* was chemically analyzed and a new sweetener was found, hernandulcin, that is 800 to 1000 times sweeter than sucrose.

Diospyros lycioides – source of chewing sticks in Namibia

Ceanothus americanus – Native American chewing stick

Medicinal use of chewing stick

- Most chewing stick plants have a wide range of antibacterial activity against a number of odontopathic bacterial species, and many also contained healing and/or analgesic compounds

Bloodroot – *Sanguinaria canadensis*

Rhizome of Bloodroot

Medicinal use

- Bloodroot extracts have been identified as potentially valuable in controlling plaque
- Blood root has many alkaloids, known as sanguinaria alkaloids, and sanguinarine in particular, is thought to be a potential problem limiting the usefulness of blood root as a dental medicine

Strychnos toxifera
– source of D-tubocurarine

Medicinal use

- Curare, obtained from bark of the stem, though poisonous, but used as sedative and anticonvulsive drugs.
- Curare is a powerful paralyzing agent of motor nerves,active principle curarin used for treatment of Tetanus and foul ulcers.
- It is dangerously poisonous and used as arrow poison in Amazon.

Mexican yam – *Dioscorea villosa*
Source of cortisone

Medicinal use

- Creams and dietary supplements made from *Dioscorea villosa* are claimed to contain human hormones and promoted as a medicine for a variety of purposes, including cancer prevention and the treatment of Crohn's disease and whooping cough.
- It has been used to corrects the low progesterone and high estrogen ratio.
- It is believed that it contains steroid precursor, used to make both sex hormones and adrenal cortisone.

Indian snakeroot – *Rauwolfia serpentina* –Source of reserpine

Medicinal use

- *Rauvolfia serpentina* contains a number of bioactive chemicals, including yohimbine, reserpine, ajmaline, deserpidine, rescinnamine, serpentinine.
- The extract of the plant has also been used for millennia in India – Alexander the Great administered this plant to cure his general Ptolemy I Soter of a poisoned arrow.
- It was reported that Mahatma Gandhi took it as a tranquilizer during his lifetime.It has been used for millennia to treat insect stings and the bites of venomous reptiles.
- A compound which it contains called reserpine, was used in an attempt to treat high blood pressure and mental disorders including schizophrenia, and had a brief period of popularity for that purpose in the West from 1954 to 1957

Madagascar periwinkle *Catharanthus roseus* –Source of vincristine

Medicinal use

- In Ayurveda (Indian traditional medicine) the extracts of its roots and shoots, though poisonous, is used against several diseases.
- Vincristrine, a chemotherapy medication used to treat a number of types of cancers, is also found in the plant.
- In traditional Chinese medicine, extracts from it have been used against numerous diseases, including diabetes, malaria, and Hodgkin's lymphoma.

White Hellebore – *Veratrum album*
Source of hypotensive alkaloids

Medicinal use

- . It was believed by ancient peoples that white hellebore treats epilepsy, dizziness, melancholy, insanity, demonic possession, leprosy, tremors and gout, among many other ailments.
- Old Germanic lore describes the use of the root to induce abortions.
- The psychoactive properties of white hellebore are derived from the rhizome and the leaves.

Cinchona officinalis – source of quinine

Medicinal use

- Historically, malaria has been one of the worst of all human diseases.
- In some countries malaria is common and millions of people suffer from the disease throughout the world.
- In the 17th century, Jesuits in South America discovered that a native remedy for other diseases made from an infusion of the bark of cinchona (*Cinchona* spp., Rubiaceae) coincidentally controlled malaria.

Ephedre sp.- source of ephedrine

Medicinal use

- Ephedrine and a series of related compounds are used today as decongestants (e.g., in Sudafed, Robitussin etc.) and to treat low blood pressure.

Willow in flower, *Salix nigra*, Salicaceae

Medicinal use

- This compound, acetylsalicylic acid, could be taken orally and was an effective analgesic, anti-inflammatory, and antipyretic drug and is probably the most widely used drug in the world today.

- Interestingly, we only learned how aspirin actually functions in the last 30 years. Aspirin inhibits the synthesis of certain prostaglandins.

Coca, *Erythroxylum*

Medicinal use

- The Indians of Andean South America have long used coca leaves (from *Erythroxylum coca*, Erythroxylaceae) as a stimulant. The Indians chewed the leaves mixed with lime to free the alkaloids. The alkaloids reduced feelings of hunger and pain.

- Later when the alkaloids were isolated, it was discovered that they had local anesthetic properties. Cocaine has been used for surgery (especially dental surgery).

Digitalis purpurae

Medicinal use

- The use of plants to treat heart disease goes back thousands of years and is found in several cultures. One of the plants found in the folk medicine of Europe is *Digitalis purpurea.*
- In 1775, William Withering, a British physician documented that patients treated with foxglove improved. He standardized the dosage of the drug.

- Digitalis became accepted and today is widely used in treatment of dropsy, a condition associated with congestive heart failure.
- The active compounds are saponins,but have an aglycone with a special type of structure.

Papaver somniferum

Medicinal use

- The alkaloids found in opium poppy, *Papaver somniferum* (Papaveraceae), have long been used to alleviate pain.

- Opium was used to treat dysentery from at least the first century B.C.
- Morphine is one of the principal alkaloids of opium. These alkaloids are very addictive, but are potent pain killers (analgesics).
- Codeine, another morphine alkaloid, is a potent antitussive agent, that is, it inhibits coughing.

Henbane, *Hyoscyamus niger*

Medicinal use

- It contains alkaloid named scopolamine (hyosine)
- Use is limited and not significant.

Black nightshade, *Atropa belladonna*

Medicinal use

- Belladonna has been used since the times of the Greeks. It was also used in the Middle Ages in Europe to enhance the appearance of women by causing them to have large pupils.

- Today, these alkaloids are used as antidotes for poisoning, to treat cardiac problems, for antidiarrhoetic preparations, and to dilate pupils during eye examinations.

Autumn crocus, *Colchicum autumnale*

Medicinal use

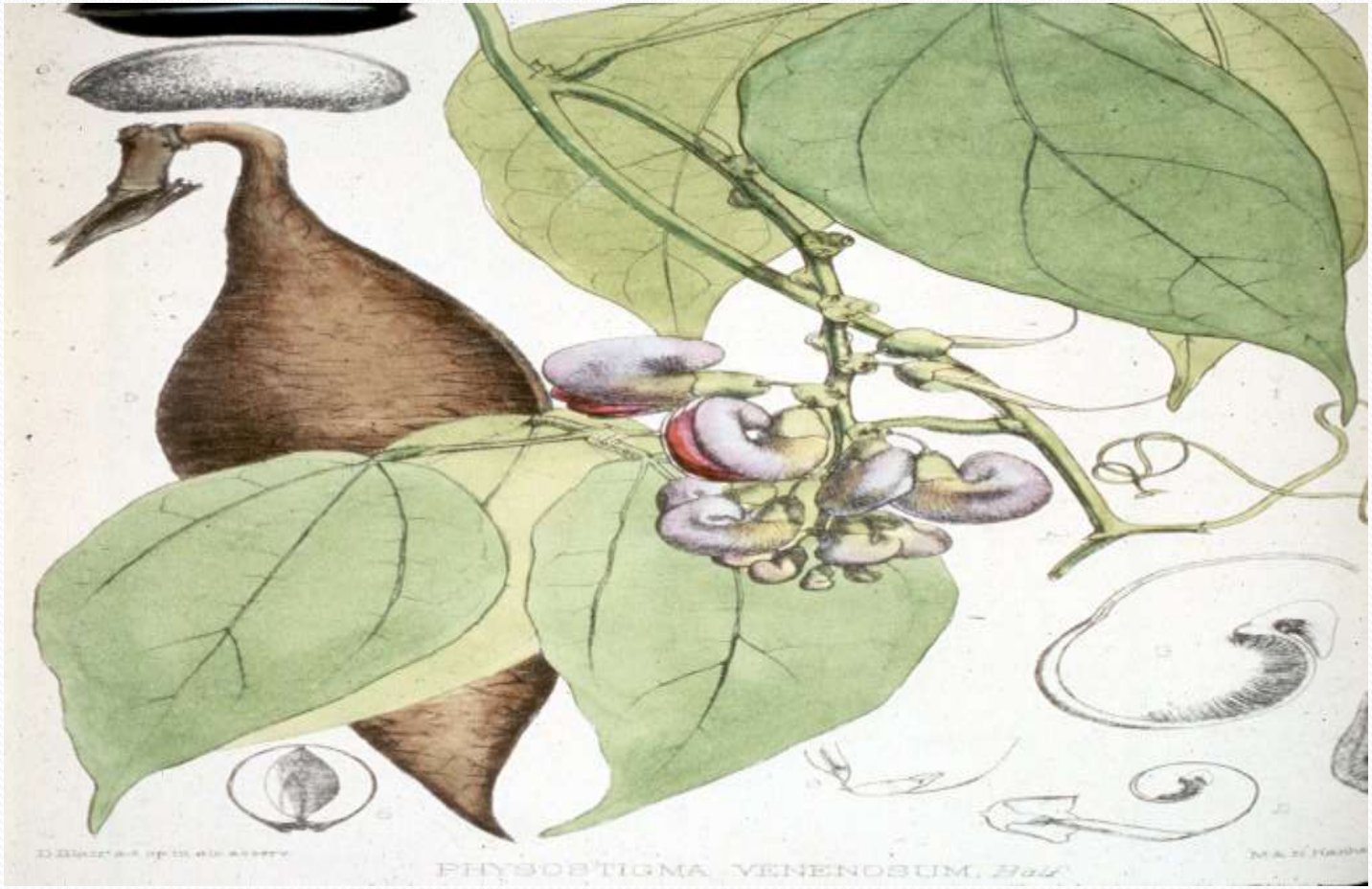
- Colchicine, an alkaloid from *Colchicum autumnale* (Liliaceae), is used to treat gout. The compound is fairly specific for the disease, but is highly toxic and its use must be carefully monitored.

Yew, *Taxus baccata*

Medicinal use

- The antitumor activity of taxol (paclitaxel), a diterpene alkaloid from several *Taxus* species, was first discovered in the 1960's, but the alkaloid didn't become widely used until the mid 1980's.
- Taxol is useful for treating several types of tumors, but was originally developed for ovarian tumors.
- The alkaloid occurs in highest concentration and in the most readily purifiable form in the bark of *Taxus brevifolia*, the Pacific yew.
- Recently, materials from other species of *Taxus* have proven useful for sources of the drug

Calabar bean, *Physostigma venenosum*



Medicinal use

- Calabar beans have been used as a trial-by-ordeal plant. The active ingredient, physostigmine, is presently used to treat glaucoma.

Ergot, *Claviceps* spp.

Medicinal use

- Today the alkaloids from *Claviceps* spp. on cereal grains are used to treat migraine headaches, control hemorrhaging after childbirth, and to induce labor.

Ginkgo

Medicinal use

- Extracts from the leaves of *Ginkgo biloba*, a gymnospermous tree from China, improve capillary blood flow and improve memory and some aspects of brain function. The active components are diterpenes.

Ginseng

Medicinal use

- Ginseng has long been used by Oriental peoples as a way of maintaining health and for treating and curing many types of human ailments. In Japan, Korea, and China, the most common species is *Panax ginseng*.
- Because of the shape of the roots, based on the doctrine of signatures, this plant was presumed to treat many problems.
- The active compounds are triterpenoid glycosides; some are called gensenosides.

Echinacea, *Echinacea purpurea*

Medicinal use

- Echinacea induces an immune response in humans and has been used more recently to treat colds and other viral diseases.

Valerian, *Valeriana officinalis*

Medicinal use

- Valerian has long been used as a sedative. The dried roots and rhizomes have been used as a tranquilizer and calmative for more than 1000 years in cases of nervousness.

- Interestingly, in this case, the active components have never been conclusively identified. However, the plant is documented to be an effective sleep-inducing drug

Black cohosh, *Cimicifuga racemosa*

Medicinal use

- An infusion of the roots and rhizomes is drunk to treat rheumatism, uterine difficulties to stimulate menstrual flow, and as an antidiarrheal, and cough suppressant.
- It was the active component of Lydia Pinkham's Vegetable Compound in the 1800s and early 1900s.
- The plant has been shown to have estrogenic activity and is used in Europe to treat premenstrual syndrome (PMS).

Aloe vera

Medicinal use

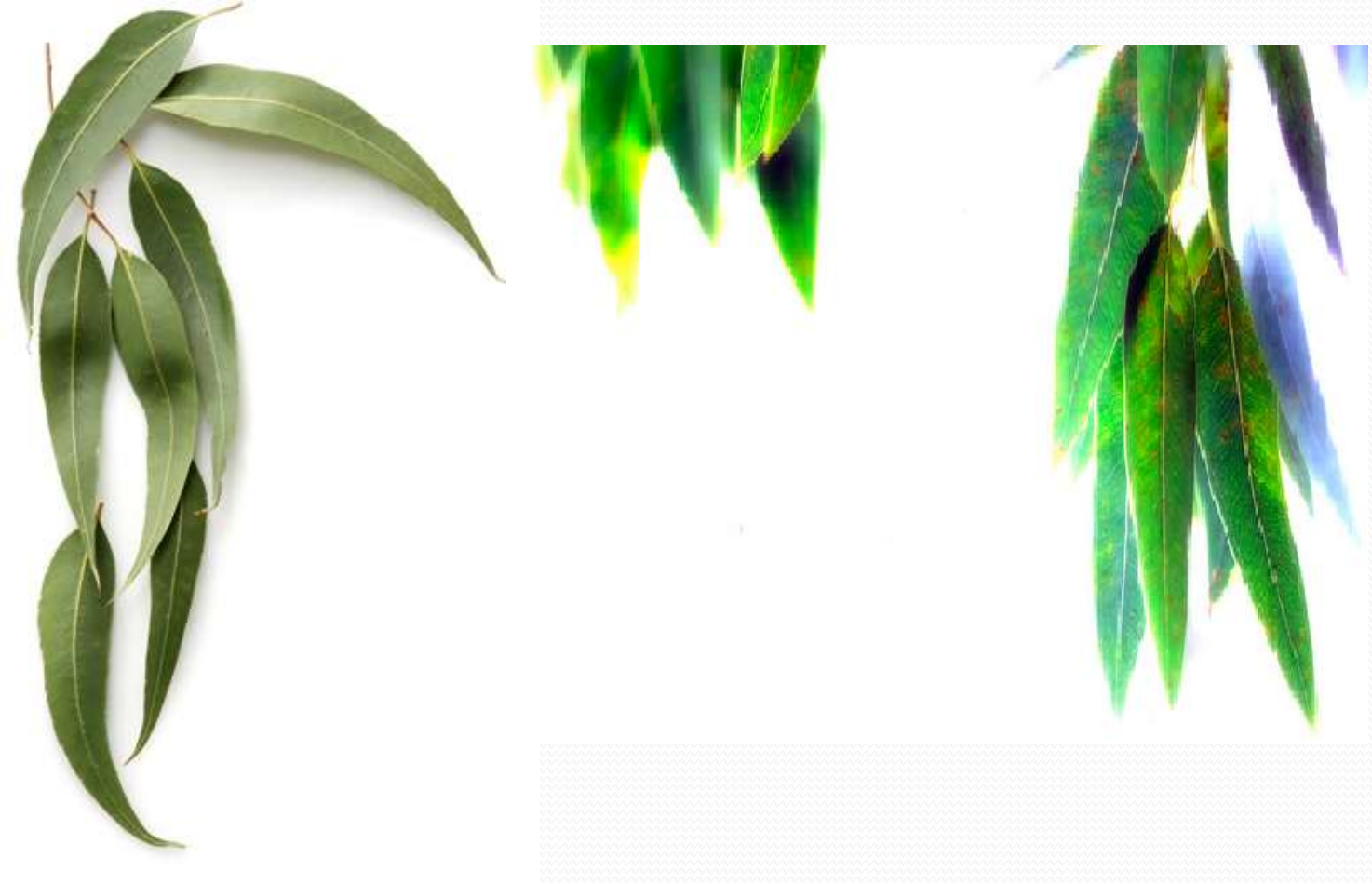
- Aloe vera is good for irritated and inflamed skin,helps in speeding up the process of healing of wound.
- It is good for hydrating and toning of the skin
- Cosmetic companies use aloe vera in makeup, moisturizer, shaving creams, soaps etc
- It is used in multipurpose skin treatment.

Clove

Medicinal use

- Temporarily to treatment of toothache.
- Relieves from upper respiratory infection.
- Treat scrapes and bruises.
- Improves digestion.
- Boost insulin function of the body.
- Cloves oil is used toothache releasing products, in laxative pills
- Clovacaine which is a local anesthetic used in oral ulceration and inflammation.

Eucalyptus



Medicinal use

- It is used as antiseptic, very small amount is used in cough syrup, decongestant, sweets, toothpaste and mosquito repellant.
- The nectar of eucalyptus produces high quality honey.

Neem

Medicinal use

- Neem leaves are dried in India and placed in cupboards to prevent insects eating the clothes and also while storing rice in tins. Neem leaves are dried and burnt in the tropical regions to keep away mosquitoes. These leaves are also used in many Indian festivals like Ugadi.
- Neem products are believed by Ayurvedic practitioners to be, antifungal, antidiabetic, antibacterial and antiviral. It is considered a major component in Ayurvedic and Unani medicine and is particularly prescribed for skin diseases. Neem oil is also used for healthy hair, to improve liver function, detoxify the blood, and balance blood sugar levels. Neem leaves have also been used to treat skin diseases like eczema, psoriasis, etc.
- Neem extracts have also been used in cosmetics, repellants, honey, soaps and lubricants.

Tulasi

Medicinal use

- ***Tulasi*** **has been used for thousands of years in Ayurveda for its diverse healing properties. It is mentioned in the Charaka Samhita, an ancient Ayurvedic text. *Tulsi* is considered to be an adaptogen, balancing different processes in the body, and helpful for adapting to stress. Marked by its strong aroma and astringent taste, it is regarded in Ayurveda as a kind of "elixir of life" and believed to promote longevity.**

- ***Tulasi*** **extracts are used in ayurvedic remedies for a variety of ailments. Traditionally, *tulasi* is taken in many forms: as herbal tea, dried powder, fresh leaf or mixed with *ghee*. Essential oil extracted from Karpoora *tulasi* is mostly used for medicinal purposes and in herbal cosmetics, and is widely used in skin preparations and for fever, colds and infections.**

Turmeric

Medicinal use

- **turmeric has been used traditionally for thousands of years as a remedy for stomach and liver ailments, as well as topically to heal sores, basically for its supposed antimicrobial property. turmeric was a medicine for a range of diseases and conditions, including those of the skin, pulmonary, and gastrointestinal systems, aches, pains, wounds, sprains, and liver disorders. A fresh juice is commonly used in many skin conditions, including eczema, chicken pox, shingles, allergy, and scabies**
- **The active compound curcumin is believed to have a wide range of biological effects including anti-inflammatory, antioxidant, anti tumour, antibacterial, and antiviral activities, which indicate potential in clinical medicine. In Chinese medicine, it is used for treatment of various infections and as an antiseptic.**

Vasaca

Medicinal use

- Asthma, bronchitis, breathlessness, as expectorant
- Menorrhagia
- Insecticidal
- Antispasmodic
- Local bleeding due to piles and it has antiseptic properties

Joba

Medicinal use

- Emollient, Aphrodisiac and Refrigerant
- Bronchial Catarrh
- For Coughs, Venereal Disease, Fever, Gonorrhoea

Mango

Medicinal use

- Laxative, astringent
- Unripe fruits show antibacterial and antifungal activity in opthalmia and eruptions
- Seeds used in asthma
- Bark used in rheumatism and diptheria.

Solanum trilobatum

Medicinal use

- The whole plant is used to treat asthma,
- bronchitis and esinophilia.
- It has been proven to have anti-inflammatory activities

Phyllanthus niruri

Medicinal use

- This herb is effective in the treatment of "**jaundice**". It is prescribed in Ayurvedic treatment to treat jaundice/Hepatitis and it also takes care of the effective functioning of Liver.
- A clinical study with *Phyllanthus niruri*, indicated that it may reduce the levels of urinary calcium.
- A more recent rat study found that *Phyllanthus niruri* has been shown to interfere with many stages of stone formation, reducing crystals aggregation.

Glycyrrhiza glabra

Medicinal use

Glycyrrhizin has also demonstrated antiviral, antimicrobial, anti-inflammatory, hepatoprotective, and blood pressure-increasing effects *in vitro* and *in vivo*, as is supported by the finding that intravenous glycyrrhizin slows the progression of viral and autoimmune hepatitis.

Liquorice has also demonstrated efficacy in treating inflammation-induced skin hyperpigmentation.

The antiulcer, laxative, antidiabetic, anti-inflammatory, immunomodulatory, antitumour and expectorant properties of liquorice have been investigated.

Tamarindus indica

Medicinal use

- Tamarind intake is likely to help in delaying progression of skeletal fluorosis by enhancing urinary excretion of fluoride.
- Based on a 2012 human study, supplementation of tender tamarind leaves improved disturbances to carbohydrate, lipid and antioxidant metabolism caused by chronic fluoride intake.
- It has been used in chronic kidney failure and significant result was obtained.

Ginger

Medicinal use

According to the American Cancer Society, ginger has been promoted as a cancer treatment to keep tumors from developing.

In limited studies, ginger was found to be more effective than placebo for treating nausea caused by seasickness, morning sickness, and chemotherapy.

It was classified as a stimulant and carminative and used frequently for dyspepsia, gastroparesis, slow motility symptoms, constipation, and colic. It was also frequently employed to disguise the taste of medicines.


Thank
You