

INTRODUCTION

- HISTORY
- DEFINITION
- SCOPE OF PHARMACOGNOSY

- The 3 important necessities of life namely food, clothing, shelter, and most of other useful products are supplied to human beings by the plant kingdom.
- Nature has provided complete store house of remedies to cure all ailments of mankind. In the past almost all the medicines used were from the plants.
- All phyla of plants Thallophyta, Bryophyta, pterodophyta and spermatophyta contain species that yield official and un official products of medicinal importance.
- The total no of known species are approximately 3,35,000 or more recognized families of spermatophyta.
- Long before the Christian era plants were used medicinally in china, india, Egypt and Greece.

- One of the most famous text is **Papyrus ebers** , 60 feet long and a foot wide at 16th century before christ.It has an document of 800 formulas and 700 different drugs such as acacia,fennel, and castor oil.
- Most of the medicinally active substances identified in the 19th and 20th centuries were used in the form of crude extracts.
- In china many medicinal plants had been in use since 500 BC.The oldest known herbal is **PENTSAO** written by emperor shen nung around 3000BC .It contains 365 drugs one for each day of the year.
- Indians also classified the herbs in to gunas. **Charaka** made 50 groups of 10 herbs each.**Sushrutha** has 760 herbs in 7 distinct sets based on some of their common properties.
- **Ayurvedha** (An ancient science of life) contains **charaka samhita** and **sushrutha samhita**

- **Hippocrates** Father of medicine (460 – 360 BC) **Aristotle** (384 – 322 BC) **Dioscorides** (40-80 A.D) **Galen** (131 – 200 AD) were contributed to medicine.
- The Arabian physicians also made contributions to the medical sciences.
- The **first pharmacist Galen** was known to have had a no of pain relieving materials including opium in his apothecary **Paracelsus** (1493 – 1541).
- The importance of the **extraction method** and alcohol as an extractant was reported by **Lemary** (1645 – 1715).
- **William withering** in 1785 published an account of some of the medicinal properties of fox glove leaves based on 10 years of experimentation.
- Percolation process was used in the year 1788.

- In 1803 the French pharmacist **DEROSNE** isolated narcotine from opium.
- In 1806 **SERTUERNER** isolated morphine from opium and its role in alleviating pain was recognized. In the next few years strychnine (1817) emetine (1817) brucine (1819) piperine (1819) quinine (1820) and colchicine (1820) were isolated.
- In 1818-1819 the French pharmacist **pellietier** first reported the isolation of strychnine from Ignatius beans and latex from nuxvomica seeds.
- In 1852 a new extraction process for alkaloid was developed by stass and otto process.
- Isolation of nicotine from tobacco leaves by (posselt and Reimann) in 1828.Cocaine in 1860 by (Neumann),Ovabain in 1877 by (Hardy and Gallows)

- In 1875 pilocarpine (Gerrat and Hardy), in 1887 ephedrine isolated by Nagai ,in 1891 podophyllotoxin by kuersten.
- Isolation of Ergometrine, Digoxin, Reserpine, Theophylline and Quinidine are the significant discoveries of the 20th century.
- In 19th century the term “**Materia medica**” was used for the subject now known as Pharmacognosy. While studying sarsaparilla **SEYDLER** a german pharmacist coined the name pharmacognosy in 1815 in the title of his work “ **Analecta pharmacognostica** “.
- Pharmacognosy is derived from 2 Greek words **Pharmakon (a drug) and Gignasco (to acquire the knowledge of) crude drugs.**
- Pharmacognosy is the study of crude drugs obtained from the plants , animals and mineral origins.

- In short it is a objective study of crude drugs.
- It includes the knowledge of history , distribution , cultivation collection ,processing for market and preservation the study of sensory , physical , chemical and structural characters and uses of crude drugs.
- **Pharma cognosy** also includes study of other materials used in pharmacy such as suspending , disintegrating and flavouring agents , filtering aids and substances like antibiotics,allergens,hallucinogenic and poisonousnplants , immunizing agents , pesticides , raw materials for the production of oral contraceptives etc .,
- Plant classification was introduced by the scientist **swede Linnaeus** (1707-1778).

- Plant classification further developed by **Bentham and hooker** (1862 -1863) **A.W.Eichler** (1883) **Engler and prand** (1887-1898).
- In 1865 **G. Mendels** important observations on plant hybrids were published.
- The anatomical observations of crude drugs was published by **Berg** in 1865. An anatomical atlas of powdered vegetable drugs was compiled in 1904 by **Greenish and collin**.
- Pharmacognosy is related with the subjects of botany , zoology , plant taxonomy , plant breeding , plant pathology , phyto chemistry the technology involving extraction , purification , chemotaxonomy , bio genetic pathways and for the formation of primary and secondary matabolites , plant tissue culture.
- Biochemisty and chemical engineering is essential for the development of collection , processing and storage technology of crude drugs.

- Pharmacognosy has an important link between pharmacology and medicinal chemistry.
- Pharmacology helps for the understanding of drugs on animals and human system.
- Pharmacognosy has a vital link between Ayurvedic and Allopathic systems of medicines, the active principles of crude drugs derived from natural origins could be dispensed, formulated and manufactured in dosage forms acceptable to the allopathic systems of medicine.

Scope of Pharmacognosy

- Several crude drugs provide bio active molecule for the final synthesis.80% of world population depends on crude drug and folklore medicine.
- All over the world the demand of herbal drug increased enormously.

CULTIVATION AND DOMESTICATION OF MEDICINAL PLANTS

- India imports many drugs such as benzoin , storax,ipomoes , Tolu balsam,copaiba etc.if the cultivation of these drugs producing plants are carried out and cultivated in india a lot of foreign exchange can be saved which will be helpful in the development of country.
- To fulfil the phytochemical industries Mentha piperata,Santalum album , ocimum sanctum, plantago ovata can be cultivated.

ANALYSIS OF PHYTOCHEMICALS

- Many bio active molecule are extracted and isolated from the crude drugs
- These are analysed by modern technique such as paper,thin layer ,gas and high performance liquid chromatography.

PREPARATION OF GENERAL TONICS AND STIMULANT

- Some of the Ayurvedic formulations based on crude drugs are very effective in liver diseases and disorders .
- (Eg) Liv 52 , Livomin,Livogen etc. Ginseng , thulasi , Ashwagandha, shatavari,Brahmi etc are used as stimulants and adaptogenic drugs

IN STEROID INDUSTRY

Many pharmaceutical industries are involved in the extraction of diosgenin from Dioscorea species. It is an important precursor for the production of steroidal drugs such as sex hormones , contraceptives , cortico steroids .

HERBAL PREPARATION

- Herbal preparations are popularised due to their high effectiveness , low cost easy availability and less side effects.
- *Adhatoda vasica* (*vasaka*) broncho dilator, *Boerhavia diffusa* (*punarnava*) and *Andrographis paniculata* (*kalmegh*) used as anti hepato toxic , Anabolic .
Bacopa monneri (*brahmi*) for memory etc are used as herbal medicines.

PREPARATION OF ANTIBIOTICS AND NOVEL MEDICINES

Antibiotics are prepared from natural sources. The evolution of novel medicines depends on Pharmacognosy.

FLAVOURING AGENTS AND PERFUMES

India produce large number of essential oils from Ajowan, Citronella , Eucalyptus, Mentha, Palmrosa, Lemon grass, Turpentine etc . Mentha oil is used in the preparation of vitamin A . Central institute of Medicinal and Aromatic plant (*C I M A P*) Lucknow is doing significant work in this field.

TISSUE CULTURE

- This technique is used for the production of secondary metabolites and for increasing the yield of bio active molecules.

PHYTO MEDICINES

- **Artemisinin** used as an anti malarial, **taxol** as an anti cancer , **Forscolin** as an anti hyper tensive, **Rutin** used as vitamin P and a capillary permeability factor and **piperine** as a bio availability enhancer.

PLANT DRUGS AND REMEDIES

- Complex diseases like cancer and AIDS are treated by plant drugs. Many drugs balsam of tolu , balsam of peru , benzoin etc are imported to india if these drugs are cultivated in india foreign exchange can be saved significantly
- Alkaloids, glycosides and antibiotics have been isolated in huge number and used as a curative agent.

ALTERNATIVE SYSTEMS OF MEDICINE

TRADITIONAL CHINESE MEDICINE AND KAMPOH SYSTEM

- This ancient system was introduced in the year 200 BC and 100 AD by the emperor Huang Di Nei jing .this system was based on yin and yang theory and the 5 basic elements water,metal,earth,fire and wood.
- This theory says that everything in universe consists of a **dark (yin)** and **light side (yang)** opposites like wet and dry , up and down, day and night .
- The elements are the 5 phases indicating the process of continuous movement of life.
- The important herbs from this system are Ephedra sinica ,Rheum palmatum , Carthamus tinctorius,clerodendron trichotomum , panax ginseng etc
- This system spread to Japan and korea in a form called kampo as the traditional system of Japanese medicine.

AYURVEDA-INDIAN SYSTEM OF MEDICINE

- **Ayurveda – ancient science of life** is believed to be prevalent for last 5000 years in india . It is one of the most important system in the world.
- This system is based on 5 basic elements space, air , energy , liquid and solid.
- They exist in the human body in combined forms like vata(space)pitta(energy and liquid) kapha(liquid and solid)vata,pitta and kapha are called Tri dosha (Three pillars of life).
- Tridosha exist in human body in 7 forms called saptadhatu
- **Rasa** (lymph) **Raktha** (blood) **meda** (adipose tissue) **mamsa** (flesh) **majja** (nervine tissue) **shukra** (reproductive tissue) and **asthi** (bones).
- When tridoshas, saptadhatu and mala are in balance with each other it is called healthy condition while imbalance causes a pathological condition.

- It is hypothesized that the 5 characters of the medicinal herbs rasa , guna , virya , vipak and prabhava can be applied to treat various pathological condition .
- Authentic information on Ayurveda has been compiled by ancient Indian medicine practitioners in forms called Samhita and other similar books.
- Ayurvedic pharmacy propose 5 basic dosage forms like swaras , kalka , hima and phant . A no of other dosage forms like churna , avaleha , ghrita,sandhana kalpa , bhasma are prepared from them.
- Mostly all of them are poly herbal formulations.
- Some of the important herbs in Ayurveda are Rauwolfia serpentina , Asparagus racemosus , cassis angustifolia , sesamus indicum , withania somnifera, Holarrhena anti dysenterica ,Aconitum napellus,piper longum etc

UNANI SYSTEM OF MEDICINE

- The well known Greek philosopher Hippocrates ,Aristotle and Galen (384-322BC) made valuable contributions to it.
- This system of Greek origin was further carried to Persia (Iran) where it has been improved by Arabian physicians.
- This system is based on **2 theories Hippocratic theory** of 4 humours and the **Pythagorean theory of 4** proximate qualities.
- The **4 humours** are **blood ,phlegm,yellow bile and black bile** while the 4 qualities are states of living human body like **hot ,cold ,moist and dry**. They are represented as earth , water ,fire and air.7 working principles like temperament,humours ,organs life , spirit,energy and actions.
- These principles are responsible for the body constitution and health as well as diseased conditions. The unani system of medicine aims at treating the cause of disease and not its symptoms.

- Thorough history of the patient is recorded in addition to his pulse , urine and stool examination. The diseased condition is considered to be due to the imbalance between humours and accordingly treatment is given.
- The drugs are poly herbal formulations and their collective effect.
- Unani system of medicine is called by various names in different parts of world such as Arab medicine, Loniah medicine, Islamic medicine and also oriental medicine.
- Unani medicines are
Madar,fufal,gilo,kabab,chini,karanj,kulthi,lodh,sana,Tagar
zeera,siyah etc

HOMEOPATHIC SYSTEM OF MEDICINE

- This system developed in the 18th century by **Samuel Hahnemann** a German physician and chemist. He proposed that the cause of disease itself can be used for its treatment.
- **Like cures like** with this principle he showed that cinchona can produce the symptoms of malaria. He succeeded in getting relevant results with a large no of extracts prepared from plants, animals and minerals.
- He compiled all these observations in what is called “The organon of medicine”. This system is based on the **drug proving and proover**.
- In a healthy person called proover the symptoms created by different doses of drug extract are noted which is called drug proving and it specifically considers physical, mental and emotional changes of the proover.
- Consequently these symptoms are compared with a patient with similar symptoms and accordingly same type of extract is given for the treatment

- During the treatment the drug extracts are extremely diluted which is believed to cause potentiation and enhancement of curative effect.
- **Vegetable drugs** – Arnica, Belladonna , Marigold , chamomile, colchicum , hemlock , hyocyamus,hyperium,ipecac,opium,ergot,aconite,nuxvomica etc
- **Animal drugs** – honey bees, calcium carbonate ,cantharis
- **Minerals and metals** – Arsenic oxide , barium carbonate, calciumphosphate,mercuricchloride,sulphur,copper, aluminium,phosphorus,platinum etc

SIDDHA SYSTEM OF MEDICINE

- The term siddha means achievement and siddhars were saint personalities who attained proficiency in medicine through practice of bhakthi and yoga.
- According to traditional belief lord shiva unfolded the knowledge of medicine to his wife Parvathi which was then passed to siddhars.
- This is the system of pre vedic period identified with Dravidian culture and it is largely therapeutic in nature.
- Like Ayurveda this system believes the role of **3 humours vatha, pitta and kapha** and all that objects in universe are made up of 5 basic elements namely **earth, water, sky, fire and air**.
- The identification of causative factors of diseases is done through pulse reading, the colour of body, the study of voice, urine examination, the status of digestive system and the examination of tongue.
- The literature of siddha system is mostly in tamil.

- A few natural drugs used in siddha system of medicine are
- Abini (papaver somniferum)
- Alari (Nerium indicum)
- Ettikkai (strychnos nuxvomica)
- Omathai (Datura stramonium)
- Haikalli (Euphorbia nerifolia)
- Rathapolam (Aloe barbadensis)

NATUROPATHY AND YOGA

- Naturopathy is not a system of treatment but also a way of life based on laws of nature.
- The attention is particularly paid to eating and living habits , adoption of purificatory measures , use of hydrotherapy,mud packs bath,body massage etc
- This system of yoga is as old as Ayurveda.
- The 8 components of yoga are observance of meditation and samadhi.
- Yoga exercises have potential in improvement of better circulation of oxygenated blood in the body restraining the sense organs improvement of social and personal behaviour and induction of tranquility and serenity in the mind.

BACH FLOWER REMEDIES

- Bach flower remedies were **discovered by Edward Bach** a physician in the early decades of the 20th century. These includes 38 remedies prepared from flowers of wild plants bushes or trees.
- The remedies are prescribed as per the patient state of mind as depression, anger, fear, worry, lack of confidence etc. The prescription is meant for achieving vitality and a harmonious state of mind, the lack of which causes sickness.
- According to **Dr Edward Bach** the remedies enrich the body with vibrations of humors superior nature rather than attacking a disease .It is believed that change of outlook and peace of mind has a major role in healing of a disease
- Some of the remedies prescribed are white chest nut , wild rose, mimulus agrimony ,chicory , gentian etc .
- For the purpose of medication the mother tinctures are prepared and dispensed in a diluted form as in homeopathic potentiation.

AROMATHERAPY

- It is one of the most ancient healing 4500BC when Egyptians used aromatic substances in medicines.
- Greeks also used plant essences for aromatic baths and scented massage.
- In Ayurveda there is mention of scented baths (abhyanga) **Prof. Gantle Fosse** a French cosmetic chemist **coined the term Aromatherapy** and described healing properties of essential oils.
- Different essential oils from various parts of plants are massaged in to the skin to treat a range of diseases to have an effect on the mind and emotions.
- **They are massaged in to the skin or inhaled or taken as bath.**
- They heal wounds , promote formation of scar tissue , treat acne and skin problems , pre menstrual tension, Rheumatism, poor circulation . Nervine disorders like headache, stress, insomnia etc.,
- Black pepper, caraway, fennel, garlic, geranium, ginger, jasmine, lavender, rosemary , eucalyptus and sandalwood are used as essential oils .