Definition,History,Scope & Development

- **Defination of pharmacognosy:-**
  Pharmacognosy is defined as the scientific and systematic study of structural, physical, chemical and biological characters of crude drugs along with their history method of cultivation collection and preparation for the market.
- **Introduction:-**
  Pharmacognosy is the study of crude drugs obtained from plants, animals and mineral and their constituents.
- Pharmacognosy either return link between Ayurvedic and allopathic system of medicine.
- pharmacognosy is the infrastructure on which depends evaluation of novel medicines.
- The word pharmacognosy is derived from the Greek word
- pharmakon, 'a drug'Gignosco, ' to acquire knowledge'

- **Crude drug:-**
  The drugs which are obtained from natural sources like plants, animals, minerals and they are used as such they are occur in nature without any processing expect drug drying and size reduction. Sources of crude drug:-
- **Sources of crude drug :-**

	Source	Examples
1	Plant	Tulsi,turmeric,ginger
2	Animals	Honey,beeswax, gelatin
3	Minerals	Chalk,talk,bentonite

HISTORY OF PHARMACOGNOSY

1) **Hippocrates:-**The greatest physician Hippocrates (460- 360 B. C)known as **'father of medicine'.**

2) **Galen:-**

Galen(131- 200AD)was Greek pharmacist.

He worked on extraction of chemical constituent from the plants.

3) **Charak:-** Charak was one of the principal contributors to the ancient art and science of Ayurveda.

4) **Sushuruta:-** he is known as '**father of surgery'.**

Indian physician and surgeon.

5) **C.A.Seydler:-** he wrote the book **"Analecta pharmacognistica"**

- **Traditional Indian system of Medicine:-**

1. Ayurveda
2. Unani
3. Homeopathy
4. Siddha
5. Naturopathy and yoga
6. Bach flower remedies
7. Aromatherapy

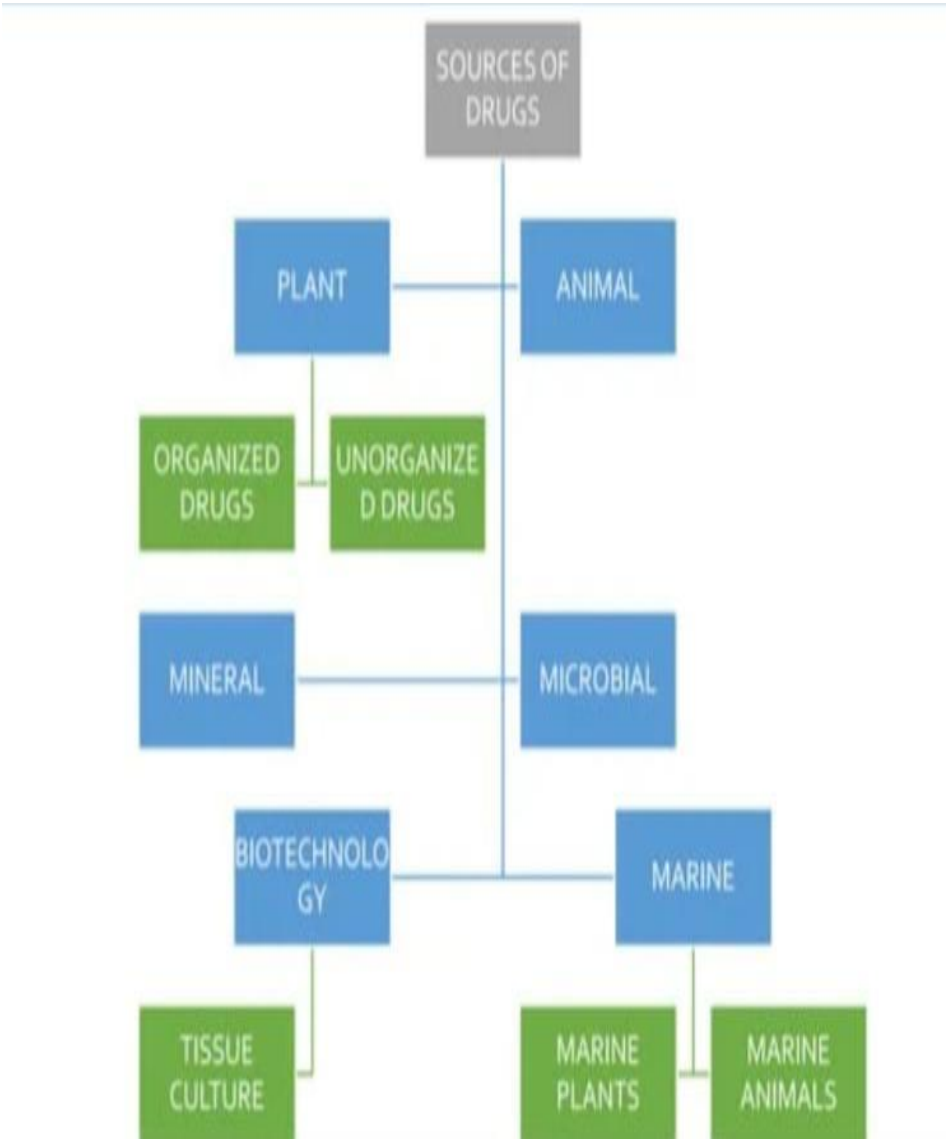
❖ Scope of pharmacognosy

1) **Analysis of phytochemicals :** many bioactive molecule are extracted & isolated from the crude drugs. These are analysed by modern technique such as different types of chromatography.
2) **In steroidal industry** : Diosgenin is an important precursor obtained from dioscorea species, used for production of Steroidal drugs, contraceptive.
3) **Herbal preparation:** generally 80% of world population rely on herbal preparation, due to their high effectiveness, low cost, easy availability & less side effect.

- **4) Preparation of antibiotics :** antibiotics are very useful in maintaining the health of people are obtained from natural source.
- **5) Flavouring agents & perfumes :** There are large number of aromatic plants which are extensively used as flavouring agents and perfumes.
- **6) Tissue culture :** this technique is now a day widely used for the production of secondary metabolites.

Source of Drugs- Plants,Animals,Minerals&Tissue Culture

1. Plants Sources
2. Animals Sources
3. Marine Sources
4. Tissue Cultures
5. Mineral Sources



A. Plants Source:-

(1)Organized:

- **Entire:** Shankhpushpi, Brahmi, Punarnava, Neem, Giloy
- **Leaf:** Vasaka, Digitalis, Mint
- **Fruit:** Fennel, Coriander, Amla, Capsicum
- **Flower**: Dhatakipushpa
- **Root:** Rauwolfia, Ashwagandha
- **Seed:** Mustard, Almond, Methi, Linseed
- **Rhizome:** Turmeric, Ginger
- **Wood:** Sandalwood, Red Sandalwood
- **Bark:** Cinnamon bark, Willow Bark, Arjuna Bark, Ashoka Bark

(2) Unorganized:

- **Latex:** Opium
- **Juice:** Aloe, Amla, Giloy
- **Gums:** Acacia, Tragacanth
- **Extract:** Black Catechu, Pale Catechu

Shankhpushpi

Giloy

2. Drugs from Microbial sources:- Penicillin, Cephalosporin, Tetracycline

3. Drugs from Animal origin:-Gelatin, Honey, Bees wax

4. Drugs from marine sources:-Sponge, Red algae, Cod liver oil, Shark liver oil, Brown algae, Agar, Alginate

5. Drugs from mineral sources:-Abraka bhasma, Lohbhasma, Talc, Shilajit, Kaolin, Bentonite

6.Biotechnology:-Taxol,Diosgenin, Shikonin,Ginkolide,Ginsengosides, Streptomycin

Red Algae

Kaolin Clay

B.Animal Sources:-

- Leeches (Hirudo medicinalis) are used to reduced inflammation by withdrawing blood. Hirudin, extracted from leeches (has **anticoagulant** properties), has been suggested for use in thrombosis & other conditions in which the blood shows a disposition to clot too readily, because it helps to prevent blood clot.
- **Carminic acid** a colorant from cochineal are the insect source.

Leeche

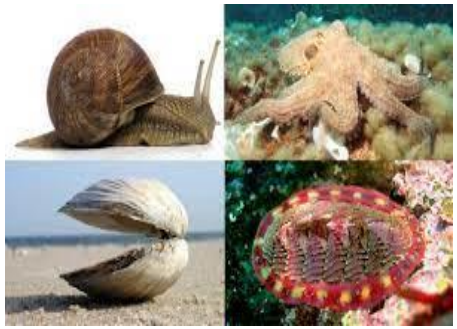
cochineal

C.Marine Source:-

- The quest for obtaining new medicines has gone beyond the terrestrial regions to the oceans & its flora & fauna. Scientists have explored novel compounds from marine source like **Annelida, Arthropoda, Mollusca, Nematoda, Chordate, Hemichordate.**

Annelida

- **Cod liver oil** is the great source of omega-3-fatty acids.
- **Halibut fish liver oil** is source of Vitamin A and D.
- **Red algae** are rich in protein, vitamins and anti-oxidant.
- **Shark liver oil** prevent the damage caused by radiation used in treatment of cancer.



Mollusca

D. Plant Tissue Culture

- Plant tissue culture is a collection of techniques used to maintain or grow plant cells, tissues or organs under sterile conditions on a nutrient culture medium of known composition. Plant tissue culture is widely used to produce clones of a plant in a method known as **micropropagation**

- **Organized drug:-** Those drug which are direct part of plant or animal such as leaves,flower,root etc__
  - These are plants and animals origin.
  - They consist of organized cellular structure.
  - these can be identified by morphological characters.
- **Unorganized drug:-** Those drugs which are not a part of plant but derived from a plant/animals.
  - These are from plants,animal,mineral origin.
  - these derived substance can be obtained through a process of extraction,distillation,natural secreation etc.
  - they do not have cellular structure.

Classification of drug:-

- Alphabetical classification.
- Taxonomical classification
- Morphological classification
- pharmacological classification
- chemical classification
- chemo-taxonomical classification
- sero-taxonomical classification

❑ Adulteration:-

"The mixing or substituting original crude drug partially/whole with other similar looking substance''.

❑ Types of Adulteration:-

1. Direct {intentional} Adulteration.
2. Indirect{unintentional} Adulteration.

Evaluation:-

It is defined as determination of identity,purity & quality of drug.

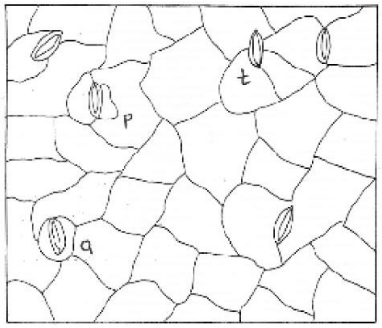
❑ Methods of evaluation:-

i. Organoleptic evaluation
ii. Microscopic evaluation
iii. Physical evaluation
iv. Chemical evaluation
v. Biological method

❖ Quantitative Microscopy:-

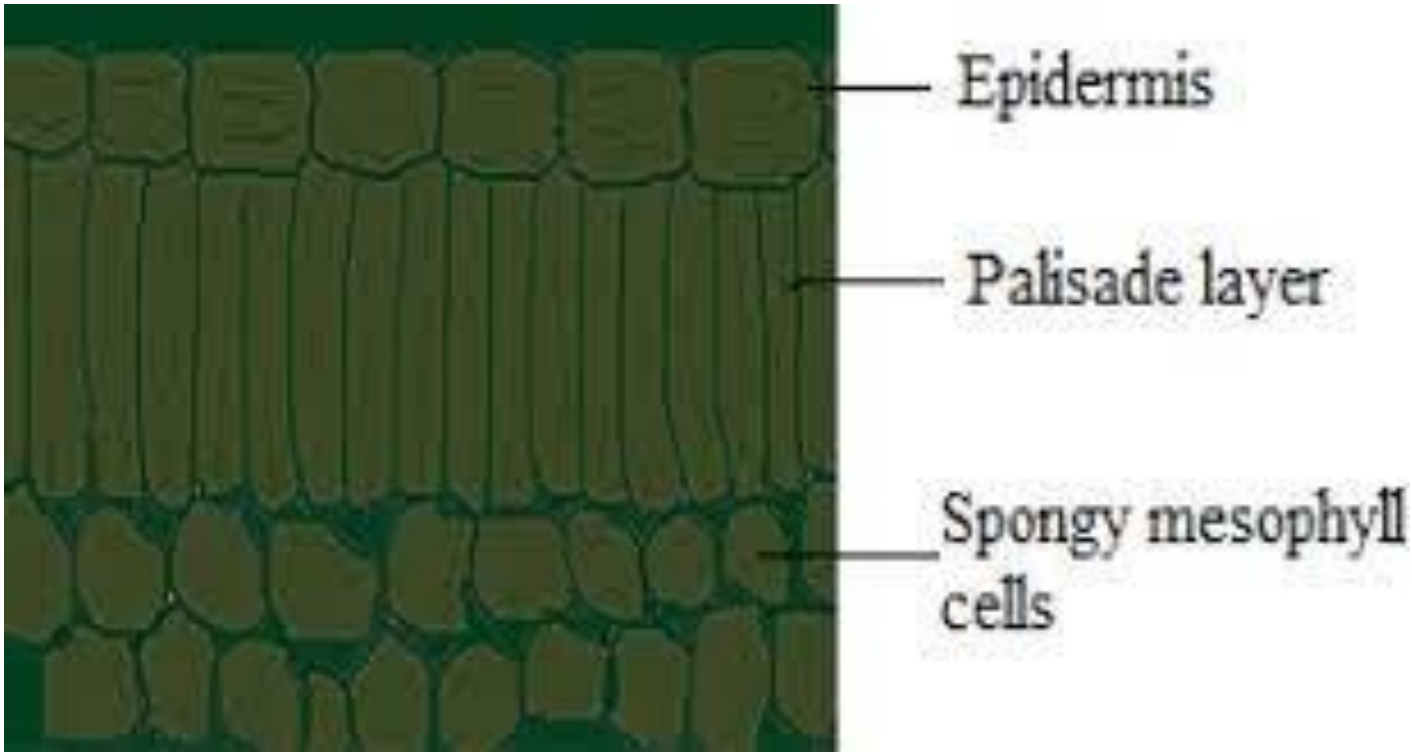
➢ Leaf constant:-

- **Stomatal no**: It is an average no.of stomata present 1sq.mm of epidermis ex.Datura innoxi=141
- **Stomatal Index :** percentage which the no.of stomata form to total no.of epidermal cell.
- S.I= S/(E+S)×100



- **Vein islet no:**
  Islet is the area surrounded by veins.
  ex. Indain senna 19-23

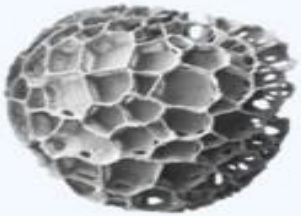
- **Palisade Ratio:**
  Average no.of palisade cell unders 1 epidermal cell.
  ex. Digitalis purpurea-3.7- 4.2



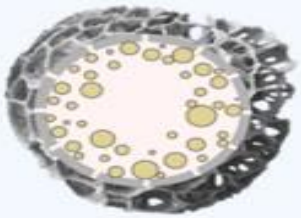
Lycopodium Spore Method

A

(i)



(ii)



(iii)

B

Harvest spores and sieve to remove plant debris

Defat spores by acetone reflux at 50°C for 6 h

Remove protein & cellulosic material by reflux with 85% (v/v) phosphoric acid at 70°C for 30 h

Fifteen step washing with water, acetone, 2M hydrochloric acid, 2M sodium hydroxide, water, acetone, ethanol

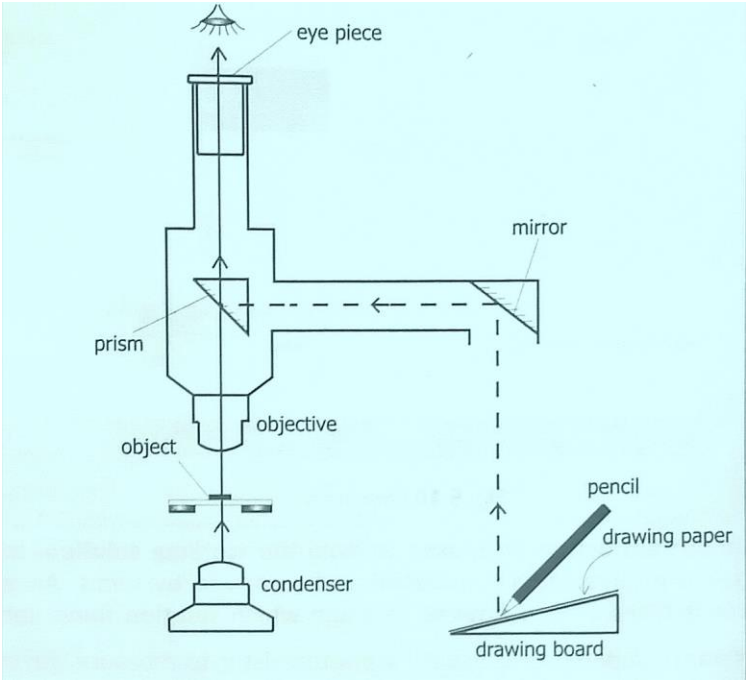
Dry sporopollenin capsules until stable weight

❖ Camera Lucida:-

It is an optical instrument,when attach with a compound microscope help drawing microscope image of object on paper.

- It works on simple optical principle reflecting beam of light through a prism on to the plane mirror and there from the image is reflected one to the plane paper.
- The observer moves the pencil on the lines of the image & draws a correct & faithful figure of the object on the paper.
- **Three main parts**

1. Attachemt ring
2. Prism
3. Mirror



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- Google

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