

Lala Ami Chand College of Pharmacy
Village- Abdulgarh, Barara Road, District-Ambala (Haryana)
Session 2019-20
D. Pharmacy 1st
Subject-Pharmacognosy

Answers no. 1 to 25 (1 marks each)

- A1. Pharmaceutical aid are the drugs and substances which have little or no pharmacological effect but they are essentially used in the preparation of pharmaceutical dosage form.
- A2. Rauwolfia is used as **Antihypertensives**.
- A3. Organised drugs are the drugs having definite shape size and cellular structure eg- leaves.
- A4. Astringents are the drugs which precipitate the proteins eg- alum.
- A5. Drug Adulteration is defined as practice of substituting the original drug with similar looking substandard drug having inferior pharmacological action.
- A6. Drug Evaluation is defined as checking the identity, quality and purity of a drug.
- A7. Anisocytic Stomata is found in **Hyosyamus**.
- A8. Biological activity is expressed in **I.U (International Unit)**.
- A9. Dragendroff reagent is positive in case of **Alkaloids**.
- A10 Piperine is used as **Antiseptic**.
- A11 Haemolysis and foam test are positive for **Saponin Glycosides**.
- A12. Cardiac glycosides give **Baljet Test** positive.
- A13. Diuretics are the drugs which increases the urine excretion eg- Gokhru.
- A14. Amla belongs to family **Euphorbiaceae**.
- A15. Rauwolfia was discovered by **Leonhard Rauwolf (1582)**.
- A16. The chemical constituent of cotton is **cellulose**.
- A17. Synonym of belladonna is **Deadly night shade**.
- A18. Devil dung is the synonym of **Asofoetida**.
- A19. Baljet test gives **yellow to orange colour** with sodium picrate solution.
- A20. Vitamins are natural substances found in plants and animals and known as essential nutrients for human beings.
- A21. Honey is obtained from Bee **Apis mellifera**.
- A22. Starch gives **blue colour** with iodine solution.
- A23. Synonym of Kaolin is **China clay**.
- A24. Major chemical constituent of Gokhru is **steroidal saponins**.
- A25. Dwarf morning glory is the synonym of **Shankhpushpi**.

Answers no. 26 to 40 (3 marks each)

A26. Identification Test of Alkaloids: Most **alkaloids** are precipitated from neutral or slightly acidic solution by. Dragendorff's reagent (solution of potassium bismuth iodide) orange coloured precipitate. Mayer's reagent (potassium mercuric iodide solution) Cream coloured precipitate.

Detection of Alkaloids:

Extracts were dissolved individually in dilute HCl and filtered.

1. Mayer's Test: Filtrate was treated with Mayer's reagent (Potassium Mercuric Iodide). Formation of a yellow colored precipitate indicates the presence of alkaloids.
2. Wagner's Test: Filtrate was treated with Wagner's reagent (Iodine in Potassium Iodide). Formation of brown/reddish precipitate indicates the presence of alkaloids.

A27. Examples of Alphabetical Drug Classification:

- A- Acacia, Asafoetida.
- B- Belladonna, Bael.
- C- Caraway, Colophony.
- D- Datura, Digitalis.
- E- Ergot, Ephedra.
- F- Fennel, Fenugreek,
- G- Giloy, Garlic.
- H- Hyosyamus
- I- Ipeccac
- J- Jalap.

In the same way drugs are classified till alphabet Z.

A28. Stomatal Index: Stomatal index is the percentage which the number of stomata forms to the total number of epidermal cells, each stomata being counted as one cell. Stomatal index can be calculated by using following equation.

$S.I = \frac{S}{E + S} \times 100$ E + S I = Stomatal index, S = No. of stomata per unit area, E = No. of epidermal cells in the same unit area.

Procedure: Clear the piece of the leaf (middle part) by boiling with chloral hydrate solution or alternatively with chlorinated soda. Peel out upper and lower epidermis separately by means of forceps. Keep it on slide and mount in glycerin water. Arrange a camera lucida and drawing board for making the drawings to scale. Draw a square of 1mm by means of stage micrometer. Place the slide with cleared leaf (epidermis) on the stage. Trace the epidermis cell and stomata. Count the number of stomata, also the number of epidermal cells in each field. Calculate the stomatal index using the above formula. Determine the values for upper and lower surface (epidermis) separately.

A29. Identification test for Saponin Glycosides:

Froth formation Test (foam)

Place the 2 ml solution of drug in water in a test tube, shake well, stable froth (foam) is formed.

Haemolysis test

Add 0.2 ml of solution of saponin (prepared in 1% normal saline) to 0.2 ml of blood in normal saline and mix well. Centrifuge and note the red supernatant compare with control tube containing 0.2 ml of 10% blood in normal saline diluted with 0.2ml of normal saline.

A30. Uses of Asafoetida: Asafoetida is sometimes applied directly to the skin. Asafoetida is used for breathing problems including ongoing (chronic) bronchitis, H1N1 "swine" flu, and asthma. It is also used for digestion problems including intestinal gas, upset stomach, irritable bowel syndrome (IBS), and irritable colon. Other uses include treatment of "whooping cough" (pertussis), croup, and hoarse throat.

Some people use asafoetida for hysteria, insanity, convulsions, and as a nerve stimulant for ongoing mental and physical fatigue with depression (neurasthenia).

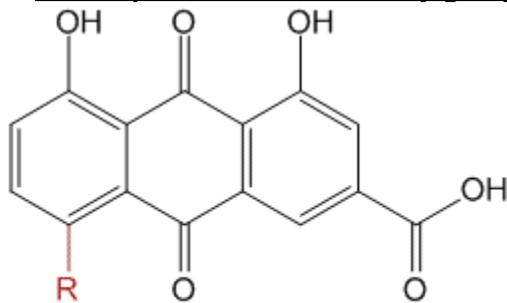
Women sometimes use asafoetida to restart their menstrual periods after menstruation has stopped for some reason. for corns and calluses.

A31. Chemical constituents of Rhubarb: Chrysophanol, emodin, aloe-emodin, rhein, physcion were the free anthraquinones to be first isolated and to be found in nearly all species.

Also glycosides of some of the above were also isolated. However these substances did not give a satisfactory explanation for the drug action and thus later the following types of anthraquinones were established in rhubarb.

1. Anthraquinones without a carboxy group-Chrysophanol, emodin, aloe-emodin, physcion. Chrysophanein and glucoaloe-emodin (glycosides) fall under this category too.

2. Anthraquinones with a carboxy group- Rhein and its glycoside, glucorhein.



R= H = Rhein

R= Glucose = Glucorhein

3. Anthrones or dianthrones of emodin or physcion or chrysophanol or aloe-emodin.

4. Heterodianthrones obtained from two different anthrones- Combination of aloe-emodin anthrone and emodin anthrone (Palmidin A), combination of aloe-emodin and chrysophanol anthrone (Palmidin B), combination of emodin anthrone and chrysophanol anthrone (Palmidin C).

A32. Uses of Chaulmoogra oil:

1. Excellent Antimicrobial

Chaulmoogra contains an active ingredient known as hydnocarpic acid, which is an excellent antimicrobial agent. It can be used to treat eczema, psoriasis, bruises, wounds and sores.

2. Can Be Used as a Mild Preservative

Due to its antibacterial properties, you can use **chaulmoogra oil** as a mild preservative in preparations for hair and skin.

3. Anti-inflammatory Properties

Chaulmoogra oil has relaxative and anti-inflammatory properties, which can help muscle spasms caused by rigorous exercise, cramps and heavy lifting.

A33. Chemical Test for Nux- Vomica:

1. Strychnine test:

To a thick section of endosperm add ammonium vanadate and sulphuric acid. Middle portion of endosperm is strained purple because of strychnine.

2. Strychnine test:

Strychnine also gives violet colour with potassium dichromate and conc. Sulphuric acid.

3. Brucine test:

To a thick section add concentrated nitric acid. Outer part of endosperm is stained yellow to orange because of brucine.

4. Hemicelluloses test:

To a thick section add iodine and sulphuric acid. The cell walls are stained blue.

A34. Uses of Cotton: Cotton is a food and a fibre crop. Cotton seed is fed to cattle and crushed to make **oil**. This cottonseed **oil** is used for **cooking** and in products like **soap**, margarine, emulsifiers, **cosmetics**, pharmaceuticals, **rubber** and plastics. Linters are the very short fibres that **remain** on the cottonseed after ginning.

A35. Uses of Ergot: Ergot extract has been used in pharmaceutical preparations, including ergot alkaloids in products such as Cafergot (containing caffeine and **ergotamine** or ergoline) to treat **migraine** headaches, and **ergometrine**, used to induce uterine contractions and to control **bleeding** after childbirth.

A36. Note on Turmeric:

Biological source:

Turmeric consists of the dried rhizomes of *Curcuma longa* L. (*C. domestica* Valetton)

Family:

Zinziberaceae.

Chemical constituents:

1. Curcuminoids- Non-volatile colouring matter.
2. Curcumin, a diferuloylmethane; desmethoxy dicinnarmoylmethane; bidesmethoxy curcumin.

Uses:

1. Anti-inflammatory agent.
2. Stimulant, tonic.
3. Aromatic and carminative.
4. Choleric and cholagogue.
5. Antifertility agent.

A37. **Uses of Ipecac:** Ipecac is taken by mouth to cause vomiting after suspected poisoning. It is also used to treat bronchitis associated with croup in children, a severe kind of diarrhea (amoebic dysentery), and cancer. Ipecac is also used as an **expectorant** to thin mucous and make coughing easier. Small doses are used to improve appetite.

A38. **Biological Source and Uses of Sandalwood oil:**

Biological source- It consists of dried heartwood of the plant *Santalum album* belonging to family Santalaceae.

Uses- Sandalwood oil benefits include its ability to encourage mental clarity and relaxation. Sandalwood oil uses include colds, coughs, urinary tract infections, acne, eczema, psoriasis and more. Sandalwood oil has the ability to act as a natural astringent, anti-**inflammatory**, anti-**viral** and **expectorant**.

Q39. **Antidiabetic:** are the plants which are used in the management of Diabetes mellitus. The most common and effective **antidiabetic** medicinal **plants** of Indian origin are Babul (*Acacia arabica*), bael (*Aegle marmelose*), church steeples (*Agrimonia eupatoria*), onion (*Allium cepa*), garlic (*Allium sativum*), ghrita kumara (*Aloe vera*), neem (*Azadirachta indica*), ash gourd (*Benincasa hispida*).

Flavouring agents: Substances added to foods and medicine to improve the quality of taste. These include **flavoring** substances/ extracts/preparations, which give the food its taste or odor or both. **Flavoring agents** are of three types. **Natural Flavours** and **Natural**

Flavouring Substances: These are flavor preparations or single substances, obtained from vegetables by physical processes. It has a broad array of **uses** in food, chocolate, ice cream and beverages. Other common **flavoring agents** include: Amyl acetate, **used** as banana **flavoring**. Benzaldehyde, **used** to create cherry or almond flavor.

A40. **Pectin:** **Pectin** is a naturally occurring substance (a polysaccharide) found in berries, apples and other fruit. When heated together with sugar, it causes a thickening that is characteristic of jams and jellies. Pectin is a **fiber** found in fruits. It is used to make medicine. People use pectin for **high cholesterol**, high triglycerides, and to prevent colon cancer and prostate cancer. It is also used for **diabetes** and gastroesophageal reflux disease (GERD).

Answers no. 41 to 55 (5 marks each)

A41. **Uses of Guar gum:** In foods and beverages, **guar gum** is **used** as a thickening, stabilizing, suspending, and binding agent. In manufacturing, **guar gum** is **used** as a binding agent in tablets, and as a thickening agent in lotions and creams.

Gelatin: Gelatin is used for **weight loss** and for treating **osteoarthritis**, rheumatoid **arthritis**, and **brittle bones (osteoporosis)**. Some people also use it for strengthening bones, joints, and fingernails. Gelatin is also used for improving hair quality and to shorten recovery after **exercise** and sports-related injury.

A42. **Pharmacognosy of Tulsi:**

Biological source:

Tulsi consists of the fresh and dried leaves of *Ocimum* species like *Ocimum sanctum* L. and *Ocimum basilicum* L.

Family:

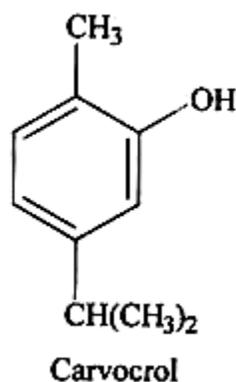
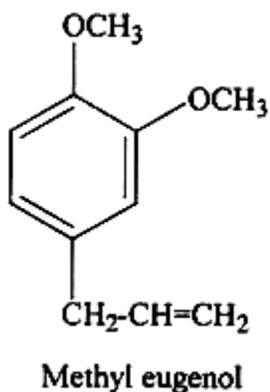
Labiatae.

Chemical Constituents:

Volatile oil (0.8%):

- i. Eugenol, nerol, eugenol methyl ether,
- ii. caryophyllene, terpinene-4-ol-decylaldehyde,
- iii. α -selinene, α and β -pinene,
- iv. Camphor and carvacrol.

i. Cineole, linalool.



Uses:

Used as Antiviral.
Used as Febrifuge and refrigerant.
Anti- fertility agent.
Diaphoretic and Bactericidal.

A43. Senna:

Biological source: Tinneveley Senna consists of the dried leaflets of *Cassia angustifolia* Vahl belonging to Family- Leguminosae.

Chemical constituents: 1. Senna contains anthraquinone glycosides as sennosides A, sennosides B, sennosides-C, sennosides D, emodin, chrysophenol, Aloe emodin, rhein.

2. Two naphthalene glycoside, i.e. 6-hydroxy musizin glucoside and Tinnevellin glycoside.

3. It also contains yellow flavinol, colouring matter kaempferol and its glycosides kaempfrin,

4. Sterol and its glucoside.

Uses: 1. Used as laxative and cathartic.

2. Senna is mixed with carminative drugs due to its gripping action.

3. Powder senna is mixed with vinegar and applied externally to cure skin diseases.

A44. Uses of clove: Cloves act as an **antiseptic, anti-fungal, antibacterial, antioxidant,** analgesic, **anti-inflammatory,** and they can also help heal. Their use is recommended to treat coughs, flatulence, inflammation, tooth aches, **bronchitis,** and also to help lose weight since cloves improve **digestion,** making weight loss easier.

Uses of cinnamon: Cinnamon Is High in a Substance With Powerful Medicinal Properties. ...

- Cinnamon Is Loaded With Antioxidants. ...
- Cinnamon Has Anti-**Inflammatory** Properties. ...
- Cinnamon May Cut the Risk of **Heart Disease.** ...
- Cinnamon Can Improve Sensitivity to the Hormone Insulin. ...
- Cinnamon Lowers **Blood Sugar Levels** and Has a Powerful Anti-Diabetic Effect.

A45. Chemical constituents of Digitalis: **Digitalis** contain 0.2 to 0.45% of both primary and secondary glycosides. Primary glycosides- Purpurea glycosides A and B, glucogetaloxin and Secondary are – digitoxin, gitoxin and getaloxin.

Uses of Digitalis: **Digitalis** is used to treat congestive heart failure (CHF) and heart rhythm problems (atrial arrhythmias). **Digitalis** can increase blood flow throughout your body and reduce swelling in your hands and ankles.

A46. Guggal: The guggul plant is widely distributed throughout India and adjacent dry regions. The tree is a small shrub with thorny branches. The gum, called "guggul" or "gum guggulu," is tapped from the stem of the plant, and the fragrant yellow latex solidifies as it oozes out. Excessive production of the gum eventually kills the plant. Guggul has been used in the traditional Ayurvedic medical system for centuries and has been studied extensively in India. Commercial products are promoted for lowering cholesterol; however, clinical studies do not support this claim. Anti-inflammatory and heart/blood vessel effects are being evaluated, as well as use in cancer, obesity, and diabetes.

A47. Gymnema chemical constituents and Uses: *Gymnema sylvestre* (Asclepiadaceae) also known as 'gurmar' or 'sugar destroyer' is a woody, climbing traditional medicinal herb which has many therapeutic applications in Ayurvedic system of medicine. It is used for lowering serum cholesterol, triglycerides and blood glucose level (hypoglycemic or antihyperglycemic), hypolipidaemic, weight loss, stomach ailments, constipation, water retention and liver diseases, either high or low blood pressure, tachycardia or arrhythmias, and used as aperitive, purgative, in eye troubles, antiinflammatory, smooth muscle relaxant, prevention of dental caries, cataract and as anticancer-cytotoxic agent. Its flowers, leaves, and fruits contains alkaloids, flavones, saponins, sapogenins, anthraquinones, hentri-acontane, pentatriacontane, α and β -chlorophylls, phytin, resins, d-quercitol, tartaric acid, formic acid, butyric acid, lupeol, β -amyrin related glycosides and stigmasterol having main principle bioactive compounds viz. gymnemic acids, gymnemasides, gymnemagenin, gurmarin, gymnemosides, gymnemanol, gymnemasins, gypenoside, and conduritrol which act as therapeutic agent and play vital role in many therapeutic applications

A48. Note on Gokhru: *Pedaliium murex* (*P. murex*) Linn (Family: Pedaliaceae) is annual herb, which grows abundantly on the sea costs in South India, Srilanka, Ceylon, Mexico and

tropical Africa. In and around Visakhapatnam the plant is very prolific after summer rains. The plant has medicinal attributes. Dinatoin glycoside and diosmetin glucuronides are isolated from the leaves of *P. murex*.

An infusion from leaves and stems was reported to be used in the treatment of gonorrhoea and dysuria. In the past several flavonoids have been isolated from the leaves and flowers. Recently, two new compounds are isolated from the fruits (Heptatriacontan-4-one, tetratriacontanyl octacosanoate).

A decoction of the fruits was mentioned to be effective as demulcent, diuretic, antispasmodic and aphrodisiac. The decoction of root is used as antibiliary. It is also used in the treatment of urogenital disorder. It has been traditionally used for the treatment of puerperal diseases, digestive tonics, ulcers, fevers, wounds, other ailments and general debility.

A49. Hyoscyamus:

Biological source-It consists of the dried leaves and flowering tops of *Hyoscyamus niger* Linn. It contains not less than 0.05% alkaloids, calculated as hyoscyamine belonging to Family- Solanaceae.

Chemical constituents: 1. Tropane alkaloids (0.04-0.72%)

(i) Hyoscyamine (60%);

(ii) Hyoscine (Scopolamine) (40%),

(iii) Atropine,

(iv) Apotropine,

(v) Cuskygrine.

2. Apohyoscine, ascorbic acid and other amino acids like alanine, arginine, aspartic acid, glutamic acid, glycine, etc.

3. Tropine, hyoscypicrin, hyoscine N-oxide and choline are also isolated from the plant.

Aconite:

Biological source-Aconite is a crude extract of dried leaves and roots from various species of *Aconitum napellus* belonging to Family- Ranunculaceae.

Chemical constituents: Aconite is a crude extract of dried leaves and roots from various species of Aconitum plants (or monkshood) that contain **aconitine** and other **diterpenoid** ester alkaloids (**aconitine**, mesaconitine, jesaconitine, hyaconitine)

A50. **Note on Amla:** Amla or the Indian gooseberry is a fruit which is popular for its many health benefits. The fruit is extremely rich in Vitamin C, iron and calcium.

1. It gives a boost to your immunity: Vitamin C rich amla can give a boost to your immunity. Vitamin C is important for children, adults, and the elderly.

2. It is good for your heart health: Content of Vitamin C in amla is great for your heart health. It strengthens and thickens arteries in your heart. This is especially important for people who have high levels of bad cholesterol.

3. Amla is good for skin and hair: Health skin and hair is vastly dependent on your intake of Vitamin C. Vitamin C helps collagen perform in the right way, thus improving your skin quality and making it tighter. Amla gives you the glowing skin you have always aspired for. You can mix amla powder with yogurt and apply it as a face mask.

For hair, you can mix amla powder with water of coconut oil or sesame oil and massage it deep in to your scalp. It can help in getting rid of dandruff, dry skin on your scalp, and improve your hair quality.

A51. **Uses of Papain:** It is used as a digestive aid and for treating parasitic worms, inflammation of the throat and pharynx, shingles (herpes zoster) symptoms, ongoing diarrhea, hay fever, **runny** nose, and a skin condition called psoriasis. Papain is also used along with conventional treatments for tumors.

Uses of Diastase: Diastase **enzymes** function to catalyzes the breakdown of starch into maltose. Diastase is a starch-liquefying enzyme, principally alpha-amylase, derived from porcine pancreas glands.

Q52. **Chemical test of Peppermint oil:** Mix in a dry **test** tube 6 drops of Oil with 5 mL of a 1 in 300 solution of nitric acid in glacial acetic acid, and place the tube in a beaker of boiling water: within 5 minutes the liquid develops a blue color which, on continued heating, deepens and shows a copper-colored fluorescence, and then fades, ...

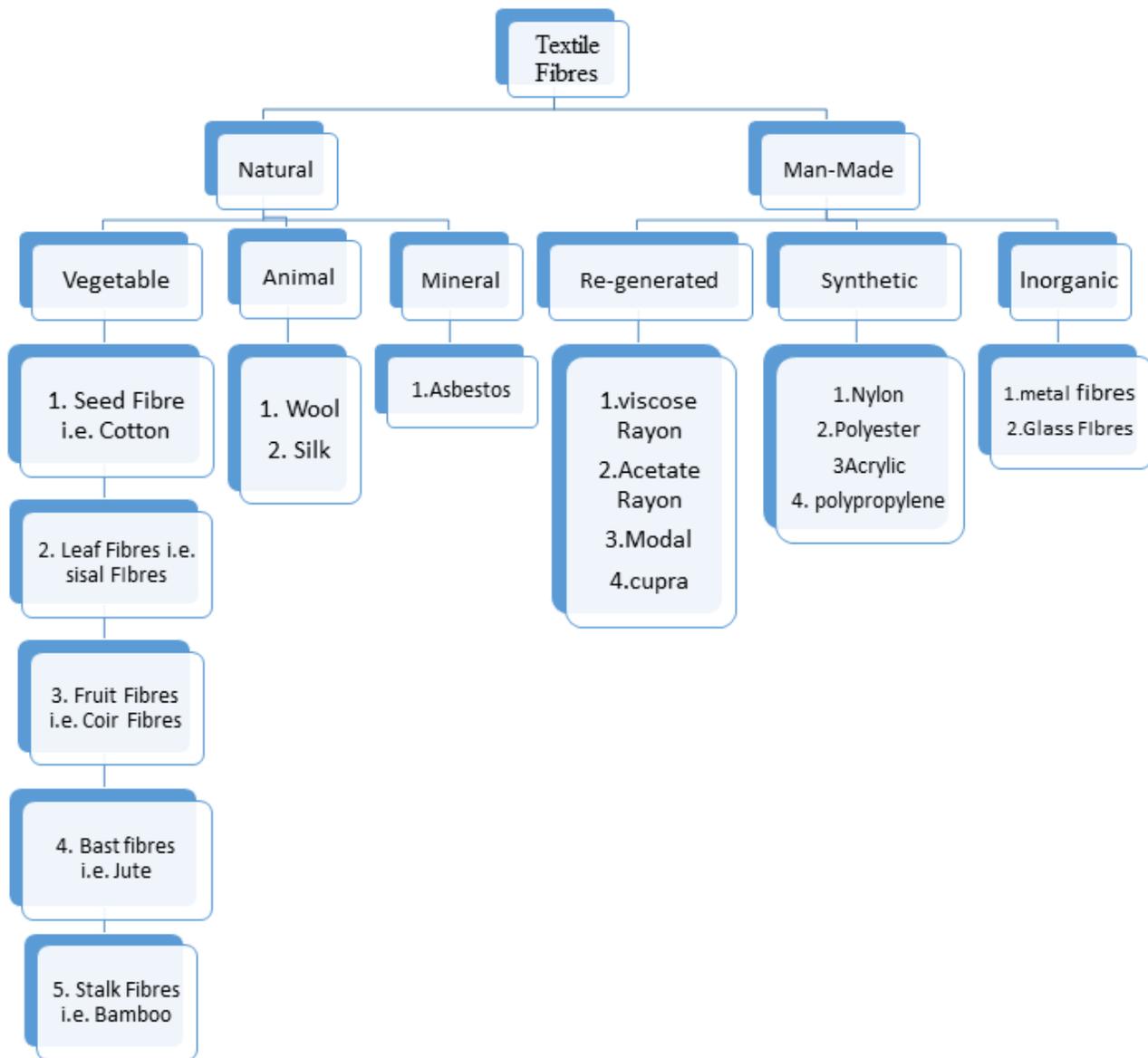
Q53. **Chemical constituent and uses of Neem:** **Active constituents** of **neem** leaf extract include isomeldenin, nimbin, nimbinene, 6-desacetylnimbinene, nimbandiol, immobile.

Uses: The **chemical** compounds present in **neem** have anti-inflammatory , antiarthritic ,antipyretic ,hypoglycaemic , Antifungal, spermicidal, antimalarial, antibacterial and Diuretic **properties**. Oil from **neem** seeds is **used** in arthritis, skin diseases and muscular sprains.

Chemical constituents of Lemon: **Lemon** has many bioactive **components** such as citric acid, Ascorbic acid, minerals, flavonoids and essential oils .It was reported that caryophyllene was the main **composition** in Egyptian **lemon** leaf oil, followed by linalool, nerol and limonene.

- **Uses:** It promotes hydration.
- It's a good source of **vitamin C**.
- It supports **weight loss**.
- It improves your skin quality.
- It aids digestion.
- It freshens breath.
- It helps prevent **kidney stones**.

A54. Classification of Fibres: Fibre is the basic component of any textile material. There are different types of fibres around us in daily use. Fibres with a short length are called as staple fibres, whereas fibres with long length are called as filaments.



A55. Chemical constituents of Rauwolfia : contains dozens of alkaloids of the indole alkaloid family, including ajmaline, ajmalicine, reserpine, and serpentine, among others.

Uses of Rauwolfia: Rauwolfia alkaloids belong to the general class of medicines called antihypertensives. They are used to treat **high blood pressure**(hypertension). **High blood pressure** adds to the workload of the heart and arteries. It is also used for snake and reptile bites, **fever**, constipation, feverish intestinal diseases, liver ailments, achy joints (rheumatism), fluid retention (edema), epilepsy, and as a tonic for general debilities. One of the chemicals in **Indian snakeroot** is the **same** as a prescription drug called reserpine.

Answers no. 56 to 65 (8 marks each)

A56. **Morphological system of drug classification:** In this system the drugs are arranged according to the morphological or external characters of the plant parts i.e. which plant part is used as a drug, e.g. leaves, roots, stems, etc.

The drugs which obtained from the dried parts of the plants & containing cellular tissues are called as (**Organized Drugs**) e.g. Rhizomes , barks , leaves , fruits , entire plants , hairs ,& fibers.

The drugs which are prepared from plants by some intermediate physical processes such as (incision , drying or extraction with a solvent and not containing any cellular plant tissues are called as (**unorganized drugs**) such as Aloe juice , opium latex , agar , gambir , gelatin , tragacanth , benzoin , honey , beeswax , lemon grass oil etc.

Organized Drugs:

Woods – Quassia , Sandalwood , Red Sandalwood .

Leaves – Digitalis, Eucalyptus, Mint, Senna, Spearmint, Squill, Coca, Hyoscyamus, Belladonna, Tea.

Barks – Cinnamon.

Advantages: Morphology of the plant is known.

The drugs are classified into organized and unorganized drugs.

Disadvantages: No information about the chemical nature of drug.

No information about the pharmacological use of the drug.

Chemical classification: The crude drugs are divided into different groups according to the chemical nature of their most important constituent. Since the pharmacological activity and therapeutic significance of crude drugs are based on the nature of their chemical constituents. The chemical classification of drugs is dependent upon the grouping of drugs with identical constituents. Types of the chemical constituents:

A-Primary metabolites

1- Carbohydrates – Carbohydrates are polyhydroxy aldehydes or ketones containing an unbroken chain of carbon atoms.

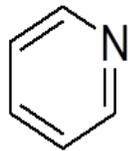
- Gums - *Acacia* , *Tragacanth*
- Mucilages – Plantago seed.
- Others - Starch, Honey, Agar, Pectin, Cotton.

2- Protein – and amino acid e.g. Gelatin.

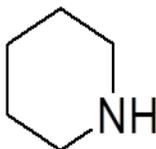
B- Secondary metabolites

- 1- **Glycosides:** are compounds which upon hydrolysis give rise to one or more sugar part (glycone) and non – sugar part (aglycone).
 - Anthraquinone Glycosides – Aloe , Cascara , Rhubarb , Senna
 - Saponins Glycosides –Quillaia , Glycyrrhiza.
 - Cyanophore Glycosides – Wild cherry bark.
 - Isothiocyanate Glycosides – Mustard.
 - Cardiac Glycosides – Digitalis, Strophanthus.
 - Bitter Glycosides – Gentian , Calumba , Quassia.

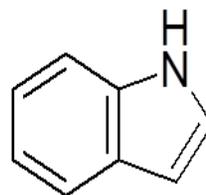
- 2- **Tannins:** are complex organic, non – nitrogenous derivatives of polyhydroxy benzoic acids.
Ex: Pale catechu, Black catechu, Ashoka bark, Galls and Amla.
- 3- **Volatile Oils** – Monoterpenes & Sesquiterpenes obtained from plants. Ex: Cinnamon , Fennel , Dill , Caraway , Coriander , Cardamom , Orange peel , Mint , Clove , Valerian .
- 4- **Lipids**
 - Fixed oils – Castor, Olive, Almond, Shark liver oil.
 - Fats – Theobroma, Lanolin.
 - Waxes – Beeswax.
- 5- **Resins** – Complex mixture of compounds like resinols , resin acids , resinotannols , resenes .
.Ex : Colophony , Podophyllum, Cannabis, Capsicum, Turmeric, Balsam of Tolu and Peru , Myrrh , Ginger .
- 6- **Alkaloids** – Nitrogenous substance of plant origin
 - Pyridine and Piperidine – Lobelia, Nicotiana.
 - Tropane – Coca , Belladonna , Datura, Stramonium , Hyoscyamus , Henbane.
 - Quinoline - Cinchona
 - Isoquinoline – Opium, Ipecac, Calumba.
 - Indol – Ergot , Rauwolfia .
 - Amines – Ephedra
 - Purina – Tea, Coffee .



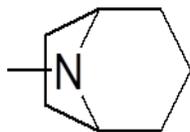
pyridine



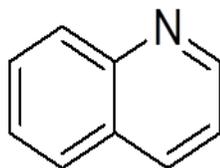
piperidine



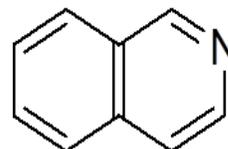
indole



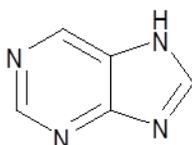
tropane



quinoline



isoquinoline



purine

7- **Vitamins** – riboflavin

8- **Protein-** gelatin, ficin, papain.

9- **Triterpines** –Colocynth.

A57. **Carminatives:** A **carminative**, also known as carminativum (plural carminativa), is an herb or preparation intended to either prevent formation of gas in the gastrointestinal tract or facilitate the expulsion of said gas, thereby combatting flatulence.

Herbal Carminatives:

Dill (*Anethum graveolens*)

Angelica (*Angelica archangelica*)

Caraway (*Carum carvi*)

Cinnamon (*Cinnamomum* spp.)

Cardamon (*Elettaria cardamomum*)

Fennel (*Foeniculum vulgare*)

Hops (*Humulus lupulus*)

Chamomile (*Matricaria recutita*)

Lemon balm (*Melissa officinalis*)

Cinnamon Cassia

- **Botanical Name :** Cinnamon Cassia
 - **Family Name :** Lauraceae
 - **Common Name :** False Cinnamon, Chinese Cassia, Cinnamomum Aromaticum, Rou Gui, Sthula Tvak, Taja
 - **Part Used :** Bark, Leaf, Leaves
 - **Habitat :** An evergreen tree originating in southern china, and widely cultivated there and elsewhere southern and eastern asia.
 - **Product offered :** Bark, Leaf, Oil, Leaves
-



Uses : Cassia is used in traditional Chinese or Indian medicine, where it is considered one of the 50 fundamental herbs. Cassia bark (both powdered and in whole, or "stick" form) is used as a flavouring agent for confectionery, desserts, pastries, and meat; it is specified in many curry recipes, where Ceylon cinnamon is less suitable. It is be used for erectile dysfunction (ED), hernia, bed-wetting, joint conditions, menopausal symptoms, menstrual problems, and to cause abortions. Bark oil have been used either as flavors or as carminative, stomachic, tonic, or counterirritants in pharmaceutical and cosmetic preparations, including liniments, suntan lotions, nasal sprays, mouthwashes or gargles, and toothpaste, among others.

Citrus Aurantium

- **Botanical Name :** Citrus Aurantium
 - **Family Name :** Rutaceae
 - **Common Name :** Bigarade Orange, Bitter Orange, Seville Orange (sweet), Portugal Orange, Citrus Dulcis.
 - **Part Used :** Fruit, Flowers, Peel
 - **Habitat :** Cultivated throughout india.
 - **Product offered :** Flower, Peel
-



Uses : Bitter orange is antiseptic, anti-oxidant, antispasmodic, aromatic, astringent, carminative, digestive, sedative, stimulant, stomachic and tonic. It is rich in Vitamin C, flavonoids and volatile oil. It is appetite suppressant, metabolism and energy booster. Tea prepared from fruit is used to relieve headache. Fruit is used in constipation, dyspepsia and indigestion. Fruit peel powder is used in face pack against sunstroke and skin blemishes. It is also used to dissolve kidney stones. It purifies blood and improves immunity. The seed and the pericarp are used in the treatment of anorexia, chest pains, colds, coughs etc. "Bitter orange oil", expressed from the peel, is in demand for flavoring candy, ice cream, baked goods, gelatins and puddings, chewing gum, soft drinks, liqueurs and pharmaceutical products.

A58. Ashwagandha

- **Botanical Name :** Withania Somnifera
- **Family Name :** Solanaceae
- **Common Name :** Withania, Winter Cherry, Indian Winter Cherry, Indian Ginseng, Ashwagandha
- **Part Used :** Roots, Leaves
- **Habitat :** Cultivated throughout drier parts of india.
- **Product offered :** Roots

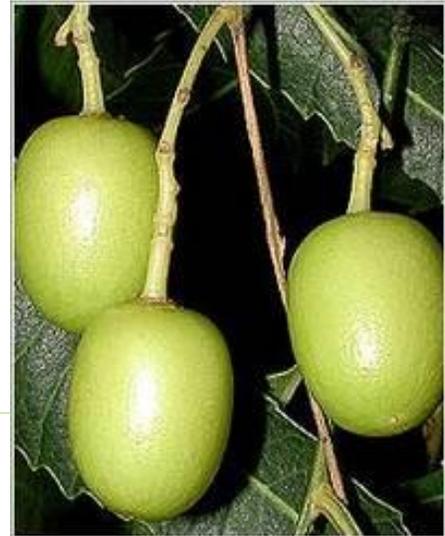


Uses : Ashwagandha is tonic, abortifacient, astringent, deobstruent, nervine, and . It is official Indian Pharmacoepeia and is popularly known as Indian Ginseng. It gives vitality and vigour and helps in building greater endurance. Ashwagandha has been used in diseases such as rheumatism, leprosy and arthritis. Used to treat general debility, arthritis, depression, chronic fatigue, insomnia, anxiety, depressed immunity, infertility and memory loss. It increases the iron content in the blood.

A59. Antidiabetic drugs: Antidiabetic herbs helps in control or reduction of high levels of glucose in the blood in case of diabetes mellitus. There are different types of diabetes herbs, and their use depends on the nature of the diabetes, age and situation of the person, as well as other factors.

Azadirachta Indica

- **Botanical Name :** Azadirachta Indica
- **Certifications :**
- **Family Name :** Meliaceae
- **Common Name :** Lilac, Margosa Tree, Neem, Neem Chal
- **Part Used :** Leaves, Flower, Oil, Seed.
- **Habitat :** It is evergreen and grows throughout india.
- **Product offered**
: Bark,Leaves,Seeds,Fruit,Oil,Flower,Stem



Uses : It acts as vermifuge, insecticide, astringent, tonic and antiseptic. It possess anti diabetic, anti bacterial and anti viral properties and used successfully in cases of stomach, worms and ulcers. Root barks possess astringent, tonic and antiperiodic properties. It is also useful in malarial fever. The oil is used in making neem-based soaps, shampoos and toothpaste. Leaves are used to cure chicken pox. It is also used in the treatment of acne and has blood purifying property.

Pterocarpus Marsupium

- **Botanical Name :** Pterocarpus Marsupium
- **Family Name :** Fabaceae



- **Common Name** : Indian Kino Tree, Malabar Kino Tree, Kino
 - **Part Used** : Heart Wood, Leaves, flowers.
 - **Habitat** : The drier, hilly zones of dry deciduous forest.
 - **Product offered** : Wood
-

Uses : The heartwood of pterocarpus marsupium is astringent, bitter acrid, anti-inflammatory, anthelmintic and anodyne. It is considered magical for diabetes. It turns the water blue as soon as it comes in contact with the water. It is good for elephantiasis, leucoderma, diarrhoea, dysentery, rectalgia, cough and greyness of hair. The bark is used as an astringent and in toothache. The bruised leaves are considered useful as an external application for boils, sores and skin diseases.

A60. **Vitamin:** are the nutrients which are required in small quantities for the growth and nutrition of the body. The common examples of vitamins are vitamin A, D, E, K.

Emblica Officinalis

- **Botanical Name** : Emblica Officinalis
 - **Certifications** :
 - **Family Name** : Euphorbiaceae
 - **Common Name** : Gooseberry, Phyllanthus Emblica, Emblica, Indian Gooseberry, Amla
 - **Part Used** : Fruit
 - **Habitat** : Northern and south western india.
 - **Product offered** : Fruits, Seeds
-



Uses : Emblica Officinalis or Amla is aperient, carminative, diuretic, aphrodisiac, laxative, astringent and refrigerant. It is the richest known source of vitamin 'C'. It is useful in anaemia, jaundice, dyspepsia, haemorrhage disorders, diabetes, asthma and bronchitis. It cures insomnia and is healthy for hair. It is considered as one of the most rejuvenating drugs, imparting a long healthy life and weight gain. It also acts as an antacid and antitumorigenic agent.

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metabolism and energy booster. Tea prepared from fruit is used to relieve headache. Fruit is used in constipation, dyspepsia and indigestion. Fruit peel powder is used in face pack against sunstroke and skin blemishes. It is also used to dissolve kidney stones. It purifies blood and improves immunity. The seed and the pericarp are used in the treatment of anorexia, chest pains, colds, coughs etc. "Bitter orange oil", expressed from the peel, is in demand for flavoring candy, ice cream, baked goods, gelatins and puddings, chewing gum, soft drinks, liqueurs and pharmaceutical products.

A61. Gelatin: Gelatin is a mixture of peptides and proteins produced by partial hydrolysis of collagen extracted from the skin, bones, and connective tissues of animals such as domesticated cattle, chicken, pigs, and fish. Gelatin is used for weight loss and for treating osteoarthritis, rheumatoid arthritis, and brittle bones (osteoporosis). Some people also use it for strengthening bones, joints, and fingernails. Gelatin is also used for improving hair quality and to shorten recovery after exercise and sports-related injury.

Lanolin: Lanolin is a greasy yellow substance made from secretions (sebum) from the skin glands of sheep to condition their wool. It is a natural, animal-derived product harvested from shorn wool. Unrefined lanolin has been used for thousands of years by various cultures, and refined lanolin has been used for more than a hundred of years in ointments.

Lanolin is a long-chain waxy ester that contains cholesterol, but with a different composition than human sebum. There are two common forms: lanolin and lanolin alcohol. The latter, the one that's more commonly used in skin care, adds a molecule to provide a smoother skin feel. Because of its high fat content, lanolin is occlusive, meaning it prevents the evaporation of water from the skin (transepidermal water loss). This keeps skin moisturized and helps the skin heal.

A62. Collection and Preparation of Opium: narcotic drug that is obtained from the unripe seedpods of the opium poppy (*Papaver somniferum*), a plant of the family Papaveraceae. (See poppy.) Opium is obtained by slightly incising the seed capsules of the poppy after the plant's flower petals have fallen. The slit seedpods exude a milky latex that coagulates and changes colour, turning into a gumlike brown mass upon exposure to air. This raw opium may be ground into a powder, sold as lumps, cakes, or bricks, or treated further to obtain derivatives such as morphine, codeine, and heroin. Opium and the drugs obtained from it are called opiates.

The groups of most pharmaceutical importance from the ones above are derived from first and second groups. Examples:

Morphine: Powerful reliever for chronic pain. It's toxic and addictive.

Codeine: Its effects are softer than morphine but is less addictive. It is used to reduce coughing.

Heroin: Semisynthetic derivative that produces analgesia similar to morphine. It is a highly addictive drug so its use is restricted to extreme situations under medical authorization.

Papaverine: Antispasmodic of the smooth muscle of the gastrointestinal, biliary and genitourinary tract.

Morphine and related opioids are **active ingredients** that should be used with extreme caution as they have various effects that can be analgesia, drowsiness, changes in mood, respiratory depression, decreased gastrointestinal motility, nausea, vomiting and alterations of the endocrine and nervous systems.

A63. History and scope of Pharmacognosy: History: The history of pharmacognosy is as old as human existence. To know the future one should know the past. The word 'drug' is derived from Latin term *Droog* means dried, when dried plants were commonly used as medicine. Broadly, history of pharmacognosy can be classified into three major stages. First stage before eighteenth century, very few documents and recorded evidences are available showing use of natural products by human. Second stage involves nineteenth century, which is the time when basic subject has evolved. In this century, the name pharmacognosy came into practice. Initially the subject was more likely to descriptive botany of medicinal plants. But as the time progress, it changes the course and encompasses extraction, isolation and other advances techniques. In twentieth century, which may be considered as third stage of development, series of discoveries resulted in complete metamorphosis of the subject. From last two decades, pharmacognosy is studied in more systematic manner. As herbal wave continue to sweep the world, importance of natural product is at the pinnacle. People are expecting natural products to fit in modern framework. As a result of this there are series of new herbal formulations in the market.

The ancient Egyptians documented their knowledge about medicine on paper made from *Cyperus aquaticus* commonly called aquatic sage or papyrus. *Papyrus Ebers* (around 1500 BC), *Berlin Papyrus*, *Edwin Smith Papyrus*, *Kahun Medicak Papyrus* are some of the oldest handbooks which contain information of illness and treatments. In ancient Egypt and Mesopotamia clay tablets were used to document knowledge of drugs which are dating back to 3000 BC. Ancient India, information about drugs was documented in several Ayurvedic texts which still exist. Apart from *Atharvaveda* there are several books like *Charak Samhita*, *Sushrut Samhita*, *Astang Hridaya*, *Madhav Nidan* and *Bhava Prakash*.

In eighteenth century, pharmacognosy was much closely related to botany. In old days, drugs from natural origin were used in crude form as powder or decoction. Later in nineteenth century, development in science has expanded arena of pharmacognosy. Now a day's pharmacognosy has become a kind of multidisciplinary subject which embraces phytochemistry, analytical pharmacognosy, pharmacotherapy, medicinal plant biotechnology, herbal formulations and nutraceuticals. **Zoopharmacognosy** is branch of pharmacognosy which involves observation of animal behavior for discovery and development of new drugs.

Scope: Pharmacognosy is critical in development of different disciplines of science. A pharmacognosist should possess a sound knowledge of the terms used to describe the vegetable and animal drugs as covered under botany and zoology, respectively. The knowledge of plant taxonomy, plant breeding, plant pathology and plant genetics is helpful in the development of cultivation technology for medicinal and aromatic plants. Plant - chemistry (phytochemistry) has undergone significant development in recent years as a distinct discipline. It is concerned with the enormous variety of substances that are synthesized and accumulated by plants and the structural elucidation of these substances. Extraction, isolation, purification and characterization

of phytochemicals from natural sources are important for advancement of medicine system. The knowledge of chemotaxonomy, biogenetic pathways for formation of medicinally active primary and secondary metabolites, plant tissue culture and other related fields is essential for complete understanding of Pharmacognosy. One should have the basic knowledge of biochemistry and chemical engineering is essential for development of collection, processing and storage technology of crude drugs.

1. Pharmacognosy is important branch of pharmacy which is playing key role in new drug discovery and development by using natural products. Pharmacognosy has given many leads for new drug discovery and development.
2. It is an important link between modern medicine systems (allopathy) and traditional system of medicine. It is part medicinal system which is affordable as well as accessible to common man. As part of integrative system of medicine, pharmacognosy can help to increase effectiveness of modern medicine system.
3. It is acting as bridge between pharmacology, medicinal chemistry and pharmacotherapeutics and also pharmaceuticals. It also bridges pharmaceuticals with other pharmacy subjects.
4. More than 60 percent of world population is still using natural product for their primary healthcare needs. Pharmacognosy can provide safe and effective drugs in combination with modern medicine system.
5. Pharmacognosy includes knowledge about safe use of herbal drugs including toxicity, side effects, drug interaction thereby increasing effectiveness of modern medicine.
6. Pharmacognosy is an important link between pharmacology and medicinal chemistry. As a result of rapid development of phytochemistry and pharmacological testing methods in recent years, new plant drugs are finding their way into medicine as purified phytochemicals, rather than in the form of traditional galenical preparations.
7. Pharmacognosy is the base for development of novel medicines. Most of the compounds obtained from natural product serve as prototype or base for development of new drug which are more active and less toxic.
8. By means of pharmacognosy, natural products can be dispensed, formulated and manufactured in dosage forms acceptable to modern system of medicine.
9. There are vast number of plant and animal species which are not studied systematically.
10. Development of pharmacognosy also leads to development of botany, taxonomy, plant biotechnology, plant genetics, plant pathology, pharmaceuticals, pharmacology, phytochemistry and other branches of science.

~~used~~ Natural medicines have been

A64. Ayurvedic System of medicines: Ayurveda is a classical system of healthcare originating from the Vedas documented around 5000 years ago and currently recognized and practiced in India and many countries of the Indian subcontinent. It is one of the oldest healthcare systems that take a holistic view of the physical, mental, spiritual and social aspects of human life, health and disease. Scattered references of health, disease and use of natural sources for treatment were initially made in the Vedas (particularly in Rigveda and Atharvaveda) and around 5000 to 3000 B.C. the knowledge of Ayurveda was first comprehensively documented in

the compendia called Charak Samhita and Sushruta Samhita. According to Ayurveda, health is considered as a basic pre-requisite for achieving the goals of life - Dharma (duties), Arth (finance), Kama (materialistic desires) and Moksha (salvation). As per the fundamental basis of Ayurveda, all objects and living bodies are composed of five basic elements, called the Pancha Mahabhootas, namely: Prithvi (earth), Jal (water), Agni (fire), Vayu (air) and Akash (ether). The philosophy of Ayurveda is based on the fundamental correlation between the universe and the man. Ayurveda imbibes the humeral theory of Tridosha- the Vata (ether + air), Pitta (fire) and Kapha (earth + water), which are considered as the three physiological entities in living beings responsible for all metabolic functions. The mental characters of human beings are attributable to Satva, Rajas and Tamas, which are the psychological properties of life collectively terms as 'Triguna'. Ayurveda aims to keep structural and functional entities in a state of equilibrium, which signifies good health (Swasthya). Any imbalance due to internal or external factors leads to disease and the treatment consists of restoring the equilibrium through various procedures, regimen, diet.

A65. **Cinchona:** Biological Source: Cinchona is obtained from the barks of Cinchona succirubra, Family- Rubiaceae.

Cultivation, Collection and Preparation

1. Cinchona requires acidic soil and sufficient soil for proper growth.
2. It also requires sufficient altitude.
3. Proper measures should be taken to avoid any disease in Cinchona. A disease named stripe cancer is quite common with this plant. It is caused due to a phytopathogenic fungus *Phytophthora cinnamomi*. The disease is characterized by the presence of necrotic stripes in the bark.

Macroscopic Characters

Stem-Bark: The quills are about 30 cm long and 2-6 mm thick. Lichen is present in huge quality on the outside surface. The taste of the stem bark is bitter and astringent.

Root-Bark: Root bark is found in twisted pieces. Length is about 3-6 cm and the inner surface is striated.

Microscopical Characters

1. Crystals of calcium oxalate are present in the cortex.
2. The phloem fibers are spindle shaped. However, the distribution of phloem fibres varies among the different species of Cinchona.
3. Starch grains are about 6-10 μ m diameter.

Chemical Constituents

The primary alkaloids in cinchona are quinine and quinidine. Moreover, cinchonidine and cinchonine are also present in good quantity. Again, the amount of alkaloids present differs from one variety to another.

Other constituents are quinic acid, cinchotannic acid and quinovin. Quinovin on hydrolysis gives quinoic acid and quinoside (isorhamnose).

Chemical Tests

1. Cinchona when heated in a test tube with glacial acetic acid results in blood red tubes on the side of the test tube.
2. After moistening cinchona bark with sulphuric acid, if the bark is obtained in UV light, it gives blue fluorescence.
3. Cinchona on treatment with bromine water and dilute ammonia solution gives emerald green color. This is also known as Thalleoquin test.

4. The drug when treated with silver nitrate solution gives white precipitate. It occurs due to presence of quinidine.

Uses

Cinchona has a number of uses and it can be used to treat a variety of diseases. Here are some of the uses:

1. Cinchona bark has antimalarial properties. It also used in fever to reduce the body temperature and as an analgesic.
2. The drug is also useful in cases related to cardiac problems like arrhythmia.
3. The drug is also used as an antiseptic and has been found to be useful in diseases like abscesses, cavities, and ulcers.
4. It is useful in dyspepsia and gastric catarrh.