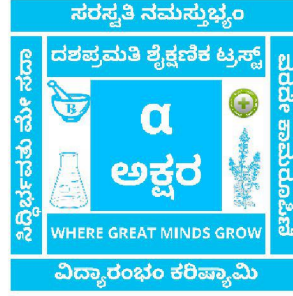


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PHARMACOLOGY

IMPORTANT QUESTIONS AND ANSWERS

CONTENTS:

- 1. DEFINATION, HISTORY AND SCOPE OF PHARMACOGNOSY**
- 2. CLASSIFICATION OF NATURAL DRUG**
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- 9. MICROSCOPY OF CRUDE DRUGS.**
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- 11. MORPHOLOGY OF CRUDE DRUGS**

PHARMACOGNOSY AT A GLANCE

Give Example for the following Parts

Seed	: Linseed, Isphagula, Castor oil, Nuxvomica, Nutmeg,
Leaves	: Seena, Digitalis, Vasaca, Vinca.
Barks	: Cinchona, Cinnamon, Arjuna Bark.
Roots	: Rauwolfia, Ipecac, Aconite.
Rhizomes	: Termeric, Ginger
Flowers	: Pyrethrum
Flower Bud	: Clove
Fruits	: Coriander, Fennel
Dried Latex	: Opium, Papain
Dried Juice	: Aloes
Dried Gum	: Acacia, Tragacanth
Dried Extract	: Catechu, Agar, Gelatin
Fungus	: Ergot
Animals Drug	: Bees Wax, Gelatin.

Give Example for the following families

Apocyanaceae	: Rauwolfia, Vinca
Rubiaceae	: Cinchona bark, Ipecac
Rutiaceae	: Lemonpale, Orange pale, Catechu.
Leguminosae	: Acacia, Tragacanth, Black Catechu
Lauraceae	: Cinnamon bark

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Acanthaceae	: Vasaka
Solanaceae	: Belladonna
Umbelliferae	: Fennel, Coriander
Myrtaceae	: Clove
Meliaceae	: Neem
Compositae	: Clove
Combretaceae	: Arjuna Bark
Loganiaceae	: Nuxvomica
Euphorbiaceae	: Castor oil, Amla
Liliaceae	: Aloe
Zingiberaceae	: Zinger, Turmeric

Name the Drugs Which Contain the Following Chemical Constituents

1. Emetin	: Ipecac
2. Sennoside A,B,C,D	: Senna
3. Anethol, Fenchone	: Fennel
4. Atropine	: Belladonna
5. Cocaine	: Opium
6. Eugenol	: Clove
7. Catechin	: Black Catechu
8. Reserpine	: Rauwolfia
9. Ferulic Acid	: Asafoetida
10. Invert Sugar	: Honey
11. Myristicin	: Nutmeg
12. Papain	: Papaya

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13. Curcumin	: Termeric
14. Vitamin A	: Shark Liver Oil
15. Vitamin C	: Amla
16. Myrisyl Palmitate	: Bees Wax
17. Vascicine	: Vasaka
18. Recinolic acid	: Castor Oil
19. Vincristine, Vinblastine	: Vinca
20. Digitoxin	: Digitalis
21. Strychnine, Brucine	: Nuxvomica
22. Quinine	: Cinchona
23. Bassoron	: Tragacanth
24. Arabin	: Acacia
25. Agarose	: Agar
26. Picroside, Kutcosida	: Pierorrhiza

Name the Drugs which possess the following actions

1. Laxative	: Ex. Aloes, Castor oil, Ispaghula, Senna
2. Cardio tonic	: Ex. Digitalis, Arjuna Bark
3. Carminatives	: Ex. Fennel, Coriander, Cardamom, Ginger
4. Astringent	: Ex. Pale Catechu, Black Catechu
5. Anti-Hypertensive	: Ex. Rauwolfia
6. Anti-tussives	: Ex. Vasaka, Tulsi
7. Anti-Rheumatic	: Ex. Guggul, Colchicum
8. Anti-leprotic	: Ex. Chaulmoogra Oil
9. Anti-Diabetic	: Ex. Pterocarpus, Gymnera

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10. Anti-Cancer : Ex. Vinca
11. Di-Uretics : Ex. Gokhru, Punarnava
12. Anti-dysentery : Ex. Ipecac
13. Anti-septic : Ex. Benzoin, Ncem, and Myrrh, Turmeric
14. Anti-Malarial : Ex. Cinchona Bark
15. Oxytocic : Ex. Ergot
16. Anti-asthma : Ex. Ephedra
17. Anti-Spasmodic : Ex. Belladonna
18. Insecticide : Ex. Pyrethrum
19. Sedative : Ex. Aswagandha, Cannabis
20. Anti-Hypertensive : Ex. Aswagandha

CHAPTER-1

DEFINITION, HISTORY AND SCOPE OF PHARMACOGNOSY

Q1. Define the following

- a) Pharmacognosy
- b) Crude Drug
- c) Organised Drugs
- d) Un-Organised Drugs

a) Pharmacognosy: It is the study of crude drugs obtained from plants, animals and minerals and their constituents.

b) Crude Drug: An agent which alters or changes the biological phenomenon & obtained from plant, animal & mineral sources.

Plant Sources

Ex: Seena, Clove, Fennel

Animal Sources

Ex: Shark liver oil, Bee Wax, Wool, Silk

Mineral Sources

Ex: Bentonite, Chalk, Kaolin.

c) Organized drug: Drugs which have cellular structure & identified by morphological and microscopical characters.

Ex: Seena, Ginger, Coriander

d) Un-Organised drugs: Un-organised drugs are derived from parts of plants or animal by some process of extraction and followed by purification, if necessary.

Ex: Juices, Resins.

Q.2. How Organized drugs differ from un-Organised drugs.

Organised drugs	Un-Organised Drugs
1. These are the organs of plants or animals.	1. These are derived from parts of plant or animal.
2. These are solid in nature. Ex: Bark, Roots, Stem, Fruits.	2. These are solid, semisolid or liquid in nature. Ex: Oils & Balsams
3. They have well defined morphological characters.	3. They do not have definite morphological characters.
4. These have cellular structures.	4. Do not have cellular structures.
5. It is identified by morphological characters. Ex Rauwolfia, Ginger, Turmeric.	5. It is identified by Chemical test & Physical standards. Ex. Acacia, Agar, Tragacanth, Benzoin, Starch.

Q.1 Write a note on history and Scope of Pharmacognosy.

Answer: In Indian, the knowledge of medicinal plants were describe in the **Rig-Veda** and **arthaveda** from which **ayurveda** was developed, the ancient book like **charka samhita** and **sushruth samhita** gives information of drugs used as a Medicine.

Greek scientist like **Hippocrates** and **Aristotle** contributed a great deal. Aristotle wrote about the animal kingdom and **Theophrastus** wrote about the plant kingdom. In Egypt people were familiar with use of plant and animal drugs.

Discorides described medicinal plants; in 1815. **Sydler** introduced the name **Pharmacognosy**, the word Pharmacognosy is derived from two Greek words. Words **Pharmakon**, (Drugs) and **Gignosco**, (to acquire Knowledge)

Pharmacognosy further developed due to the following four events.

1. Isolation of Penicillin is 1928 by Fleming.
2. Isolation of Reserpine from Rauowollia and its use as Anti – Hypertensive drug.
3. Isolation of Vinca alkaloids.
4. Isolation of steroidal hormones.

SCOPE OF PHARMACOGNOSY:

1. Pharmacognosy helps in the detailed study of drug obtained from Plant, animal or mineral source.
2. It helps in finding out the botanical source and family i.e. origin.
3. The method of cultivation gives as knowledge about the type of soil, Climatic condition and altitude required for the plants.
4. It also gives us information about Chemical Constituents and their Uses.
5. The drug can be evaluated to find out their quality and purity.
6. Adulterants and substituents if any can be found out.

CHAPTER: 2

NATURAL CLASSIFICATION OF CRUDE DRUGS

Q1: Describe Illustrate and discuss advantages and disadvantages of various systems of Classification of crude drugs?

Answer. The various system of classification is:

1. Alphabetical Classification
2. Taxonomical Classification
3. Morphological Classification
4. Pharmacological Classification
5. Chemical Classification
6. Chemo taxonomical Classification

1. Alphabetical Classification: The drugs are arranged according to alphabetical order of the names in any particular language. This is the simplest form of classification. This is adapted in the I.P, B.P.

Disadvantages:

1. It does not provide any information about the scientific nature of the drugs.
2. It does not help in distinguishing the drug if plant, mineral or animal source.
3. It can't be known whether it is Organised or unorganized.

2. Taxonomical Classification: It is the biological classification of crude drugs. Here the drug are arranged according to the plants from which they are derived i.e. Phylum, Orders, Families, Genus & Species.

For Example:

Phylum	: Spermatophyte
Division	: Angiosperm
Class	: Dicot
Orders	: Rosales
Family	: Leguminosaea
Genus	: Glycyrrhizin, Astragalus
Species	: G.Glabra, A. Gummiifer

Animal drugs are classified as Fish, Arthropods, mammals etc.

Advantage: It is classified based on botanical Characters.

Disadvantage: The parts of the plants cannot be identified botanically as they may have been subjected to various processes.

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3. Morphological Classification: The crude drugs are classified based on the part of the plants like leaves, fruits, flower, woods bark, Extracts gums etc.

Parts of the Plant	Drugs
Wood	Quassia
Barks	Cinchona
Flower bud	Clove
Seeds	Nuxvomica
Entire Plant	Ephedra
Gum	Acacia
Latex	Opium

Advantages:

1. It is very useful in identifying the adulteration
2. Crude drugs from plants can be easily identified

Disadvantages:

1. It does not reflect on chemical composition of the drug

4. Pharmacological Classification: The crude drugs are classified according to the pharmacological action of their chief constituents. The drugs with similar action are put together.**Example:**

Carminatives	: Coriander, Caraway
Purgatives	: Senna, Rhubarb, Aloes
Cardio tonics	: Digitalis, Squill.
Anthelmentic	: Male fern and Quassia

Advantages: If the Contents of the Crude drugs are not known, they can be classified properly on the basics of therapeutics of pharmacological properties.

Disadvantages:

1. The main disadvantage is that a drug can be placed in various classes according to its therapeutics use. Ex: cinchona can be grouped in anti-malarial and anti-arrhythmic.
2. Drug having different action but therapeutic is same are put together. Ex: Bulk purgative, irritant purgative.

5. Chemical Classification: The method is applicable to the crude drugs containing similar types of chemicals (or) the drugs are classified according to the chemical constituents present in the drugs.

Example:

1. Alkaloids	:Aconite, Cinchona, Belladonna
2. Glycosides	: Digitalis, Senna, Squill
3. Carbohydrates	: Agar, honey, Starch
4. Volatile Oil	: Clove, Eucalyptus
5. Tannins	: Catechu

Advantages: The drugs from animal and plant source if they possess similar type of constituents are placed together.

Disadvantages: This type of classification makes no proper placement of drugs containing two different types of chemical constituents.

CHAPTER -3

PHARMACEUTICALS AIDS

Q1. Define Pharmaceutical AIDS and classify with example

Answer: The substances which are little or no therapeutic value, but are essentially used in manufacture or compounding of various pharmaceutical substances.

Classification: These are classified into the following:

- a) Emulsifying agents : Acacia, Tragacanth
- b) Sweetening Agents : Honey
- c) Colouring Agents : Turmeric
- d) Disintegrating Agents : Starch
- e) Flavoring Agents : Orange
- f) Ointment base : Bees Wax, Lanolin
- h) Lubricants : Talcum
- i) Diluents : Cinnamon Water

Q.2 Write the differences between fixed oils and Volatile Oils

S.No	FIXED OIL	VOLATILE OILS
1.	They do not evaporate at room temperature	They evaporate at room temperature
2	These are obtained from seed	These are obtained from different parts of the plant
3.	These are obtained by Expression of seed	These are obtained by distillation method
4.	These have characteristic odour	These have sweet odour
5.	These are insoluble in water	These are slightly soluble in water
6.	These are glycosides of ester of fatty acids	These contain terpenes
7.	These produce an greasy spot on paper	These do not produce greasy spot on paper
8.	They can be saponified with alkalis	These cannot be saponified with alkalis
9.	Physiologically, they are emollients & demulcents. Ex: Castor oil, arachis oil	These are used as carminatives & flavoring agents.Ex. Clove, Fennel.

Q.3 Write a note on Umbelliferous fruits?

Answer:

- a) These are fruits belonging to the family of Umbelliferae.
- b) The Umbelliferous fruits are **shizocarpous**.
- c) They are usually **cremocarp** which are a sub division of **schizocarps**.
- d) The topmost part of the cremocarp is called **stylopod**.
- e) In cremocarp, the fruit is divided into two **mericarps**.
- f) The lower part of the fruit is known as **pedicel**.
- g) The two mericarps of the cremocarap may be joined together by a stalk called **carpophore**.
- h) The mericarp has two surfaces. They are:

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1. **Dorsal surface**

2. **Commissural surface**

- j) These have two ridges. They are primary ridges & secondary ridges.
- h) The vascular bundles are present below the primary ridges.
- i) The **vittae** are present below the secondary ridges.
- j) The vittae secrete the volatile oils.
- k) **Mericarp** contains endosperm and the endosperm contains **embryo**.
- l) The **embryo** contains fixed oils and proteins.
- m) The **Umbelliferous** fruits are used as flavoring agents and carminatives.
Ex: Fennel, Dill, Caraway & Coriander

Q.4 what are gums? Write the differences between gums & mucilage.

Gums: Gums are abnormal products of plants. They are transparent substance.
They contain poly-urinoïdes combined with Ca, K, & Mg.

S.No.	Gums	Mucilage
1	They are abnormal products.	They are normal products.
2	They are plant exudates.	They are not exudates.
3	They are produced due to injury.	They are produced normally.
4	They are produced on the surface of the stem.	They are produced inside the plant.
5	Chemically they are mixture of amino-biomic acid Ex- Acacia, Tragacanth	They are mixture of monosaccharide and Galacto-uronic acid. Ex- Agar, Ispaghula

Q. 5 Define Glycon & aglycon

Glycon: They are the sugar portion. Glycon enhances the solubility of aglycon.

Aglycon: They are non-sugar portion. The therapeutic action of drugs due to the presence of aglycon.

CHAPTER-4

ADULTERATION AND EVALUATION OF CRUDE DRUGS

Q.1 Define and classify different methods of Adulteration?

Adulteration is a practice of substituting original crude drug partially or wholly with other similar looking substance.

Reasons

1. Scarcity
2. High price of drug

Method of adulteration of Drugs:

The different type of adulterants found in market is given below:

a) Substitution with substandard commercial varieties:

The adulterants used here may resemble original crude drug by morphological, chemical or therapeutic characters but are substandard in nature and cheaper in cost. This is a most common practice of adulteration.

Ex: - i) Nux-vomica or strychnos nux-vomica are adulterated with strychnos nux-blanda.
ii) Senna is adulterated with Arabian dog Senna

b) Substitution of exhausted drugs:

The drugs are exhausted for their active constituents and reuse genuine drugs. This practice is more common in case of volatile oils.

Ex:- Fennel, coriander, caraway, dill & clove.

c) Substitution with artificially manufactures substances:

In this type of adulteration substances are artificially prepared which resembles original. Drug is used as substitutes. Generally, this practice is used for much costlier drugs.

Ex. Artificial invert sugar mixed with honey.

d) Presence of vegetative Matter from the same plant:

In this type, other part of the same plant growing along with medicinal plant are mixed with drug due to their resembling Colour, odour and some cases constituents

Ex. Cloves are mixed with clove stalks.

Caraway and fennel fruits are mixed with other parts of the florescence

The stem portions are mixed along with leaf drugs like Senna.

e) Adding of synthetic chemicals:

In this type the synthetic chemical which constitutes one of the chemical constituents of the drug are added to the genuine drug.

Ex: Benzyl benzoate to balsam-of-Peru.

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f) Harmful adulteration:

Several times wastage from the market are collected and admixed with drugs. This is observed in case of unorganized drugs.

Example:- The pieces of amber colored glass in eolophony, Lime stones in asafoetida.

g) Adulteration of powders

In some cases, the powder form of the drugs are frequently, found to be adulterated.

Example:-

- * Dextrin in ipecac
- * Exhausted ginger powder in powdered ginger
- * Red sandal wood in capsicum

EVALUATION OF CRUDE DRUGS

Q.2 Define evaluation and classify with example?

Definition:- Evaluation means the determining of identify purity and quality or activity of the drugs.

Identity, means exact name source etc.

Purity refers to absence of foreign material, moisture etc.

Quality means concentration of the active constituents.

I. MORPHOLOGICAL EVALUTION /ORGANOLAPTIC EVALUTION

- a) **Colour:** Leaves or herbs like lobelia should be green in Colour. If they are dried in shade, they are green but if dried in sunlight they get bleached or pale in colour.
- b) **Smell:** Some drugs have characteritic smell which helps in their identification. Leaves of different species of mentha can be identified by smells. Cantheroids have a ammonia like smeli, deteriorated clove and exhausted clove are distinguished by smell.
- c) **Taste:** Glycyrrhiza can be determined by sweet taste, capsicum and ginger can be identified by pungent taste, catechu determined by astringent taste. Cinchona, Nux-vomica, picrorrhiza is determined by bitter taste.
- d) **Shape:** Nuxvomica consists of disc shape, cinnamon bark consists of compound quill shape, Aconite having funnel shape (conical shape).
- e) **Fracture:** Glycyrrhiza having fibrous fracture, the fracture of nux-vomica is hollow, the fracture of nutmeg is oily, the fracture of ipecac is brittle.

II. PHYSICAL EVALUTION

Physical standards are to be determined for drugs whenever possible.

They are rarely constant for crude drugs but may help in evaluation of crude drugs. They are:

- a. **Moisture content**
- b. **Swelling factor**
- c. **Melting point**

- d. Solubility
- e. Optical rotation
- f. Reflect index
- g. Ash value
- h. Extractive value

a) **Moisture content:-** It is determined by the following methods
 Drying heating at 105°C to a constant weight in an oven
 Example:- Digitalis ----- not more than 5%
 Ergot ----- not more than 8%

b) **Sewlling factor:-** Example, Mucilage containing drugs like Agar.

d) **Melting point:-**This method is helpful in finding out the purity of the drugs.

Example:-	<u>Drug</u>	<u>Melting Point</u>
	Bees Wax	62- 65oc
	Colophony	75 -85oc

d) **Solubility:-** The presence of adulterant in the drug should be determined by solubility.

Example:-

Colophony is soluble in light petroleum.
 Castor oil is soluble in alcohol.
 Asafoetida is soluble in carbon di-sulphate.

e) **Optical rotation:-** Optical rotation is determined at 25% using sodium lamp as sources of light.

Example: -	<u>Drug</u>	<u>Optical Rotation</u>
	Caraway	---- 75 to 80
	Honey	---- 3 to 15

f) **Reflect index:-**This method is used to determine the purity of the volatile oils and fixed oils.

Example:-	<u>Drug</u>	<u>Refractive index</u>
	Caraway oil-	--- 1.4838 to 1.4858
	Clove oil	--- 1.527 to 1.535

g) **Ash value:-**These helps in finding out the care taken during collection & preparation of the drugs.

Total ash-It is the organic ash obtained by incineration of the drug and it consists of carbonates, silicates, Phosphate & Silica.

Acid insoluble ash-It is the part of total ash which is insoluble in dilute hcl. Adhering matter & sand is determined by acid insoluble ash.

Example:-	<u>Drug</u>	<u>Total Ash</u>	<u>Acid Insoluble ash</u>
	Ginger	---- 6.0%	--- 1.7%
	Clove	---- 7%	--- 0.75%

h) **Extractive value:-** It is divided into two parts:
 i)Water soluble Extractive
 ii)Water insoluble Extractives.

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- i) Water soluble Extractive:** This method is applied to drugs which contain water soluble active chemical constituents such as tannins, Carbohydrates & glycosides.
- ii) Alcohol soluble Extractives:** Alcohol is an ideal solvent for extraction of various chemicals.
Ex. Alcohol, Resins, Tannins.

III. CHEMICAL EVALUTION:

In this chemical evaluation the drugs are evaluated methods and chemical tests. The following are various methods of chemical evaluation:

- a) Instrumental Methods.
- b) Chemical Constants.
- c) Individual Chemical Tests.
- d) Instrumental Methods
- f) Colorimetry for alkaloids of Solanaceae.
- g) Fluorimetry for quinine and reserpine.
- h) Spectrophotometry for Lobline and strychnine.

Chemical Constants: Acid Value, Iodine value and ester value are used for the identification of fixed oils and fats.

Individual Chemical Tests: The individual chemical test given below:

- i) Ergot alkaloid can be determined by Para dimethyl amino-benzaldehyde reagent → Produces blue Colour.
- ii) Gums are identified by solution of lead acetate or lead sub acetate solution → White precipitate
- iii) Anthracene glycoside are determined by modified Borntragers test → Pink color
- iv) Carbohydrates are identified by reducing Sugar test → Red precipitate
- v) Asafetida treated with H₂SO₄ → Red color.
- vi) Agar treated with ruthenium red → Pink color
- vii) Solution of Gelatin treated with picric acid → Yellow color.

IV. MICROSCOPIC EVALUATION

If the drug is broken or even in the powdered form, they can be identified by microscopic evaluation. Microscopic evaluation can be classified further as:

- a) Histological Examination.
- b) Microscopic Linear measurements
- c) Quantitative Microscopy

a) Histological Examination: It involves in the examination of presence and also arrangement of cells and tissues.

Example:- Leaves may show stomata and trichomes, Barks show phloem elements, Woods show xylem elements, Seeds show aleurone grains.

- b) Microscopic Linear measurements:** This involves measurements of sizes such as
- i) Diameter of starch grains.
 - ii) Length of stomata in leaves
 - iii) Diameters of phloem fibers

These measurements are also helpful in identification.

iii) **Quantitative Microscopy:** This involves the determination of microscopic constants such as: a) Vein islet number

- b) Palisade ratio
- c) Stomata index

a) **Vein islet number:** It is the number of vein islet present /square mm of leaf surface. It is the constant for a given species of the plant. It is usually does not with age-of plant and is independent of the size of the leaf.

<u>Drug</u>	<u>vein islet number</u>
Cassia Angustifolia	19 - 23
Digitalis purpurea	2 - 5.5

b) **Palisade ratio:** It is the average number of palisade cells beneath one epidermal cell Using 4 epidermal cells continuously for the count.

<u>Drug</u>	<u>Palisade ratio</u>
- Digitalis purpurea	3.7- 4.2
Atropa belladonna	6 -10

c) **Stomatal index:** It is the percentage which the number of stomata from the total number of epidermal cells. Each stomata being counted as one cell. It can be calculated by The following formula

$$SI = \frac{S \times 100}{E S}$$

Where as:

SI = Stomata index

S = Number of stomata/unit area,

E = Epidermal cells in the same area.

<u>DRUG</u>	<u>STOMATAL INDEX</u>
Atropa belladonna	20.2 -- 23
Indian Senna	17 -- 20

V. BIOLOGICAL EVALUATION

In this method of evaluation the drugs are assayed by their pharmacological effects on living organisms like living cell, tissue, organ, bacteria fungi and living animal. This method is applied when the evaluation cannot be done by physical and chemical evaluation. This assay are also called bio-assay or biological assay Because living organisms are used. The activity of drug used in represented in Units know as international units (I.U)

Example:- a)Anthelmintic drugs like male fern are bio-assay on earth worms.

b) Cardiotoxic drugs like digitalis and stopanthus are bioassay on heart of the frog

c) Atropine is bio-assayed on eye of rabbit.

d) Ergot is bio-assayed by on uterus of pregnant Rat.

CHAPTER-5

SUTURES AND LIGATURES

Q.1 What are suture and Ligatures? Mention the difference between absorbable and non- absorbable sutures with examples.

Sutures is a string or fiber, which is used for sewing or stitching tissues like skin, muscle and tendon with the help of a needle.

Ligature is also a suture but it is used without a needle for tying injured blood vessels to prevent bleeding.

Absorbable Sutures: These are absorbed and digested in the tissues of the body.

Example: Surgical Sutures, Kangaroo tendon.

Non- absorbable Sutures: They are not absorbed and remain as such in the body as implants.

Example: Silk, Cotton, Nylon.

Q.2 Write Preparation and Sterilization of Catgut.

- Surgical catgut is a strand or fiber prepared from intestine of sheep.
- Healthy animal is selected and slaughtered.
- The intestine is removed from the sheep and cleaned.
- The intestine of sheep consists of four layers. They are **Serosa Layer, Muscular Layer, Sub Mucous Layer, Mucous Layer**
- About first 7.5 meters of intestine is selected for catgut preparation.
- The Surgical catgut is prepared from the sub-mucous membrane of the Intestine.
- The innermost layer and the outmost layers of intestine are separated out With the help of scraping.
- During scraping cells are present in sub mucous membrane are arranged regularly and have the property of tensile strength.
- Then it is split lengthwise in 2-3 ribbons. These ribbons have smooth and enough surface.
- Smooth surface ribbons are selected for preparation catgut.
- Take 2-6 ribbons are spun under tension which increases the mechanical Strength.
- The ribbons are hardened by soaking in the solution of chromium solution and dried.
- The hardness of the catgut is depended upon the soaking time of catgut.
- The hardening process done to delay the time of absorption catgut in body fluids.
- The dried ribbons are then polished with the help of abrasive surface to obtain smooth surface.
- The polishes catgut is gauged for its diameter.
- Then the catgut is sterilized and packed.

Sterilization of catgut

The sterilization of catgut is done by three methods.

They are:

1. Heat sterilization
2. Chemical sterilization
3. Sterilization by radiation

1. Heat sterilization: - Catgut contains 12-25 percent moisture. Heating above 80°C will cause hydrolysis and gelatin will be formed, so boilable and non-boilable methods are used.

Boilable Method: In this method, catgut is placed in glass tube and tubes are filled with anhydrous high boiling liquids like toluene or xylene and heated. The tubes are sterilized by autoclave. This method requires high temperature.

Non-boiling Method: In non-boiling method, the catgut is contained in a foil or plastic packet and immersed in a liquid usually alcohol. Temperature should not be high.

2. Chemical sterilization: Chemical sterilization is done by organic and in-organic compounds, which are used as antiseptics, disinfectants or bactericides which kill micro-organisms.

Example - formaldehyde, Hydrogen peroxide, Iodine and ethylene oxide.

Formaldehyde hardens the catgut. Therefore the absorption of in the body is delayed and its tensile strength is reduced. Hydrogen peroxide gives poor quality. Ethylene oxide is employed as a sterilizing agent in gaseous form or in solution.

3. Sterilization by radiation:- The catgut is sterilization by radiation method. In this method r-ray obtained from cobalt is used as sterilizing agent.

Sterilization of catgut

The sterilization of catgut is done by three methods.

They are:

1. Heat sterilization
2. Chemical sterilization
3. Sterilization by radiation

1. Heat sterilization: - Catgut contains 12-25 present moisture. Heating above 80o C will cause hydrolysis and gelatin will be formed, so boilable and non-boilable methods are used.

Boilable Method: In this method, catgut is placed in glass tube and tubes are filled with anhydrous high boiling liquids like toluene or xylene and heated. The tubes are sterilized by autoclave. This method requires high temperature.

Non-boiling Method: In non-boiling method, the catgut is contained in a foil or plastic packet and immersed in a liquid usually alcohol. Temperature should not be high.

2. Chemical sterilization: Chemical sterilization is done by organic and in-organic compounds, which are used as antiseptics, disinfectants or bactericides which kill micro-organisms.

Example - formaldehyde, Hydrogen peroxide, Iodine and ethylene oxide.

Formaldehyde hardens the catgut. Therefore the absorption of in the body is delayed and its tensile strength is reduced. Hydrogen peroxide gives poor quality. Ethylene oxide is employed as a sterilizing agent in gaseous form or in solution.

3. Sterilization by radiation:- The catgut is sterilization by radiation method. In this method r-ray obtained from cobalt is used as sterilizing agent.

CHAPTER – 6

SURGICAL FIBRES

Q.1 Define Surgical fibers and classify with examples

The fibers are elongated thick walled cell with pointed ends, cell walls of which consist of cellulose and may not contain lignin.

Classification: - Fibers obtained from various sources can be categorized as follows:

Plants Fibers: For Ex. Cotton jute

Animal fibers: For Ex. Silk, wool

Mineral fibers: For Ex. Glass, asbestos

Synthetic fibers: For Ex .Nylone, Terylene

Regenerated fibers: For Ex. Viscose rayons, Acetate rayons

Q.2 What are re-generated fibers? Explain with example.

Regenerated fibers are produced by isolating controlling & modifying the naturally occurring long chain molecules. For Ex. Viscose rayon nylon.

Viscose Rayon: It is prepared from the rayon in the coniferous wood of spruce trees. They are white lustrous, solid & transparent. They are used for surgical dressings. The terin rayon is used for fibers derived from cellulose.

Nylon: It is a synthetic poly-amide obtained by the condensation of acidic and hexa methylene di-amine. It is available as mono filaments in varying sizes. They are used for making filter media which is resistant to abrasion, alkali, bacteria and fungi.

Terylene: It is a polyester fiber which is a poly condensation product of ethylene glycon and Terpthalic acid.

Q.3 Write a note on preparation of absorbent cotton.

It is commonly grown for the purpose of fibers in the tropical countries. The plant after flowering bears fruits known as capsules. The fruits are 3 to 5 celled. Each capsule contains numerous seeds. The seeds covered with the hair are known as bolls. The bolls are collected, dried and taken to the ginning press where in the trichomes are separated from the seed. Various devices are used to separate the hairs. The short and long hairs are separated from each other. The hairs with short length are known as linters and are used for the manufacture of absorbent cotton, while long hairs are used for the preparation of cloth.

The raw cotton obtained by this full of impurities. Like wax, fat, colouring matter, vegetables debris. It is processed to go rid of most of the impurities. It taken to the machine known as cotton opener and followed by treatment with dilute soda solution or soda ash solution under pressure for about 10-15 hours. The wax, fatty material & colouring matter are removed by this treatment. It is then washed with water, dried and carded into flay sheets. It is finally packed in wrappers and sterilized.