

# Pharmacognosy

## Unit -7

Year – 1<sup>st</sup> D.pharmacy

Prepared by-

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## Surgical fibres, sutures and surgical dressing

Fibres – the term fibres is used for surgical dressing include both natural and artificial fibres and embraces epidermal trichomes , such as cotton fibres and other cell of the plan and animal products such as wool and silk. All natural fibres are made up of long chain molecules . these can grouped as under .

- a. Vegetable fibres - cotton , flax, hemp, jute, oxidised cellulose and methyl cellulose .
- b. Regenerated from carbohydrates – viscose rayons.
- c. Animal fibres- wool and slik
- d. Synthetic fibres – nylon, terylene
- e. Mineral fibres – asbestos and glass.

### Difference between vegetable and animal fibre

Vegetable fibres	Animal fibres
1. No foul smell is produced on ignition .they burn with blackish smoke	1. They give foul smell on ignition
2. Give violet colour with molisch reagents	2. No violet colour is produced with moilsch reagents
3. On boiling with picric acid no yellow stain is produced	3. On boiling with picric acid yellow stain is produced
4. No red colour is produced with million reagents	4. red colour is produced with million reagents

## COTTON

### Synonyms

Raw cotton, purified cotton, absorbent cotton.

### Biological Source

Epidermal trichomes of the seeds of cultivated species of the *Gossypium herbaceum* and other species of *Gossypium* (*G. hirsutum*, *G. barbadense*) freed from impurities, fats and sterilized, belonging to family Malvaceae.

### Geographical Source

United States, Egypt, some parts of Africa, and India.

### Description

Colour - White

Odour- Odourless

Taste -Tasteless

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Shape- These are fine filaments like that of hair, which are soft and unicellular.  
Size- 2.2–4.6 cm in length and 20–35 micron in diameter

### **Chemical Constituents**

It consists of 90% of cellulose, 7–8% of moisture, wax, fat and oil 0.5% and cell content about 0.5%. Purified cotton has almost cellulose and 6–7% of moisture.

### **Chemical Tests**

1. On ignition, cotton burns with a flame, gives very little odour or fumes, does not produce a bead, and leaves a small white ash; distinction from acetate rayon, alginate yarn, wool, silk, and nylon.
2. Dried cotton is moistened with N/50 iodine and 80% w/w sulphuric acid is added. A blue colour is produced; distinction from acetate rayon, alginate yarn, jute, hemp, wool, silk, and nylon.
3. With ammoniacal copper oxide solution, raw cotton dissolves with ballooning, leaving a few fragments of cuticle. Absorbent cotton dissolves completely with uniform swelling, distinction from acetate rayon, jute, wool, and nylon.
4. In cold sulphuric acid (80% w/w) cotton dissolves; distinction from oxidized cellulose, jute, hemp, and wool.
5. In cold sulphuric acid (60% w/w) cotton, is insoluble; distinction from cellulose wadding and rayons.
6. In warm (40°C) hydrochloric acid it is insoluble; distinction from acetate rayon (also silk, nylon).
7. It is insoluble in 5% potassium hydroxide solution

### **Uses**

Cotton is used as a filtering medium and in surgical dressings. Absorbent cotton absorbs blood, pus, mucus, and prevents infections in wounds.

## **JUTE**

### **Synonym**

Gunny.

### **Biological Source**

It consists of phloem fibres from the stem of various species of the *Corchorus*; *C. capsularis* Linn, *C. olitorius* Linn, and other species like *C. cunninghamii*, *C. junodi* etc., belonging to family Tiliaceae.

### **Geographical Source**

West Bengal and Assam.

### **Description**

They are tall, usually annual herbs, reaching to a height of 2–4 m, unbranched and if branched it has only a few side branches. The leaves are alternate, simple, lanceolate, 5–15 cm long and a finely serrated or lobed margin. The flowers are small (1.5–3 cm in diameter) and yellow, with five petals; the fruit encloses many seeds in the capsule.

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### **Preparation**

Retting is the process for the preparation of bast fibres. This process is done by three methods, that is, microbial (or water), steam, and mechanical process. The microbial or water retting process is the oldest and the popular method employed for the breaking of lignin bond present between parenchyma and sclerenchyma. The breaking of this bond facilitates the easy procurement of skin from its core. Then the material is washed dried to release pectin bond which makes the hard skin to fine thread like fibres. The jute fibres are graded according to its colour, strength and fibre length. The fibres are of white to brown and 1–4 m. long.

### **Chemical Constituents**

Jute fibres are composed primarily of the plant materials cellulose and lignin. Jute is composed of about 50–53% cellulose, nearly 20% of hemi cellulose and 10–11% of lignin along with other constituents like moisture not more than 12–13%, fats, wax, and ash contributing to 1% each.

### **Uses**

It has a large range of use (about 1,000 uses). It is listed as the second most important vegetable fibre after cotton. Jute is used chiefly to make cloth for wrapping bales of raw cotton, in the preparation of sacks and coarse cloth. They are also woven into curtains, chair coverings, carpets, Hessian cloth very fine threads of jute can be made into imitation silk and also in the making of paper. It is even used in the manufacture of tows, padding splints, filtering, and straining medium. Jute is used for the preparation of coarse bags.

## **FLAX**

### **Biological Source**

It is the pericyclic fibres which are removed from, the stem of *Linum usitatissimum* Linn., belonging to family Linaceae.

### **Geographical Source**

It is mainly found in United States, Russia, Ireland, Northern Europe.

### **Description**

The length of fibre cells ranges from 1.2 to 5.0 cm and the length of fibres cell bundles ranges from 30 to 90 cm. The short and broken fibres are called ‘tow’. Flax is hygroscopic in nature. Flax fibre is soft, lustrous and flexible. It has more tensile strength than cotton fibre but less elasticity.

### **Chemical Composition**

The flax chiefly consists of pecto-cellulose.

### **Uses**

Linen cloths can be prepared which is used as a filtering medium. The ‘tow’ is used in making coarse fabrics and cordage, while the long fibres are used for strong threads and fine linens. Flax fibre is also utilized as raw material for the high-quality paper industry for the purpose of printed currency notes and cigarette paper.

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## SILK

### Biological Source

Fibres obtained from the cocoons spun by the larvae *Bombyx mori* Linn., belonging to family Bombycidae/Moraceae.

### Geographical Source

China, France, Iran, Italy, Japan, and India.

### Preparation

One gram of silk-worm egg consists of around 15,000 eggs which are kept at 0°C to overcome the immature development. The silkworms eat mulberry leaves day and night and they grow very fast. When the colour of their heads changes darker, it indicates that the time for them to moult has come. It requires almost a month time for its development into full size. During this period it takes four moults and their body turns slightly yellow reaching a size of 4 cm long. The silk-worm finally eats a meal which is about twenty to twenty five times its weight of leaves and attains a size of 9 cm length and 10 mm thick. The skin becomes tight and all these symptoms indicate that it is going to cover itself with a silky cocoon. The process of spinning cocoon continues for almost three days. After 7–8 days, the larvae changes into chrysalides, and the cocoons are collected by throwing them into boiling water, this kills the silkworms and also makes the cocoons easier to unravel. If the caterpillar is left to eat its way out of the cocoon naturally, the threads will be cut short and the silk will be useless. The cocoons are kept in hike warm water to remove the gum. Since all the eggs hatch almost the same time, the cocoons also be collected together and treated at the same period. Some amount of cocoons are retained and allowed to come out for fertilization. The females lay nearly 500 eggs and these eggs are stored till further requirement is wanted.

### Description

Colour - Yellow

Size - 5 to 25 microns in diameter and 1,200 metre in length

Appearance - Fine, solid, smooth to touch

Solubility - Soluble in cuoxam, in cold dilute sulphuric acid.

Extra features- Hygroscopic in nature and has good elasticity and tensile strength.

### Chemical Constituents

Silk mainly consists of protein known as fibrion. Fibrion is soluble in warm water and on hydrolysis yields two main amino acids, glycine and alanine.

### Uses

Silk is used pharmaceutically in the preparation of sutures, sieves, and ligatures. The 'stiff silkworm' (dried body in the fourth to fifth stage of larva, which dies due to infection of the fungus *Beauveria bassiana*) is used in the traditional Chinese medicine.

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## WOOL

### Biological Source

Wool consist of hairs from the fleece of sheep *Ovis aries* Linn., belonging to family Bovidae.

### Geographical Source

The worlds leading producers of wool are Australia (25%), China, and New Zealand (11%), while Turkey, Iran, India, and the United States (Texas, New Mexico) contribute to 2%.

### Preparation

Wool is the fibre derived from the hair of animals of the Caprinae family, mainly sheep and goats. It is produced as the outer coat of sheep. The fibre obtained from domestic sheep has two qualities which differentiate it from hair or fur. The fibres have scales which overlap like shingles on a roof and it is crimped. The amount of crimp is directly proportional with the fineness of the wool fibres and the fine wool (like merino) have up to a 100 crimps per inch, whereas coarser wools (like karakul) have one or two crimps per inch. The hairs from sheep are removed during the shearing time. After shearing, the wool is separated into five main categories: namely fleece, pieces, bellies, crutchings, and locks. It is then cleaned from dirt and high level of grease (thus 'greasy wool') which contains valuable lanolin is present on the hair. The grease is generally removed for processing by scouring with detergent and alkali. The wool is then treated with hydrogen peroxide for bleaching, it is then washed properly and spreaded on wire nettings and dried under hot air.

### Description

Wool is generally a creamy white colour but some of the breeds of sheep naturally produce black, brown (also called moorit) and grey coloured wool. The wool is smooth, elastic, slippery to touch and slightly curly. Diameter of wool varies from 15  $\mu\text{m}$  (superfine merino) to 30 or 40  $\mu\text{m}$ . The finer the diameters the greater its value is. Wool is soluble in warm alkaline solutions, but not in dilute or strong acids.

### Chemical Constituents

Wool mainly consists of a sulphur containing protein called keratin. Keratin is composed of amino acid like cystine.

### Chemical Tests

1. Solubility test: It is easily soluble in warm alkali.
2. Wool when treated with Con. Hydrochloric acid, it does not produce any effect but dissolves silk.
3. When treated with cuoxam solution, it does not dissolve but swells the wool and produces blue colour.
4. Solution of wool treated with lead acetate produces black precipitate due to high sulphur content.

### Uses

It is used as a filtering aid and straining medium and in the manufacture of clothing, carpeting, felt and it is also used to absorb odours and noise in heavy machinery and stereo speakers.

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