V. Collection and preparation of crude drugs for the market as exemplified by Ergot, opium, Rauwalfia, Digitalis, senna.

Ergot:

Life Cycle:1) Sexual Stage: The ascospores infect the ovary of the rye plant & if conditions are favourable it develops hyphal strands. It forms a white mass over the ovary known as the mycelium.

2) Asexual Stage: The hyphal strands further develop invading the ovary & converting it to a hard violet schlerotium. Schlerotium contains stromatum which shows a globular stalk. It encloses bag like structures known as ascus containing ascospores. If these ascospores are liberated they infect another rye plant.

Opium:

Raw opium is the dried milky exudation obtained by incising the unripe but fully grown capsules of Papaver somniferum Family – Papaveraceae.

The cultivation is done in the months between September and April. A gap of 25 cm should be maintained between two consecutive plants. Before sowing the seeds, they are mixed with sands properly. About five to six capsules appear on each plant and it flowers in the month of May-June. After the petals fall from the poppy, the pod, which is about the size of a golf ball, is lanced, and the opium latex is exuded. What you see here is one lancing, made with a special knife which has four blades about 1/16th inch apart, clearly visible in the photo. Initially the latex is pink; later it changes to black. Poppies are lanced in the afternoon and the latex is scraped off the next morning. Pods ripen (soften) at different times in the field. Each pod can be lanced from 4 to 7 times. The lancing takes a great deal of time and attention. Several pods can be scraped before the opium is placed into a container. So many pods to cut and scrape. The opium collected is weighed on a daily basis before an officer of the Narcotics Dept. After the latex has been collected, all the peasants from an area take their opium to a weighment center. Their opium has been scraped into standard containers of known weight. One-tenth of a hectare produces small amounts of latex.

Rauwalfia:

Rauwolfia consists of dried roots of *Rauwolfia serpentine*, belonging to family Apocynaceae.

Rauwolfia grows in tropical forests at an altitude of 1,200– 1,300 m at temperature 10–40°C. There should be enough rain or irrigation for its cultivation. The soil should be acidic (pH 4–6), clayey and manure is applied for better crop. Propagation is done by planting seeds, root cuttings or stem cuttings. Better drug is obtained when the propaga-tion is carried out with fresh seeds. The plants should be protected from nematodes, fungus and Mosaic virus. The drug is collected mainly from wild plants. Roots and rhizomes are dug out in October–November when the plant roots are two to four years old. The aerial parts and roots are separated. The roots are washed and dried in air. The roots containing moisture up to 12% should be protected from light. Seasonal variation, genetic differences, geographic location,

improper handling and drying, and other factors account for percentage differences in alkaloid amount. Rauwolfia should be packaged and stored in well-closed containers in a cool, dry place that is secure against insect attack.

Digitalis:

Biological source: It is obtained from dried leaves of Digitalis pupurea Family : Scrophulariaceae

It is a biennial herb which is grown in England and also cultivated in India, Europe and USA. It is propagated by seeds. It requires calcareous, acidic, sandy soil for growth. Seeds are very small in size i.e. 100 seeds weigh 40 to 70 mg. Seeds are mixed with fine sand and sown in nursery beds in march/april. Young seedlings are transplanted in sep/november. Crop is manured and kept free from weeds. Plantation done twice a year. Plant flowers in the month of april and is followed by fruiting. In the first year plant bears rosette leaves and in second year sessile leaves. Leaves collected in second year in the afternoon during august and September when 2/3rd of flowers are fully developed. Discolored leaves are rejected. After collection leaves are immediately brought to drying centre and dried in vaccum dryer at a temp. below 60° C till the moisture is not more than 5%. Dried leaves are packed in air tight container with suitable dehydrating agent. If the leaves are dried above 60° C the potency is lost due to chemical degradation.

Senna:

Senna plant is a small shrub of 1–1.5 m height with paripinnatecompound leaves. Tinnevelly senna is mostly cultivated in well-ploughed, levelled, rich clayed semiirrigated land sometimes after paddy crop in South India. Propagation is done by seeds which are rubbed with coarse sand and sown thinly by broadcasting or in rows 30 cm apart, first during February–March and second after rain in July. Seeds germinate on the third day. The crop becomes ready for harvesting after about 2 months but first plucking of leaflets is done after 3 months of sowing when the leaves appears mature, thick and bluish in colour. Second plucking is followed after a month and subsequent pluckings after 4–6 weeks. The plant can survive for two to three years, but it is grown as an annual. After third plucking the plants are uprooted. Plant shows great tolerance for salinity. It sometimes shows die-back symptoms in which the branches or shoots die from the tip inward, which is caused by parasites or environmental conditions. Leaflets of Tinnevelly senna are collected by careful plucking from luxuriantly grown plants and compressed into bales.

W. Study of source, preparation and identification of fibers used in sutures and surgical dressings- cotton, silk, wool and regenerated fibers.

DEFINITION

Surgical dressing is a term applied to a wide range of materials used for dressing wounds or injured or diseased tissues. A dressing is designed to be in direct contact with the wound, which makes it different from a bandage, which is primarily used to hold a dressing in place.

NEED OF SURGICAL DRESSINGS

1. Provide an environment for moist wound healing. Desiccation of a wound is a major factor in retarding wound healing and increasing scarring. Dressing that prevent desiccation provide an optimal environment for autolysis cell migration, granulation and reepithelialization .

2. Prevent maceration by permitting evaporation or absorption. In highly exudative wounds, excessive moisture and autolytic enzimes will damage repairing tissue and will provide a perfect culture medium for microbes.
3. Promote hemostasis.
4. Protect the wound from further damage (mechanical damage, microbial invasion , dehydration , maceration , chemical damage, alteration in pH)
5. Reduce heat loss.
6. Control microbial growth (by incorporation of antimicrobial drugs).
7. Promote autolysis.
8. Promote healing.
9. Provide compression, promoting hemostasis and reducing edema.
10. Provide support.
11. Reduce pain , increase patient comfort , and improve functional use of wound site.
12. Improve the appearance ofthe wound site.
13. Reduce odor.
14. Reduce over all costs associated with wound treatment.

SOURCES OF FIBRES

Plant - Cellulose + Lignin Eg. Cotton, Jute, Hemp, Flax
Animal – Proteinous Eg. Silk, wool
Mineral – Eg. Glass, Asbestos

COTTON

Synonyms : Raw Cotton Wool, Absorbent Cotton
Biological source: Absorbent cotton consists of epidermal hair of the seeds of *Gossypium herbaceum* Linn, *Gossypium hirsutum* Linn, *Gossypium arboreum* Linn and *Gossypium barbadence* Linn
Geographical source: Egypt , India , South America , USA , South Africa , Pakistan
Prepration of Raw Cotton : Bolls of cotton are collected from the ripe and dehisced fruits of Gossypium . Raw cotton thus prepared contains impurities, chiefly colouring matter and about 0.6 percent of wax and oil which form a thin flim around the fibres and render then non-absorbent.
Prepration of Absorbent Cotton Wool: Absorbent cotton wool is prepared from the various cotton wastes obtained during the processing of raw cotton for making yarns . The wastes are loosened and then boiled for 10 to 15 hours under a pressure of about 30 lbs in a dilute solution of caustic soda and soda ash .
Macroscopical and Microscopical Characters: Absorbent cotton wool is whiter than the raw cotton. The cotton trichhomes are tablar , flattened and twisted with large lumen .
Constituents: Raw cotton contains about 90 percent of cellulose and small amounts of wax, fat , remains of protoplasm and ash. Absorbent cotton is almost pure cellulose.
Uses : Cotton is used as the chief material for many surgical dressings . It is also used as a filtering medium and an insulating material.

Silk:

It is also called Queen of fibers. It is natural protein fiber of animal origin. Instead of being grown in the form of hair, it is produced by insects in the form of continuous fine strand of fibers called as filament, to build cocoons.
Fibres obtained from the cocoons spun by the larvae Bombyx mori Linn., belonging to family Bombycidae/Moraceae

Description: Size about 5 to 25 microns in diameter and 1,200 metre in length. Apperance it looks fine, solid, smooth to touch. Hygroscopic in nature and has good elasticity and tensile strength. Soluble in cuoxam, in cold dilute sulphuric acid.
Active 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.

Wool:
Wool consist of hairs from the fleece of sheep Ovis aries Linn., belonging to family Bovidae.
Description: Wool is generally a creamy white colour but some of the breeds of sheep naturally produce black, brown and grey coloured wool. The wool is smooth, elastic, slippery to touch and slightly curly. Diameter of wool varies from 15μm to 30 or 40μm. 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.
Uses: It is used as a filtering aid and straining medium and in the manufacture of clothing.

Viscose:
Viscose is a viscous orange-red aqueous solution of sodium cellulose xanthogenate obtained by dissolving wood pulp cellulose in sodium hydroxide solution and treating with carbon disulphide.
Description: The rayon is a white, highly lustrous fibre. Its tensile strength varies from two-third to one-and-a-half times that of cotton. When wetted, it loses about 60% of its tensile strength. It has a proportionately greater loss than is found with cotton. The fabric is a water-repellent (e.g. cotton crepe bandage).
Chemical constituents: Viscose rayon is a very pure form of cellulose.
Uses: Viscose rayon is used to manufacture fabrics, surgical dressings, absorbent wool, enzyme, and cellophane.

Further readings

Biren Shah and Avinash Seth. Textbook Pharmacognosy and Phytochemistry. Second edition, Elsevier India.

William Evans. Trease and Evans' Pharmacognosy. 16th Edition. Saunders Ltd.