

HERBS AS RAW MATERIALS

Definition of Herb The word herb is derived from the Latin word herba which means grass or green stalk. Herbs generally refers to the leafy green or flowering parts of a plant (either fresh or dried). Any plant which has leaves, stem, flowers, roots & seeds used for different purposes like flavouring, food, medicine or perfume. Plants used as spice, aromatic & food are also considered as herb. While Neem (*Azadirachata indica*) is tree not herb. Other examples of herbs - Onion, Ginger, Turmeric, Brahmi. etc.

Now-a-days, as herbal wave is spreading worldwide, use of herbal medicines is increasing. Herbal drugs / phytomedicine / Herbal medicinal products (HMP) or herbal remedies are drugs obtained from plants. For example Senna (*Cassia angustifolia*, Leguminosae) leaves & pods are used for constipation.

Ashwagandha (*Withania somnifera*, Solanaceae) root are used for memory & learning.

Example of herbs Mint, fenugreek, rosemary, coriander, dill, lavender, lemon etc.

Herbal medicine Herbal medicine is the study of use of medicinal plants in treatment, cure, prevent or diagnose a disease. It is also known as phytomedicine. It refers to all the type of plants (Herbs, trees etc). These consist of medicinal plants or any parts of medicinal plants, usually in unprocessed or crude forms which have medicinal value. It contain active herbal ingredient, one or more herbal substance, one or more herbal prepⁿ.

One or more herbal substances in combination with one or more herbal prepⁿ. These are the remedies which are made from plants to prevent & treat illness. These are accessible, affordable & assured safety. It is the study of the use of medicinal plants. It includes modern standards of testing of herbs & medicines which are derived from natural sources, few quality, clinical trials & standard of purity.

Herbal medicinal product Any extract or active constituents, which is extracted from the herbal medicines called as Herbal medicinal product. These are those products which produce from herbs & used in medicinal purpose. They contain one or more active ingredients of herbal purpose or more herbal prepⁿ or one or more such herbal substances in combination with one or more such herbal preparations. For example Chyawanprash, Tulsi cof.

Natural remedies are medicinal products where the active ingredient is of natural origin & consists of an animal part, mineral or a salt, used for therapeutic purposes. According to the European pharmacopoeia, herbal drugs are mainly whole, fragmented or cut plants, plant parts, algae, fungi, usually in dried form but sometimes fresh. Herbal drugs are precisely defined by the plant part used & the botanical name according to the binomial system (genus, species, variety). Such herbal throughout most of the history, plants have been a source of medicines for the treatment of a wide array of diseases. Plant parts & plant extracts have been traditionally used to prevent or cure diseases.

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Herbal drug preparation These preparation are of crude form (comminuted) or powdered herbal substances, extracts, essential oils, tinctures, Juice, & fatty oils of herbal materials. Preparations obtained by subjecting herbal substances to treatments such as extraction, distillation, expression, fractionation, purification, concentration or fermentation are called herbal drug preparations. These herbal preparations include whole plant or parts, powdered herbal drugs, extracts, processed exudates of herbal materials. For example opium (Morphine).

Source of Herbs Herbs can be obtained through different sources. Herbs can be collected from wild sources or from cultivated source such as field or green house. Cultivation of herb is becoming common practice all over world because it gives consistent good quality raw material. Cultivated herbs are generally free from contamination.

- (1) Wild sources These plants are obtained from the wild source such as forest, plains, river banks etc where they are found in their wild form. Collection from wild source is suitable for plants which are abundant in nature obtaining herbs from wild source they grow themselves without any type of care. They grow under natural & favourable conditions.

- Advantages
- ① Less time consuming
 - ② Low cost of labour
 - ③ Economical, NO cost of land, caring, fertilizers, irrigation

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- Disadvantages of Quality can not be predicted
- ② The risk of getting injured by animals is high
 - ③ They will kill us.

(2) Cultivated source In this type, herbs are obtained from cultivated in which herbs are cultivated by various scientific technique such as plant tissue culture, hybridization & mutation to grow herbs. They grow with proper care by humans. Care is taken towards soil, climate, rainfall, temperature & fertilizers.

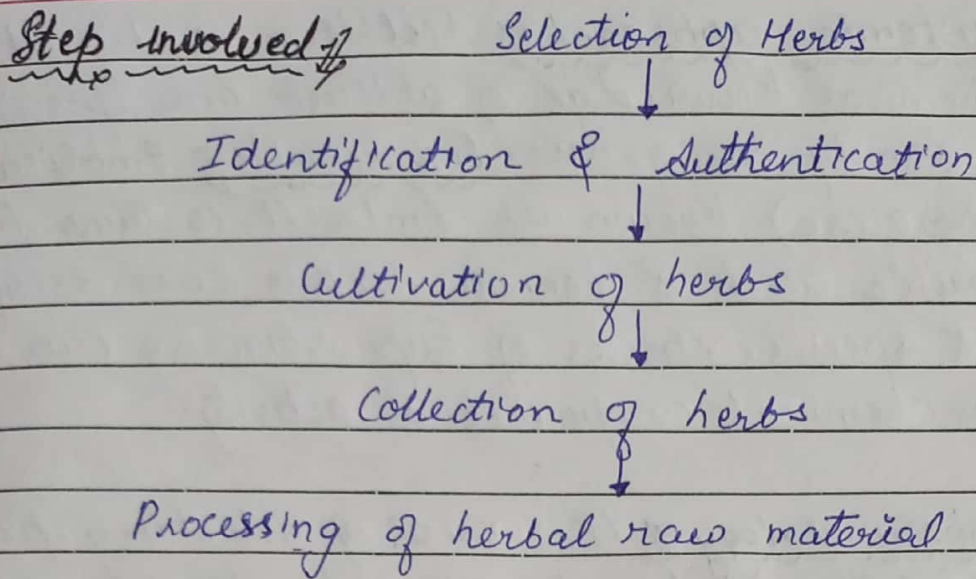
- Advantages of Better quality & purity
- ② Better yield & profit more.
 - ③ Regular supply.

- Disadvantages of It is expensive than wild.
- ② More labour & field required

For example of cultivation of aromatic plants. For herbs collected from natural places need to take certain precautions. First important step is botanical identification. Correct botanical identification is very important for ensuring good quality assurance of herbal formulation.

Selection of Herbal material According to WHO data, more than 60% of world population is directly or indirectly using plant based medicines. Herbs are subjected to various types from their selection, identification, authentication, collection, storage & processing until the final product is formed. The species or botanical variety selected for cultivation

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Should be same as mention in pharmacopoeia or national documents. It can be selected by diff. techniques.

- (1) Random selection It is the random selection of plant species then study about it. It provides an endless source for new herbs. This is an approach with any criteria the randomized investigations consist in random selection & collection of plant species for study according to the availability of plant.
- (2) Ecological / zoopharmacognosy approach It involves interaction between organism in the ecological environment. This approach search for secondary metabolites & biological activities to performed by the selection of young leaves or mature leaves for a given species. It can be selected for antimicrobial drug. Very few plants can be selected by this approach yet this is good approach as it saves time & high success rate.

- (3) Chemotaxonomic approach of selection is based on phytochemical knowledge of at least one species of same family or genus. For example Embolica officinalis (Euphorbiaceae) known as Amla. It contains Ascorbic acid, gallic acid & tannins. So one can expect other genus & species of Euphorbiaceae can also contain chemical compound & activity.
- (4) Ethanopharmacology It consists of selecting plant species in accordance to the indication of specific population groups using traditional knowledge about medicinal use of natural resources & their impact on human health.

Identification & Authentication of herbal materials.

Identification It is very important because plants contain different-different constituents.

Authentication It is a quality assurance process that ensure the correct plant species & also check the quality, safety & efficacy of final herbal material.

Correct botanical identification of drug is very important for good quality of finished product. Substitution or adulteration with morphologically or chemically similar plant is becoming common in herbal drug industry.

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Various methods for Identification & Authentication

① Morphological identification of Plant material or herbal material is identified by its morphological characteristics such as its shape, size, colour, surface texture etc.

② Macroscopic Identification of Herbal material is identified by its organoleptic properties such as colour, odour, taste & also some other physical & chemical tests.

③ Physical & Chemical methods In this parameters include total ash, water soluble ash, acid insoluble ash. These values of the individual herbal drugs are compared with the standard values of Indian pharmacopoeia & thus help in identification. It is qualitative & quantitative determination of major compounds of herbal medicines by using physical & chemical methods.

Physical methods It measures Freezing point, Melting point, bitterness, density, optical activity, solubility etc.

Chemical methods It measures colour formation, & also their chemical tests. For example of Alkaloids, Carbohydrates, Glycosides etc.

④ Microscopic characteristics It is identified by using microscope. It identify by its structure, tissue cells, stomatal no., stomatal index, vein-islet no. etc used to authorised plant species.

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⑤ Taxonomic Method of the botanical origin of the drug is identified & its scientific Latin binomial (i.e. genus species) named is determined based on this method. Information such as Botanical name, vernacular names, site of collection of plant material, details of collector, habitat, season of collection, altitude & part collected etc.

⑥ Chromatographic methods of it is also used in identification of herbal materials. Methods used in HPTLC, TLC, Column, NMR, Mass, UV etc. It is also used to authorised plant species

Cultivation of herbs of Cultivation of herbs requires intensive care & management. Various factor like environment, soil, Irrigation, pests play a vital role in the cultivation. For example of Good agriculture practices (GAP) is used for better cultivation

Collection of herbs of For the collection of herbal material, a proper time should be selected when the herbal plant yield maximum amount of Chemical constituents in it. Also required skilled labour for this.

Processing of herbal raw material of It involves a various steps after harvesting. It can be classified into primary & secondary.

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Primary Method	Secondary Method
→ Garbling	→ Cutting
→ Washing	→ Aging
→ Parboiling	→ Baking
→ Leaching	→ Boiling
→ Drying	→ Stir frying
	→ fumigation

(i) Primary Method It include simple procedure by which the herbs are prepared.

- (i) Garbling / sorting This process helps in ensuring the purity & cleaning of the harvested material such as soil, dust, dirt, impurities, insects etc are removed.
- (ii) Washing After garbling, the raw material should be cleaned well to remove the traces of remaining soil, dirt & other impurities from the surface. The root & rhizomes & tubers are washed with clean water.
- (iii) Parboiling / Blanching After washing, certain herbal raw materials need to undergo parboiling process in which they are put in boiling water for a short period. It may also facilitate in further processing such as removal of stubborn impurities as well as outer coats / covering of raw materials.
- (iv) Leaching Some impurities can be removed by subjecting the plant material under running water is called leaching.

(v) Drying of the plant material should be thoroughly dried after washing in order to prevent the deterioration & degradation of active constituents. They must remove moisture & reduce microbial contamination. For example, Dry under shade, sunlight or by artificial heat.

[2] Secondary Method It vary from one herb to another depending upon the nature, chemical constituents & their therapeutic properties.

(i) Cutting After thoroughly drying the herbal materials are processed by cutting & sectioning into smaller size which are convenient for storage as well as extraction.

(ii) Aging/Sweating Aging refers to storing the raw material for a specific time after harvesting. Sweating is done by subjecting the herbal materials at a temperature b/w $45-65^{\circ}\text{C}$ with high humidity for a period ranging from one week to few months.

(iii) Baking/Roasting This process of drug heating where the herbal material is heated in ovens drug develops a specific colour.

(iv) Boiling/steaming In this process the drug is cooked in water or any other liquid solvent such as vinegar, wine, milk etc.

- (v) Stir frying In this process, the herbal materials are put in pot of frying pan & continuously stirred for a specific period of time under heat until the external colour changes.
- (vi) Fumigation Sometime the harvested raw materials are subjected to fumes.

Extraction of herbal materials Extraction is a process of separation in which the chemical constituents present in plant & tissue are removed by using selective solvents which are called as menstrum.

Herbal extracts include infusions, Decoction, fluid extracts, tinctures & powdered extracts.