Medicinal and Aromatic plants

Plants have been the basis of many traditional medicine systems throughout the World for thousands of years and still remain as the main new source of structurally important chemical substances that lead to the development of innovative drugs. The use of medicinal plants for the treatment of many diseases is associated with folk medicine from different parts of the World.

Aromatic and medicinal plants are gaining more importance because of their potential application in the food, pharmaceutical, and fragrance industries. Medicinal and aromatic plants have been used in cosmetics, perfumery, pharmaceuticals, and food flavoring since ancient times due to the presence of essential oils and different components in them.

These classifications are not mutually exclusive, as many plants can fall into multiple categories. Additionally, the uses and classifications of these plants may vary across different cultures and traditional medicine systems. It's crucial to consider the specific properties and applications of each plant before use. As with any medicinal or aromatic plant, it's advisable to consult with experts or professionals in herbal medicine for accurate information and safe usage.

Where does the medicine come from?

Medicinal properties derived from plants can come from many different parts of a plant including leaves, roots, bark, fruit, seeds, flowers. The different parts of plants can contain different active ingredients within one plant. Thus, one part of the plant could be toxic while another portion of the same plant could be harmless.

Medicinal properties can be derived from the following:

Bark: The protective outer layer of a tree trunk that is formed by layers of living cells above the wood. Active ingredients are often found in higher concentrations in the bark. Examples of bark used for medicinal properties are quinine bark, oak bark, pepperbark, and willow bark.

Bulb: A bulb is defined as a fleshy structure comprised of numerous layers of leaf bases otherwise known as bulb scales. Onion species and garlic bulbs are popular for medicinal uses.

Essential Oil: These are defined as volatile oils that are generally extracted from plants using a steam distillation process. Examples include camphor and peppermint oil.

Fatty Oil: These are defined as non-volatile vegetable oils that are pressed from the seeds or fruits of plants and are insoluble in water. Examples of fatty oils used in medicine are **castor oil, olive oil, and safflower oil.** Some fatty oils have direct medicinal properties while others are used as carriers in liquid **formations and ointments**.

Flowers: The flowers of plants have always been popular in traditional medicine. Examples include clove and chamomile flowers. Flower parts are also used such as saffron stamens, the stigmas of maize, or pollen.

Fruit: Fruits have been heavily used for medicinal purposes. Dried whole fruits or portions of fruits can be used. Many members of the carrot family have fruits that are used in medicine including fennel fruit and anise.

Gum: Gums are solids that are mixtures of **polysaccharides** (sugars). They are water-soluble and are in part digestible by humans.

Leaf: The leaves of plants, shrubs, and trees can be used for medicinal properties. Leaves can be used alone or can be mixed with twigs, stems, and buds. Examples include maidenhair tree.

Resins: Resins are a mixture of **essential oils and terpenes** that are usually not soluble in water. They are excreted by specialized cells or in ducts of plants. Examples include frankincense, myrrh, and mastic.

Roots: The fleshy or woody roots are used for medicinal purposes. Roots may be solid (ginseng), fibrous (stinging nettle), or fleshy (devil's claw).

Rhizome: A rhizome is defined as a fleshy or woody elongated stem that usually grows horizontally below the ground. Rhizomes often produce leaves above the ground and roots into the ground. Several medicinal plants are used primarily for their rhizomes including: ginger, wild columbine, and bloodroot.

Seed: The seeds of many plants are used for their medicinal properties. Seeds may be contained within a fruit or are sometimes used on their own. Juniper berries look like fruits but they are actually seeds surrounded by beautiful woody cones.

Tuber: A tuber is defined as a swollen, fleshy structure below ground. Tubers are usually of stem origin but can be partly stem and root in origin. Tubers used for medicinal properties include African potato and autumn crocus.

Wood: Thick stems or the wood of trees or shrubs are used for medicinal properties. Sandalwood and quassia wood are popular examples.

Medicinal plants are classified based on various criteria, including their therapeutic properties, parts used, and chemical constituents. Here is a broad classification of medicinal plants:

Based on Therapeutic Properties (بە گوێرەی تایبەتمەندییە چارەسەرییەکان):

1- Antipyretic Plants (دژە تا):

Examples: Willow bark (contains salicin= Salix spp.), Neem (***Azadirachta indica***).

2- Antiseptic Plants: **دژە بەکتریا**

Examples: *Arctium lappa* Aloe vera. *Withania somniferum, Thymus vulgaris*

3- Anti-inflammatory Plants: **دژە هەوکردن**

Examples: Turmeric (*Curcuma longa*), Ginger (Zingiber officinale). *Rosmarinus officinalis* L.

4- Antispasmodic Plants: (**دژە گرژ بوون(تشنجات**

Examples: Peppermint (*Mentha piperita*), Valerian (*Valeriana officinalis*). *Matricaria chamomilla*

5- Diuretic Plants: **النباتات المدرة للبول**

Examples: Dandelion (*Taraxacum officinale*), hawthorn (*Crataegus spp.*), Horsetail (*Equisetum spp*.), Parsley (Petroselinum crispum). *Sambucus nigra*

6- Expectorant Plants: (**یارمەتی دەر یان دەرکردنی بەڵغەم**)

- Examples: Eucalyptus (Eucalyptus globulus), Licorice (Glycyrrhiza glabra). (Marshmallow)

7- Hypotensive Plants: **(دابەزاندنی پەستانی خوێن)**

Examples: Garlic (*Allium sativum*), Hawthorn (*Crataegus spp.*). *Hibiscus sabdariffa* L.

Based on Alphabetical:

Either Latin or Vernacular عامي names may be used. Although they are simple and suitable for quick references, It gives no indication of interrelationships between drugs e.g. Pharmacopoeias

Based on Parts Used (ج بەشێکی رووەکەکە بە کاردێت):

1- Leaves:

Examples: Mint (*Mentha spp.)*, thyme (*Thymus neurophyllus* (Rech.f.) R.Morales). *Rosmarinus officinalis, Laurus nobilis*

2- Roots:

Examples: Ginseng (*Panax ginseng*), *Rheum ribes* L, *Glycyrrhiza glabra* L. *Zingiber officinale*

3- Bark:

Examples: Cinchona (Cinchona officinalis) , ⟶ Andes of South America. Willow (Salix spp.).

4- Flowers:

Examples: Chamomile (*Matricaria chamomilla*), Lavender (*Lavandula* spp.).

5- Fruits:

Examples: (Punica granatum L), Blackberry (Rubus spp.). Olea europea L

6- Seed:

Examples: black caraway (*Nigella sativa* L.), Anise (*Pimpinella anisum* L.), Basil **(***Ocimum basilicum* **L.),** Borage **(***Borago officinalis* **L.),**

Based on Taxonomic:

Based on the botanical classification, drugs are arranged according to the plants, from which they are obtained, into:

Classes, orders, families, genera and species.

Based on Morphological:

1. Drugs are divided into groups such as :
leaves, flowers, fruits, seeds, herbs and entire organisms, wood, barks, rhizomes & roots (known as organized
2. Dried lattices, extracts, gums, resins, oils, fats and waxes (known as unorganized drugs).

Based on Chemical Constituents:

1- Alkaloid-containing Plants:

Examples: Opium poppy (*Papaver somniferum*), Belladonna (*Atropa belladonna*).

2- Terpenoid-containing Plants:

Examples: Cannabis (*Cannabis sativa*), Ginkgo (*Ginkgo biloba*).

3- Phenolic Compounds:

Examples: Green tea (Camellia sinensis), Cranberry (Vaccinium macrocarpon).

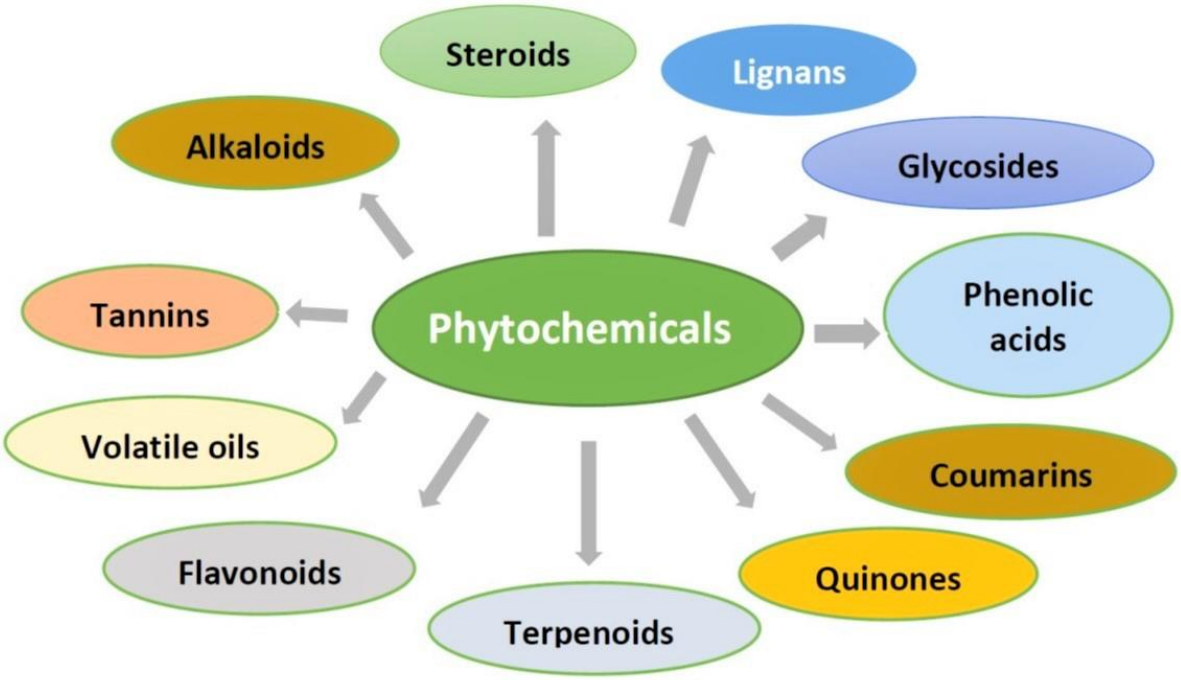
4- Essential Oil-containing Plants:

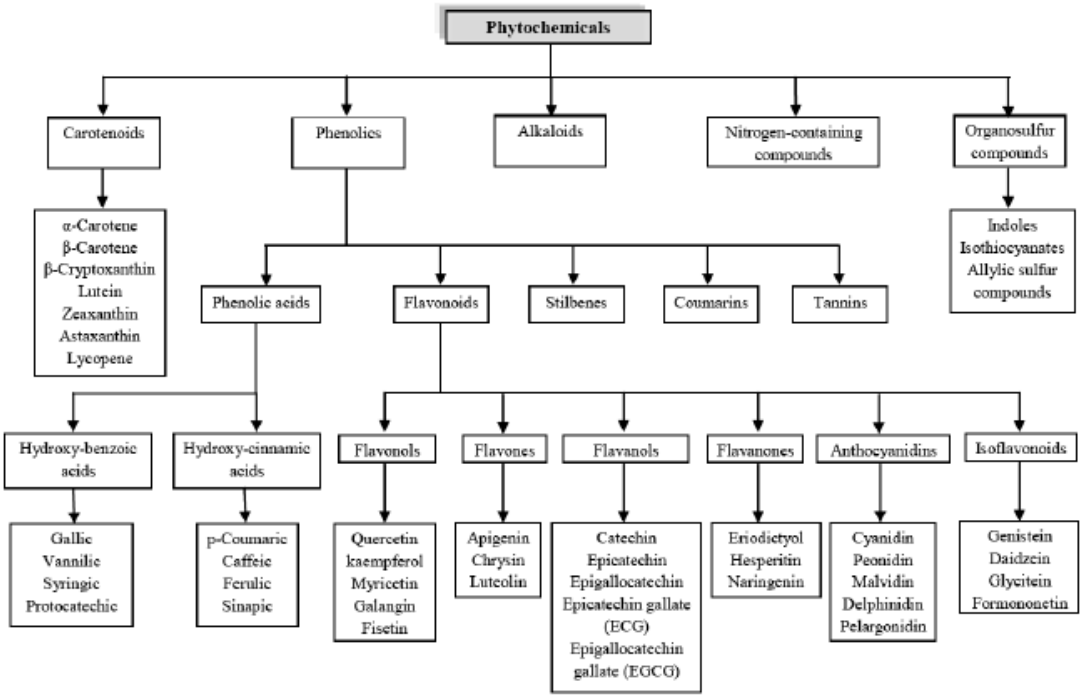
Examples: Peppermint (Mentha piperita), Tea tree (Melaleuca alternifolia).

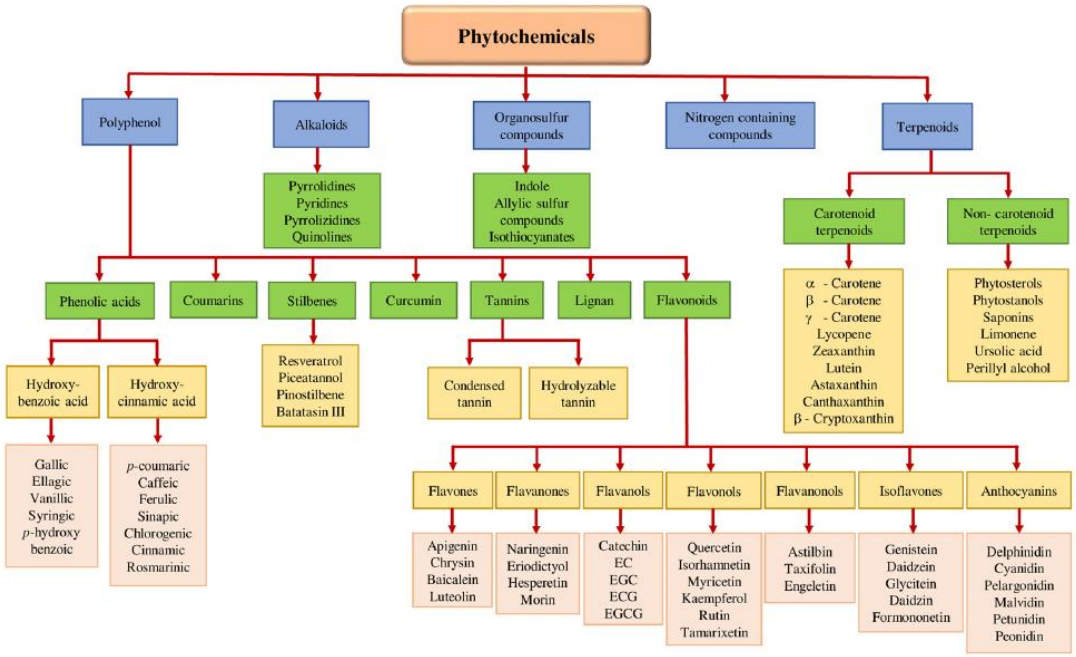
Chemical Classification

It is the sort of classification made on the basis of the active matter in the body of the plants. It is more often used in **pharmacognosy**.

1. Plants that produce Essential Oil: Anise, Parsley, Mint
2. Plants containing bitter substance: Vermouth, Gentian
3. Plants containing glycosides: Digitalis, Scilla
4. Plants containing saponin: Gypsophila, Saponaria, Hedera helix
5. Plants containing alkaloids: Datura, Atpora, Poppy, Nicotiana
6. Plants containing flavonoid: Silybum, Verbascum
7. Plants Containing Tannins: Hammelis, Quercus







Based on Usage:

1- Medicinal Plants:

Examples: Echinacea (Echinacea purpurea), Ginseng (Panax ginseng).

2- Aromatic Plants (volatile oils):

Examples: Lavender (Lavandula spp.), Rosemary (Rosmarinus officinalis).

3- Culinary Herbs:

Examples: Basil (Ocimum basilicum), Thyme (Thymus vulgaris).

4- Cosmetic and Skincare Plants:

Examples: Aloe vera, Chamomile (Matricaria chamomilla).

Based on Traditional Medicine Systems:

1- Ayurvedic Plants:

Examples: Ashwagandha (Withania somnifera), Tulsi (Ocimum sanctum).

2- Traditional Chinese Medicine (TCM) Plants:

Examples: Ginseng (Panax ginseng), Astragalus (Astragalus membranaceus).

3- Western Herbalism:

Examples: Echinacea (Echinacea purpurea), St. John's Wort (Hypericum perforatum).

Based on Geographic Regions:

1- Tropical Medicinal Plants:

Examples: Neem (Azadirachta indica), Turmeric (Curcuma longa).

2- Temperate Zone Medicinal Plants:

Examples: Echinacea (Echinacea purpurea), Ginkgo (Ginkgo biloba).

3- Arctic and Alpine Medicinal Plants:

Examples: Arctic Willow (Salix arctica), Arctic Cotton (Eriophorum scheuchzeri).

Based on Cultivation:

1- Wild Medicinal Plants:

Examples: Wild Yam (Dioscorea villosa), Goldenseal (Hydrastis canadensis).

2- Cultivated Medicinal Plants:

Examples: Ginseng (Panax ginseng), Aloe vera.

Based on Usage:

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Based on Economic Importance:

1- Spice Plants:

Examples: Cinnamon (*Cinnamomum verum*), Cardamom (*Elettaria cardamomum*).

2- Perfumery Plants:

Examples: Jasmine (*Jasminum spp.*), Rose (*Rosa spp.*).

3- Dye Plants:

Examples: madder (*Rubia tinctoria*) , Henna (*Lawsonia inermis*), Indigo (*Indigofera tinctoria*).

Remember that many medicinal plants have multiple therapeutic properties, and their classification can sometimes overlap. It's essential to consult with healthcare professionals or herbalists before using medicinal plants for therapeutic purposes, as they may interact with medications or have contraindications for certain health conditions.

Classification by Type of Consumption and Use

1- **Soft Drinks, Herbal Teas and Stimulating Plants**: Tea, Coffee, Tobacco
2. **Spice Plants**: Black pepper, Mustard, Thyme
3. **Medicinal Plants**: Digitalis, Atropa
4. **Perfume Plants**: Lavender, Rose
5. **Gum and Mucilage Plants**: Acacia, Astragalus, Plantago
6. **Resin Plants**: Sweetgum, Ferula
7. **Tannin Plants**: Rhus, Oak
8. **Dye Plants**; Rubia, Bixa, Alkana Tinctorium
9. **Insecticide Plants:** Phyretrum, Anabasis, Neem
10. **Wax Plants:** Jojoba, Myrica

The species name is usually chosen to indicate certain characteristics of the plant:

A. Striking characteristic of the plant:

Cassia acutifolia (sharp pointed leaflets)
Conium maculatum (maculate = spotted)
Cassia angustifolia (narrow leaflets)
Glycyrrhiza glabra (glabrous = smooth)
Atropa belladonna (bella = beautiful , donna= lady)
Hyoscyamus muticus (muticus = short)
Brosma serratifolia (serrat = margin)

B. Characteristic colour

Piper nigrum (black)
Digitalis purpurea (purple)
Digitalis lutea (yellow)
Brassica nigra (black)
Brassica alba (white)

C. An aromatic plant (certain aroma)

Myristica fragrans (nice aroma)
Caryophyllus aromaticus (refers to aroma)

D Geographical source:

Cinnamoum zeylanicum (growing in Ceylon)
Hydrastis Canadensis (growing in Canada)
Tamarindus indica (growing in India)
Uriginia maritima (near the Coast)

E. Pharmacological activity:

Papaver sominferum (inducing sleep)
Lytta vesicatoriam (causing blistering)
Strychnos nux-vomica (causing vomiting)
Ipomoea purge (purgative action)

F. General meaning:
Allium sativum (cultivated)
Riticum vulgare (wild)
Linum usitatissimum (most useful)

The generic name may indicate certain characters of the plant:
e.g. Atropa means fate who cuts the thread of life
Glycyrrhiza means gluco = sweet, riza = root,
Linum , Linea = thread)

Collection, drying and storage of drugs

The preparation of each drug for the market depends on its morphological nature, constituents, geographical source and other factors.
Production of Crude drugs
A. Collection of Crude Drugs:

1 . Effect of Time of the Year (Seasonal var.)

It has been found that active constituents in plants vary in amount and nature throughout the year.
Rhubarb is collected in summer (anthranol in wintrer anthraquinones in summer,
Colchicum corm : collected in spring (alkaloids).
Hyoscyamous muticus collected in summer (alkaloids).

2 Time of the Day

Digitalis is collected in the afternoon
Solanaceous leaves collected in the morning
Salix collected at night

3 Stage of maturity and age

Clove collected in bud form Santonica flowers and leaves in as unexpanded flower buds
Solanaceous leaves at flowering stage
Pyrethrum flower: in fully expanded.