

# ***Pharmacognosy***

## ***Introduction***

***Pharmacognosy*** is the study of those natural substances principally plants that find use in medicine.

The word pharmacognosy is derived from the Greek Pharmacon means a drug & gignosco which means to acquire knowledge of.

Although pharmacognosy is concerned mainly with naturally occurring substances having a medicinal action, it is completely limited to such substances. Thus surgical dressings prepared from natural fibers, flavoring & suspending agents, disintegrants, filtering & supporting media, & so are also included within the subject.

Other fields that have natural associations with the subject are poisons & hallucinogenic plants, raw materials for the production of oral contraceptives allergens, herbicides & insecticides.

Pharmacognosy is closely related to both botany & plant chemistry & indeed both originated from earlier scientific studies on medicinal plants.

At the beginning of the 20<sup>th</sup> century, the subject had developed mainly on the botanical side, concerned mainly with the description & identification of drugs both in the whole state & in powder form & their history, commerce, collection, preparation, & storage. These branches of Pharmacognosy are still of great importance, but rapid development in other areas specially Phytochemistry & Pharmacology, have greatly expanded the subject so now it is possible to approach the study of medicinal plants from the botanical, phytochemical & pharmacological point of view.

The use of modern isolation technique & pharmacological testing procedures means that new plant drugs find their way into medicine as purified substances rather than in the form of galenical preparation.

Large number of plants have been screened for their possible pharmacological value ex: antiinflammatory, hypotensive, hypoglycemic, antibiotics...etc, but the plant kingdom still contains many species of plants containing substances of medicinal value which have to be discovered. In 1985 it was reported that natural product elicited some 3500 new chemical structures of which more than 2600 were from higher plants.

Many of the botanical, chemical & physical techniques employed in Pharmacognosy are also applicable to the analysis of other commodities ex: foods, spices, gums, narcotics, fabrics, cosmetics & perfumes....etc, therefore it is used by quality control chemists associated with other industries.

Pharmacognosy played an important role in the development of other sciences ex: descriptive botany, plant taxonomy, & phytochemistry, chemical plant taxonomy, tissue culture etc...

## ***Approaches to the study of medicinal plants:***

**Vegetable drugs can be arranged for study under the following headings:**

**1. Alphabetical:** Either latin or vernacular names may be used. This arrangement is employed for dictionaries, pharmacopoeias etc...

**2. Taxonomic:** The drugs are arranged according to the plants from which they are obtained , in classes, orders, families, genera, & species.

**3. Morphological:** The drugs are divided into groups such as leaves, flowers, fruits, seeds, herbs etc... These groupings have some advantages for practical study of crude drugs & identification of powdered drugs.

**4. Pharmacological or therapeutic:** This classification involves the grouping of drugs according to the pharmacological action of their most important constituents or their therapeutic use.

**5. Chemical or biogenetic:** The important constituents ex: alkaloids, glycosides, volatile oils etc... or their biosynthetic pathways, form the basis of classification of the drugs. This is a popular approach when the teaching of pharmacognosy is phytochemically based.

## **Plant nomenclature & taxonomy**

### **Botanical nomenclature:**

In the past the plants were known by a double Latin title but Linnaeus (1707-1778) who is a Swedish biologist was the first to describe the present binomial system in which the first name denotes the species. All specific names may be written with small initial letters while the genus name starts with a capital letters. The specific name is usually chosen to indicate some striking characteristics of the plant ex: the hemlock with spotted stem of the genus *Conium* is called *Conium maculatum* whereby *maculatum* (us) means spotted. Sometimes the specific name comes from a person name or from the specific use for the plant. Botanical names are followed by the names of a person or their accepted abbreviations

Ex: *Mentha piperita* Linnaeus or *Mentha piperita* L.

This name (Linnaeus) refers to the botanist who first described the species or variety. This name is useful where there is different names for the same plant.

### **Subdivision of the phyla**

The main subdivisions or divisions arranged according to Engler's scheme could be illustrated by the following example showing the systematic position of peppermint.

Ex:

<b>Division</b>	Angiospermae
<b>Class</b>	Dicotyledoneae
<b>Subclass</b>	Sympetalae
<b>Order</b>	Tubiflorae
<b>Suborder</b>	Verbenineae
<b>Family</b>	Labiatae (Lamiaceae)
<b>Subfamily</b>	Stachdoideae
<b>Tribe</b>	Satureieae
<b>Genus</b>	Mentha
<b>Species</b>	Mentha piperita Linnaeus (peppermint)
<b>Variety</b>	Mentha piperita var. officinals (white peppermint)
Or	Mentha piperita var. vulgaris (black peppermint)

### **Taxonomic charecters**

All plants posses hundreds of charecters of a **morphological , histological, embryological, serological, chemical & genetic** nature which are important for building up a classification of the plant kingdom. The charecters employed are those which experience had shown could be used to produce **suitable groups**. The scheme into which could be inserted new plants as they were discovered or in which any plant could easily be traced, resembles a catalogue with a **“telephone directory”** arrangement of plants in which the groups of individuals listed together which not necessarily have any phylogenetic relationship but posses certain features.

### **Chemical plant taxonomy**

The concept that plants can be classified on the bases of their **chemical constituents** is not new but in the last 75years modern techniques of isolation & charecterization have led to the chemical screening of thousands of plants. Compared with morphological charecters, chemical constituents are often more precisely definable & can be of more fundamental significance for classification purpose.

The charecters employed in chemical taxonomy need to be those of intermediate distribution in the plant kingdom. The presence of such compounds as the essential amino acids & common sugars is of little diagnostic value & the occurrence of coniine in the single species Conium maculatum of the large family Umbelliferae is also of little taxonomic significance. Charecters most studied in this connection are therefore **secondary metabolites** ex: alkaloids, flavonoids, charecteristic glycosides etc...& more recently, DNA characteristics, spesific proteins & amino acids sequencing in proteins.