sense of God or spirituality. A good way of considering meditation is as "mind hygiene" keeping the paths and the channels of the mind open, and allowing the waste to be expelled. In Ayurveda, the mind is considered an organ of no greater importance than the bowels or bladder. The mind, however, processes mental and emotional energies in the forms of images and communications.

SOURCES OF CRUDE DRUGS

The term crude drug generally applies the harvested and usually dried plant or animal sources of pharmaceutically or medicinally useful products before they have undergone extensive processing or modification. However, the term is also applied to include pharmaceutical products from mineral kingdom in original form and not necessarily only of organic origin, such as kaolin, bentonite, etc. Crude drugs can thus be defined as to the natural products that have not been advanced in value or improved in condition by any process or treatment beyond that which is essential for their proper packing and prevention from deterioration. Crude drug is recognized in the official pharmacopoeia, intended for use in the diagnosis, cure, mitigation, treatment or prevention of disease in man or other animals and intended to affect the structure or any function of the body of man or other animals.

Classification of Crude Drugs (Table 1.10)

Drugs may be arranged in different ways to suit the aim and convenience of students. The

particular sequence and arrangement to follow the study of the individual drugs is referred to a system of classification of drugs. A method of classification should be precise, simple, easy to use and free from ambiguities and unnecessary confusions. Crude drugs have wide distributions, so each classification has its advantages and disadvantages. Vegetable drugs are usually classified for study in one or other of the following ways (Fig. 1.4).



Fig. 1.4: Classification of crude drugs

S.no	Parts	Examples of crude drugs
1.	Entire plants or animals	Mentha viridis, Lobelia inflate, Cochineal
2.	Entire organs of plants or animals	Cassia acutifolia, Eugenia caryophyllata, Foeniculum vulgare, Linum usitatissimum, Glycyrrhiza glabra and thyroid gland
3.	Minerals	Chalk, kaolin and talc
4.	Substances derived from plants or animals (unorganized)	Papaver somniferum, Astragalus gummifer and musk

Table 1 0. Caude days with their e





that is present in or produced by nature and not artificial or man-made is an adjective referring to *natural*. The term *natural products* refers to herbs, herbal concoctions, dietary supplements, traditional medicine, or alternative medicine. A remarkable resurgence of interest in natural product research over the areas of separation science, spectroscopic techniques, and microplate-based ultra sensitive in vitro assays. The preisolation analysis of crude extracts or fractions from different natural sources, isolation and

Medicinal Plant Biotechnology

BIOSYNTHETIC PATHWAY OF PHYTOCONSTITUENTS

2

All organisms need to transform and interconvert a vast number of organic compounds to enable them to live, grow, and reproduce. They need to provide themselves with energy in the form of ATP, and supply of building blocks to construct their own tissues.

The important molecules of life are carbohydrates, proteins, fats, and nucleic acids (Table 2.1).

TILOIN	A 1 1 C 100	101 01 1 1 10	
1 able 2.1: N	violecules of lite	e with their compositi	O

Molecules of life	Composition
Carbohydrates	Sugar units
Proteins	Amino acids
Fats	Polymeric materials
Nucleic acids	Nucleotides

A metabolic pathway is a series of chemical reactions occurring within a cell, catalyzed by enzymes, resulting in either the formation of a metabolic product to be used or stored by the cell, or the initiation of another metabolic pathway. Mainly metabolic pathways are concerned with modifying and synthesizing molecules like carbohydrates, proteins, fats and nucleic acids from basic compounds. These processes demonstrate the fundamental unity of all living matters, and are collectively described as **primary metabolism** (Table 2.2) with the compounds involved in the pathways being termed **primary metabolites**. Primary

Table 2.2: List of primary metabolism

Primary metabolism is the routine chemical process that plant need to carry out to survive and reproduce

- 1. Photosynthesis
- 2. Glycolysis
- 3. Citric acid cycle
- 4. Amino acid synthesis
- 5. Transamination
- 6. Protein and enzyme synthesis
- 7. Coenzyme synthesis
- 8. Number Absorption
- 9. Reproduction and cells
- 10. Duplication of genetic materials

metabolic pathways, which synthesize, degrade, and generally interconvert compounds commonly encountered in all organisms. They are needed for general growth and physiological development of plant which is widely distributed in nature and is also utilized as food by man. Typically, primary metabolites are found across all species within broad phylogenetic groupings, and are produced using the same pathway (or nearly the same pathway) in all these species (Fig. 2.1).

The secondary metabolites, such as alkaloids, glycosides, flavonoids, volatile oils, etc. (Table 2.3), are biosynthetically derived from primary metabolites. Secondary metabolites, by contrast, are often species-specific (or found in only a small set of species in a narrow phylogenetic group), and without these compounds the organism suffers from



Key intermediate in the formation of benzylisoquinoline phenanthrene type alkaloid

(Contd.)