

Pharmacognosy

Pharmacognosy (Greek word ‘**pharmakon**’ =drug; ‘**giginosco**’ = to acquire the knowledge of)

‘Pharmacognosy’ and ‘Pharmacodynamics’ was first used by **J. A. Schmidt** (Vienna) in his hand written manuscript *Lehrbuch der materia medica* in **1811**

C. A. Seydler, from Germany, in **1815**; use the word ‘pharmacognosy’ in his doctoral thesis titled *Analectica Pharmacognostica*.

It is initially described as *the study of crude drugs obtained from plants, animals and mineral kingdom and their constituents*.

Later it has been elaborated as the *systematic science of morphological, chemical, and biological properties along with history, cultivation, collection, extraction, isolation, bioassaying, quality control, and preparation of crude drugs of natural origin*.

The **American Society of Pharmacognosy** defines pharmacognosy as "*the study of the physical, chemical, biochemical and biological properties of drugs, drug substances or potential drugs or drug substances of natural origin as well as the search for new drugs from natural sources*".

The ‘crude drug’ is the main component of the pharmacognostic study.

❖ What is ‘crude drug’ ?

It is the raw natural products originated from plant, animal and other natural sources.

It is classified into organized and unorganized drugs-

Organized drugs – the drugs obtained from the direct parts of the plant and having cellular structures are called organized drugs.

Example- Strychnos seed, cinnamon bark, Ipicac root

Unorganized drug the crude drugs which are prepared from plants by some intermediate physical processes such as incision, drying, extraction with solvents and not containing any cellular tissue are called unorganized drugs.

Example- Opium latex, Acacia gum, Catechu extract, Aloe juice

For the identification, authentication and standardization of this crude drug and to make free from its adulterants a series of pharmacognostic parameters have been employed (*WHO have also set some Quality control methods for herbal materials which falls under the scope of pharmacognostic studies*)

- Macroscopic and microscopic examination:

Macromorphology and organoleptic features- Size, colour, odour, test, surface characteristics, texture and fracture characteristics

Micromorphology-

Foliar micromorphology (Epidermal features, Stomatal types, stomatal index, palisade ratio, vein-islet number, vein-termination number)

Trichome- Trichome types & trichome index – lignified trichome in nux-vomica, warty trichomes of Senna, glandular trichome of Mentha

Histological studies (TS, LS, TLS, RLS) Example- **wavy medullary rays of Cascara bark** (*Rhamnus purshiana*)

Powder microscopy- presence of non-lignified vessels in powders of rhubarb and ginger indicate adulteration, powdered clove do not contain sclerieds or calcium oxalate crystals

Quantitative microscopical study- (Lycopodium spore method) cheap analytical technique for powdered drugs- this method is applied for evaluating powder of clove, ginger, cardamom, nutmeg, umbelliferous fruit.

- **Organoleptic studies-** it is the study of crude drug with the help of sensory organs to identify the colour, odour, taste, texture, etc. Example- aromatic odour of Umbelliferous fruits (coriander, fennel, etc.), pale green colour of leaf drug (dried kalmegh, vasak, chirata, etc.), bitter kalmegh, pungent black pepper, etc.

- **Physicochemical properties**

Ash value (Water/acid soluble and insoluble), moisture content (fresh and dried condition), extractive value (polar to non-polar solvent), fluorescent analysis (UV=365 nm)

- Qualitative and quantitative assays of chemical constituents

Qualitative assay- preliminary phytochemical screening using different chemical reagents

Test for	Test/ reagents
Alkaloids	Wagner's reagent
	Dragendroff's reagent
Flavonoids	Shinoda test
Reducing sugars	Fehling's reagent
Proteins	Lugol's reagent
Tannins	10% Lead acetate solution
Lignin	Phloroglucinol

Quantitative assays-

Estimation of total phenolic content, total flavonoid content, total tannin content, total alkaloid content, etc

TLC (Thin-layer chromatography), GLC (Gas Liquid Chromatography), GC-MS (Gas chromatography–mass spectrometry), HPLC (High Performance Liquid Chromatography), HPTLC (High-performance thin-layer chromatography), NMR (Nuclear magnetic resonance), Spectrophotometry, etc.

Bio-assay:

Antioxidant activity

Antimicrobial activity

Antidiuretic activity

Hepatoprotective activity

Cytotoxicity assesment

Etc.

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