



## A Note on Biological Constituents in Pharmacognosy

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### DESCRIPTION

Pharmacognosy is study of plants and other natural chemicals as potential medication sources is known as pharmacognosy. The study of the physical, chemical, biochemical, and biological features of medications, drug substances, or potential drugs or drug substances of natural origin, as well as the quest for novel drugs from natural sources.

Chemical compounds are produced by all plants as part of their normal metabolic processes. Primary metabolites, such as sugars and lipids, are present in all plants; secondary metabolites, which are found in a narrower range of plants and have more particular roles, are found in a smaller range of plants. Some secondary metabolites, for example, are poisons that plants employ to repel predators, while others are pheromones that attract insects for pollination. Inulin from dahlia roots, quinine from cinchona, THC and CBD from cannabis flowers, morphine and codeine from the poppy, and digoxin from the foxglove are examples of secondary metabolites and pigments that can have therapeutic effects in humans and can be refined to generate pharmaceuticals. Plants synthesize a variety of phytochemicals, but most are derivatives: Alkaloids are a class of chemical compounds containing a nitrogen ring. Alkaloids are produced by a large variety of organisms, including bacteria, fungi, plants, and animals, and are part of the group of natural products (also called secondary metabolites). Many alkaloids can be purified from crude extracts by acid-base extraction. Many alkaloids are toxic to other organisms.

Polyphenols (also known as phenolics) are organic compounds containing phenol rings. Phenolics include anthocyanins, which give grapes their purple colour, isoflavones, phytoestrogens from soy, and tannins, which give tea its astringency.

Glycosides are compounds that have a sugar attached to a non-carbohydrate component, which is generally a tiny chemical molecule. Glycosides have a variety of roles in living things. Inactive glycosides are used by many plants to store chemicals. These can be activated by enzyme hydrolysis, which breaks down the sugar component of the molecule, allowing it to be used.

Terpenes are a broad and diversified group of chemical molecules generated by a wide range of plants, notably conifers, that have a strong odour and so may have a protective role. They're the main ingredients in resins and turpentine made from resins. Terpenoids are chemicals that are created when terpenes are chemically changed, such as by oxidation or rearrangement of the carbon skeleton. The major ingredients of many types of plants and flowers' essential oils are terpenes and terpenoids. Essential oils are frequently utilised in cuisine as natural taste enhancers, as perfumery perfumes, and in traditional and alternative medicine, such as aromatherapy. Synthetic terpenes and terpenoids, as well as their derivatives, considerably enhance the range of fragrances available. Perfumes and tastes are utilised as food additives. Monoterpenes are responsible for the scent of roses and lavender. Carotenoids are responsible for the red, yellow, and orange hues found in pumpkin, maize, and tomatoes.

### Natural products chemistry

Digoxin is a purified cardiac glycoside that is extracted from the foxglove plant, *Digitalis lanata*. Digoxin is widely used in the treatment of various heart conditions.

Bioassay-guided fractionation, or step-by-step separation of extracted components based on differences in their physicochemical properties, and assessment of biological activity, followed by another round of separation and assaying, is a common protocol for isolating a pure chemical agent from natural origin. Often, this process begins after a crude medication formulation (typically created by solvent extraction of the natural material) has been determined to be "active" in an *in vitro* assay. If the purpose of the project is to figure out which of the scores or hundreds of chemicals is responsible for the observed *in vitro* activity, the approach to that goal is rather simple: Solvent partitioning or chromatography can be used to fractionate the crude extract. *In vitro* tests are used to evaluate the fractions that are formed as a result.

### Herbal

In the past, up to 80% of the population in various Asian and African nations relied on traditional medicine (including herbal medicine) for basic health care. Prior to European invasion, Native American societies relied on traditional medicine such as ceremonial tobacco smoking, potlatch ceremonies, and herbalism, to mention a few. Traditional medical techniques are becoming extinct, especially in the Amazon.

Traditional medicines or ancient herbal medicines are frequently translated into modern remedies as a result of worldwide pharmacology and medicine research, such as the anti-malarial drug artemisinin, which was isolated from the herb *Artemisia annua*, which was used to treat fever in Chinese medicine. However, its plant extracts were discovered to have antimalarial action, earning it the Nobel Prize.