



INNOVATIVE INTEGRATED TRAINING IN
**HEALING PLANTS
BUSINESS**

IO3 - The Total Business Plants Training Material

Module No. 5

“Medical use of therapeutic plants”

Unit 2

Biognosis

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Unit 2

Ethnobotanical use and modern Phytotherapy

Summary

Here are presented: the main goal of ethno pharmacology which is to study the popular therapeutics; the definition of Traditional Herbal Medicine; the main principles of Phytotherapy; as well as the application of Pharmacognosy and Phytochemistry in the development of new drugs with herbal origin

Learning outcome descriptors

By the end of the Unit, the trainee should be able to:

Knowledge, understanding and professional skills:

1. Understands the differences between ethnobotanical, traditional herbal uses and modern pharmacology
2. Explain main principles of applied phytotherapy today
3. Recognize different types of herbal drugs according to their characteristics

General and transferable skills:

1. Show good written and oral communication skills.
2. Demonstrate general computer literacy
3. Perform computer search to retrieve information from other sources
4. Show ability to use information retrieved for improving professional status
5. Plan tasks and work independently
6. Work in team with minimal guidance where appropriate.

Unit 2

Ethnobotanical use and modern Phytotherapy

First findings about the plant's medicinal use in the primitive civilizations have been based on random observation on animal's behavior. It is known from these observations that when an animal is sick, it selects the appropriate herbal remedy based on its instinctive guidance. Over the centuries these recordings were used in mythology, but also have become the basis from which the first records begin and the first phytotherapy books written. Thus, through centuries, a phytotherapeutic tradition has been established and has reached nowadays.

Large number of traditional healers still possesses knowledge by their ancestors, which so far has been transferred from one generation to the next. As scientific progress becomes increasingly fundamental, the need for scientific proof of the existence of traditional knowledge has been arisen.

Ethno pharmacology

In modern medicine, the term ethno pharmacology, describes the specialty of pharmacy, and especially pharmacology, dealing with the thorough investigation of the biologically active substances observed or used in the context of the traditional culture of the peoples (Bruhn & Holmstedt, 1981).



Journal of Ethnopharmacology Volume 210.

The term ethno pharmacology appears in 1967 by Ephron. Ethno pharmacology, although is a specialty of pharmacy, it is rather a transversal science, precisely because it uses, in addition to pharmacology, several methods and techniques, from other sciences such as botany, pharmacology, cognitive anthropology, linguistics, communication, sociology and biostatistics in order to fulfill its purpose.

The goal of Ethno pharmacology is to study the popular therapeutics, in order to provide the laboratory the natural raw material from which the new drug will be developed. For this purpose, ethno-pharmacologists visit the local populations and in the search for this raw material they use anthropological, chemical and botanical methods.

Medicinal plants: Traditions of yesterday and drugs of tomorrow

Plants have formed the basis of traditional medicine systems all over the world. For thousands of years, the herbal kingdom continues to provide mankind with remedies, like Ayurvedic in India, Ancient Greek medicine, Chinese and others. Although, medicinal plant therapy is based on the empirical findings of hundreds and thousands of years, some of the

therapeutic properties attributed to plants were not verified. The search for new molecules, nowadays, has taken a slightly different route, where the science of ethnobotany and ethnopharmacognosy are being used as guide leading chemist to different sources and classes of compounds.

As seen in the journals, studies on herbal medicines have been encompassed under several different names, such as plant medicine, phytomedicine, pharmacognosy, and natural products. "Natural products" usually refer to products processed or derived from living organisms, including plants, animals, insects, microorganisms, and marine organisms. (Cox P.A 1997)



Residents of a pygman village near Bikoro make baskets Journal of ethnopharmacology

DEFINITION OF TRADITIONAL HERBAL MEDICINES-PHARMACOGNOSY-PHYTOCHEMISTRY

The use of plants for prevention and treatment of diseases is the earliest type of medicine on earth. The practice of traditional medicine developed along with the cultures of ancient Greece, China, India, Egypt, and other places. Different species of plants are used as medicines for treatment in different countries because of the different ecological environments. In countries with long histories and cultures, theories of etiology and pathology, methods for diagnosis, and treatment with herbal medicines or other methods, gradually formed their own complete medical systems finally established. To fully explore the preventative and therapeutic mechanisms of traditional herbal medicines, it is necessary to have a deep understanding of the theories in their corresponding medical systems. (Schultes R.E.1962)

The use of herbal medicines for treatment of diseases was documented several thousand years ago. The vast majority of people on this planet still rely on their traditional Materia Medica (medicinal plants and other materials) for their everyday health care needs.

The profound knowledge of herbal remedies in traditional cultures developed through trial and error over many centuries, and the most important cures were carefully passed on verbally from one generation to another.

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According to the World Health Organization (WHO), traditional medicine refers to health practices, approaches, knowledge, and beliefs incorporating plant, animal, and mineral - based medicines, spiritual therapies, manual techniques, and exercises, applied singularly or in combination to treat, diagnose, and prevent illnesses or to maintain well-being. If the material is of plant origin, then it is called traditional herbal medicine (THM).

Modern allopathic medicine has its roots in ancient medicine, and as it has been up till now, it is likely that many important new remedies will be discovered and commercialized in the future, by following the traditional knowledge and experiences. People, who use traditional remedies, may not understand the scientific rationale behind their medicines, but nowadays we have a better understanding of how the body functions, thus we are in a better position to understand the natural healing powers of plants and their potential as multi-functional chemical entities in treating complicated health issues.

During the 19th century, the most important pharmaceutical discipline and the mother of all present-day pharmaceutical disciplines was pharmacognosy.

Pharmacognosy was for the first time defined as a pharmaceutical discipline in 1815 by Seidler. The definition Pharmacognosy (derived from Greek pharmakon, 'remedy', and gignosco, 'knowledge') is the science of biogenic or nature-derived pharmaceuticals and poisons.

Pharmacognosy deals with all medicinal plants, including those yielding complex mixtures, which are used in the form of crude herbs (comminuted herbal substance) or extracts (phytotherapy), pure compounds such as digoxin, and foods having additional health benefits only in the context of having preventive effects (nutraceuticals).

There are three types of drugs derived from plants:

- Herbal drugs derived from specific parts of a medicinal plants e.g. *Hypericum perforatum*
- Natural products or compounds isolated from nature e.g. digoxin from *Digitalis spp.*
- Nutraceuticals or "functional foods" such as garlic, turmeric etc.

In the 17th and 18th centuries, knowledge about plant-derived drugs expanded, but all attempts to 'distillate' the active ingredients from plants were unsuccessful. The main step came in the early 19th century, when it became clear that the pharmaceutical properties of plants are due to specific molecules that can be isolated and characterized. This led to the development of a field of research now called **natural product chemistry** or, specifically for plants, **phytochemistry**. (Laird S.A, 2002)

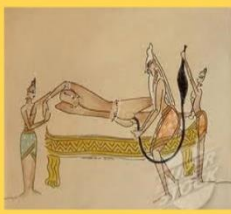

Medicinal plants typically contain a mixture of different chemical compounds that may act individually, additively or in synergy to improve health. A single plant may contain different chemicals, such as analgesic compounds and anti-inflammatory compounds that reduce swellings and pain, bitter substances that stimulate digestion, antioxidant compounds, anti-bacterial and anti-fungal that act as natural antibiotics, but also diuretic substances that

enhance the elimination of waste products, and toxins and alkaloids that change the mood and the perception.

Considering that the biological activity may be the result of the combination of several compounds, the isolation process may lead to its loss or reduction (Raskin & Ripoll, 2004), even though modern allopathic medicine usually aims to develop a patentable single compound or a magic bullet to treat specific conditions.

In fact, it is already well known that sometimes the complex mixtures of compounds in herbal medicines-phytochemicals, have greater effects than isolated compounds (Gomez Castellanos et al., 2009). Herbal medicine often aims to restore balance by using chemically complex plants, or by mixing together several different plants, in order to maximize a synergistic effect or to improve an interaction with a relevant molecular target. It is reasonable to assume that a mixture of compounds (phytochemicals or synthetic) would have greater bioactivity than a single compound because a mixture of bioactive compounds has the ability to affect multiple targets (Schmidt et al., 2008). In most societies today, allopathic and traditional systems of medicine are placed side by side in a complementary way. The former treats serious acute issues, while the latter is used for chronic illnesses, in order to reduce symptoms and improve the quality of life in a cost-effective way.

Therapeutic Potential of Ayurveda for Parkinson's Disease

<p>A. Natural levodopa substitution (with potentially reduced dyskinesias):</p> <p><i>Mucuna pruriens</i> L.(DC)</p>		<p>C. Neuroprotection:</p> <p><i>Withania somnifera</i></p> <p><i>Curcuma longa</i></p> <p><i>Mucuna pruriens</i></p>	
<p>B. Non motor dysfunction:</p> <p>Panchakarma (alternative delivery routes)—Basti & Nasya</p>		<p>D. Specific Symptoms and preventative support: <i>Centella asiatica</i> (L.)Urb, <i>Convolvulus pluricaulis</i> Chois, <i>Saraca asoca</i> (Roxb.) Willd., etc</p>	

Namyata Pathak- Gandhi Ashok D.B.Vaidya Journal of Ethnopharmacology 2017

The traditional herbal medicine (TCM) involves botany, chemistry, biology, pharmacology, toxicology, clinical trials, and other disciplines. Chemical composition and biological or biochemical activities of many herbs have been studied by researchers in universities and pharmaceutical companies for investigation purposes or new drug development.

Although conventional medicine is the mainstream medicine in Western countries, application of traditional medicine, including herbal medicines, is growing worldwide for many reasons, in particular, for the side effects or inefficacy of modern drugs.

Nevertheless, Phytomedicine is not accepted by the medical community and pharmaceutical industry because of a belief that it lacks safety and efficacy validation and regulations, as well as concerns on poor standardization and quality control, mistakes in nomenclature

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(Houghton, 1998), difficulties in identifying active ingredients and determining their complex modes of action (Raskin & Ripoll, 2004). It's a common belief that, in herbal medicines, the amount of supposedly active constituents is too low to have any relevant therapeutic effect at all. This assumption has led skeptics to dismiss these medicines as placebos (Williamson, 2001). This is not true. In a recent survey on roughly 1000 herbal medicines, only for 156 of them, emerged clinical trials supporting specific pharmacological activities and therapeutic applications. Indeed, the complexity of plant extracts makes the development of an evidence-based herbal medicine a difficult task that requires a huge analytical effort and manufacturing skills to produce well-defined, standardized herbal preparations (Cravotto et al., 2010).

RESEARCH AND DEVELOPMENT OF HERBAL MEDICINES

The herbal medicines and the treatment of diseases began with the use of herbs. For over 1500 years, the classical and most influential book in Europe had been Dioscorides' *De materia medica*. When the monographs of plants appeared, they present an illustration of the healing plant, the botanical name of the plant and its synonyms, its action and the indications for its use. When we consider that the history of classical herbal medicine spans more than 2500 years, we can assume that many of the medicinal herbs used during that period not only have specific actions but also are free of hazardous side effects. We have to estimate all this empirical experience of more than 70 generations of patients and physicians and not accept it as simply a "placebo effect" (Benedum, 1998).



Papaver somniferum



Piper nigrum



Piper nigrum

Phytotherapy as a science today

Phytotherapy is the science of the use of plants in the treatment of diseases. It covers all medicines, from medicinal plants with strong effects such as dactylitis, mandragoras, to those with mild action, such as chamomile, peppermint, etc. Phytotherapy is a complementary or alternative therapeutic practice aimed the holistic treatment of the

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patient. For the development of phytotherapy as a science, specialists from various research fields have been involved in order to make better use of herbal properties. The herbal medicinal products contain mixtures of active and inactive ingredients derived from different parts of plants, other plant materials, or combinations of them, are defined as dietary supplements or as alternative therapeutic agents.

The following definitions are described for the various forms of phytotherapeutic agents:

An herbal medicinal product is defined as a product containing exclusively as active ingredients one or more herbal substances, or one or more herbal preparations, or one or more combinations of them.

Plant substances are mainly defined as whole, cut or cut plants, parts of plants, algae, fungi, lichens, which are unprocessed, usually in dried form but also sometimes fresh. Certain exudates, which have not undergone special treatment, are also considered as herbal substances. Plant species are precisely determined, by the part of the plant that is used, as well as by the plant's name according to the binomial system (genus, species, variety and author).

Herbal preparations are preparations obtained by subjecting the plant substances to treatments such as extraction, distillation, extrusion, fractionation, purification, condensation or fermentation. They include sliced or powdered herbal substances, tinctures, extracts, essential oils, and juices obtained by pressing and treated exudates.

In relation to the efficacy and safety of herbal medicinal products, they are distinguished (<http://www.ema.europa.eu>) in:

1. Phytotherapeutics with scientifically proven therapeutic safety and/or efficacy (Herbal Medicinal Products HMP)
2. In phytotherapeutics traditionally used in 'popular therapy' (THMP).

In relation to their existing use, herbal medicinal products are distinguished in (Directive 2004/24 / EC - 20/04/2011):

1. Herbal Medicinal Products (HMP) or Well-established Use (Phytotherapeutic Products) with scientifically proven therapeutic safety and/or efficacy.
2. Phytotherapeutic products traditionally used in traditional herbal medicinal products (THMP) or traditional use. This category requires proof of security. To make a product effective and safe, its use should be longer than 30 years.
3. Pure plant substances such as digoxin. In this case, a "complete dossier of proof" is required as for conventional medicines.

In recent years, efforts have been made to apply in phytotherapy the principles of scientific research developed over the last decades to the scientific community. Phytotherapy is the science that implements scientific research to find and confirm the beneficial properties of plants in various daily health problems, with no contraindications and side effects. It is a natural and comprehensive treatment. The modern scientific knowledge of recent decades

through extensive clinical research, consistently confirms the great value of the "secrets" of phytotherapy in human health! Almost 80% of the active ingredients of conventional drugs, such as aspirin, morphine and quinine, have their roots in the science of phytotherapy! (Newall, C. A., Anderson, L. A., Phillipson, J. D. 1996).

In order to understand the extent of the science of phytotherapy, we should keep in mind the following:

- 80% of the 30,000 known chemical molecules of natural origin are of plant origin.
- More than 7,000 pharmaceutical preparations of plant origin, which are marketed in the pharmaceutical market, derived from 100 plant species, while 121 prescription drugs are derived from medicinal plants.
- 75% of the traceable herbal preparations are used, are based on traditional pharmaceuticals (Ravinshankar, 2002).

Principles of phytotherapy

Phytotherapy is based on relationships, such as the relationship between plants and man, and plants and planet. When using plants for healing, we have the opportunity to treat consciously the planet we live in. When we coordinate with the healing power of the planet, our whole bio-life is changing for life. The term "holistic" has been used to describe the "whole", not the "part". Many therapeutic systems are considered holistic because they do not focus on the disease of an organ, but consider humans as a set of organs and functions. We will try to describe the principles on which holistic therapies are based on system theory and applied to phytotherapy. (Volker Schulz, Rudolf Hansel, Mark Blumenthal, Varro Tyler 2004)

Principle of Interaction – Unity

Nature is not a random accumulation of objects and phenomena detached from one another. It is a single set and each part interacts with each other.

The theory of systems uses the term open and closed system. An open system is the system that exchanges materials, actions or information with its environment. Instead, in a closed system there is no exchange with the environment. By using this definition, all organic systems either biologically or socially are open. There are no separate and isolated instruments or functions, but the whole is united to compose a biological reality.

Principle of global change

The universe is in constant motion. Every passing second, the universal occurrence is different from what it was a second ago. This continuous change is kept within limits so that the system is maintained in a controlled balance. Homeostasis becomes possible by using information coming from the external environment and incorporated into the system, in the form of feedback. Feedback expresses the regulator of the system that changes its internal conditions but maintains its steady form. That is why homeostasis is a form of change in

which the form is kept stable. Morphogenesis is the type of change in which there is a new form. Thus, while self-protection characterizes homeostasis, self-direction characterizes morphogenesis. Each system uses both of these types in the continuous change process. In daily phytotherapeutic practice, the therapist should keep in mind that the condition of the organs and functions is variable and that he can, at any time, either be directed to heal or worsen to destruction. Therapies of phytotherapy are a constant support and activation of the healing powers of the body.

Principle of the fight of opposites

Every manifestation of the universe is a phenomenon defined by the equilibrium of two opposing forces. The apparent antagonism of these two forces is in fact a wonderful collaboration, as for example, in the cortex of brain hemispheres. Excitement and inhibition, as essential elements of superior nervous functions, are thus in uninterrupted relationship, and in an apparent rivalry. Another example is the antagonistic cooperation of sympathetic and parasympathetic. The sympathetic nervous system is in charge of the reactions of human organism, in emergency situations, when we are about to make a great effort in the minimum time, using maximum force. The parasympathetic one is designed to generate energy and restore what has been lost. So while seemingly opposing, they work together harmoniously on different levels. The body's hormones and any chemical compound or trace element may be considered, depending on its function, to have sympathicotonic or parasympathetic activity. Thus physiology is studied systemically, based on the principle of interaction and the principle of the struggle of opposites.

Thus, we can distinguish all the chemical compounds of the organism into sympathicotonic and parasympathicotonic. Many compounds are sometimes sympathetic and sometimes parasympathetic.

Principle of action and reaction

When a force is exercised on a system, then a counter force will develop, as a component of the system. When a substance is given, it causes a certain action in the body. This action causes a deviation from the previous equilibrium state. The organism's self-regulatory system is informed of this change. After substance's action, a counter-action from the self-regulatory system of the organism is mobilized.

What matters most to therapeutic practice, is that the therapist can know which of the patient's symptoms are due to the condition and what the body's attempt to restore balance. This also applies to phytotherapy, the therapist needs to know what the symptoms are due to the disease and what the symptoms are due to the lack of substances.

Principle of cyclical evolution of phenomena

When between two interacting forces one increases too much, then this leads to the ultimate increase also of the opposite one. Then, in healing, the therapist's attention should not be focused on only one symptom, but all of them (Principle of Interaction - Unity). This set of reactions, is not only symptoms of the disease, but also includes symptoms that are the body's efforts to recover, as symptoms that are considered to tend to lead in balance.

The healer is not interested in finding the source of symptom but simply follows his current. The organism is faced as a self-regulating system, which tends to achieve its own balance.

Principle of individuality

In one system there are not two subsystems that are completely identical. There are not two completely identical patients. There are no illnesses but patients. Each person is a unique phenomenon, has his own, distinct personal story. This principle also applies to the use of phytotherapy in practice. Phytotherapy is personalized according to the needs of the individual at each examination. Treatment is most effective when is personalized.

Principle of hierarchy

In each system there is a hierarchy among its members. In human body there is a hierarchy between organs based on their function. There is also a hierarchy between the medical conditions. Certainly different severity has eczema, asthma, or depression on the patient. Understanding the hierarchy of the diseases is very important for the design of the patient's therapeutic scheme. It is better the therapist not to refer to other specialist for each new medical symptom, but to try to estimate its significance as a part of the patient's condition at the time. Treatment in any case should not focus on local symptoms but on the overall picture displayed by the patient.

Understanding of the hierarchy of the disease in relation to time is also significant in planning of therapeutic scheme.

Principle of conversion of quantity into quality

The process of development is not a simple growth process, where quantitative changes do not result in qualitative changes. It is a continuous development that goes through insignificant and latent quantitative changes to obvious and radical changes that are qualitative changes. In the clinical practice of phytotherapy, this is also the case. When a treatment regime is applied, aiming to eliminate constitutional sensitivities of an individual, the person may not see any improvement for weeks and consider that the treatment may not work. But when he thinks there is stagnation, suddenly there is a period of rapid recession of the symptoms.

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