

## Chapter 7

# Phytoparmaceuticals and Its Applications in Therapy

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### ABSTRACT

*Medicinal plants have been used to treat illnesses since medicine began. Nowadays, 80% of the population in the planet uses drugs directly or indirectly derived from plants. In the past, natural products were used empirically; people experimented with them as helpful for their well-being and learned to treat ailments with specific plants. Henri Leclerc introduced the terminology of phytotherapy into medical science and this concept refers to study of the use of extracts of natural origin as medicines or health-promoting agents. Usually pharmacology isolates an active compound from a given plant, phytotherapy aims to reserve the complexity of constituents from a plant with moderately less processing. Phytopharmaceuticals (PP) are composed by one plant species or by complex mixtures of plants, presented in a natural or in a pharmaceutical form. The tendency is to use standardized plant extracts in the formulation, obtained by a patented extraction process. PP need to fulfill the same requirements as other medical products: safety, efficacy and consistent quality.*

### CONCEPTS

Medicinal plants are the source of raw materials for traditional medicine such as, Ayurvedic, Chinese, Unani, Homeopathy, and Siddha but also for modern medicine base in natural products. These days, plant materials are used in industrial scale as home remedies, over-the-counter drugs, and ingredients

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for the pharmaceutical industry. They represent a substantial proportion of the market around the world, especially in developing countries (*Bandaranayake, 2006*).

The concept phytopharmaceutical is derived from the Greek root *Phyton* which means plant and *Pharmakon* which means medicine. The literal translation is a drug based on a plant. Phytopharmaceuticals must be considered as drugs, whose active compounds are exclusively plant based, and they are constituted of plant parts, extracts, juices or distillates. The conception is that a plants or parts of them are therapeutic entities in phytotherapy (*Wichyl, 2004*).

The term phytomedicine was first introduced by Henry Le Clerc (1870-1955) and it is related to the therapeutic application of medicinal plants. Today phytomedicine is defined as the science or the art to use of botanical medicine to prevent or treat illnesses (*Braun, 2010*).

The term “herbal medicine” is full of misconceptions, related to the diversity of its approaches. Herbal medicine can be categorized into three general groups: phytotherapy over-the-counter, herbal medicine and traditional herbalism. Among these, phytotherapy is the one that follows scientific methodology and generates results related to the effects of the phytopharmaceutical. Based on the general principles of phytotherapy, plant material contains a number of pharmacologically active compounds, and they should be seen as a single unit. For example, an extract can be standardized, in order to contain a well characterized concentration of active compounds and then could be tested for a clinical condition (*Mohamed, Shuid, Borhanuddin & Fozi 2012*).

In 2002 the botanical trade of herbs and medicinal plants, in the U.S.A. was estimated, a retail of approximately US\$ 1.6 billion. China with exports of over 120,000 tons and India with some 32,000 tons per year, both dominated the international markets. It was estimated that Europe, annually imported about 40,000 tons of medicinal plants with a market value of US\$ 1 billion from Africa and Asia. For foreign-exchange reserves the medicinal plants are a new contributor beginning to emerge. To satisfy the demands on this growing market, some analyses are being conducted to unearth new plant sources of herbal remedies and medicines (*Dasture 2002*).

Medicinal plants are a major resource base for the traditional medicine and pharmaceutical industry; they also provide health security and livelihood to a huge part of Indian population. In 2015, there is a new renaissance in traditional and alternative health care systems, resulting in world herbal trade which stands at US \$ 120 billion marked. It is expected to reach US\$ 7 trillion by 2050. The National Medicinal Plants Board (NMPB) set-up in November 2000 by the Government of India has the primary mandate of coordinating all matters relating to medicinal plants and support policies and programs for growth of trade, export, conservation and cultivation. The Board is located in the Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha & Homeopathy (AYUSH) of the Ministry of Health & Family Welfare (National Medicinal Plants Board, 2015).

PP are multicomponent mixtures of natural origin either in the crude state or as pharmaceutical formulation and their use increases due to the advantages in the therapy of several diseases such as good tolerability. They need to fulfill the same requirements as other medicinal products safety, efficacy and consistent quality. Usually, standard pharmacology separates and purifies a single active compound from a specific plant; on the other hand phytotherapy aims to preserve the complex mix of active compounds from it, avoiding the necessity of more processes (*Schweim & Schwewim 2014*).

Standardized PP must have a specific content and concentration of diverse active metabolites well characterized that will act as the active drug. Substances with exogenous origin have to be quantified and they have to be under the limits recommended by the regulatory agencies of every country (*Zuin & Vilegas, 2000*).

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