

Traditional Medicine: An Ancient Remedy Rediscovered

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Abstract

The medicinal plant power is often neglected or underestimated. In fact, many people ignore that most of the drugs they use come from plants. A large amount of herbal products have been used in traditional health care since prehistory, being employed for the first time in ancient China. Plants are still the most important health care source for the vast majority of the population around the world. Traditional Medicine implies the use of plants and/or active principles because of their curative properties, easy availability and poor side effects, or because other drugs are inaccessible; therefore, herbal remedies are gaining importance and expanding throughout the world. This review focuses on the importance of plants from South America.

Keywords: Andes; Ecuador; Herbal remedies; South America; Traditional medicine

Traditional Medicine

Around the world, the use of plants with pharmacological properties is the main medical resource. This practice is known as Traditional Medicine (TM), Indigenous Medicine or Folk Medicine. According to WHO [1], TM includes knowledge, skills, and practices based on the theories, beliefs and experience proper of different situations, applied to the prevention, diagnosis, improvement or treatment of physical and mental illness.

TM implies the use of many herbal products that contain whole plants, parts of plants (leaves, roots, stems, fruits, flowers, seeds, twigs and barks) or isolated active compounds advantageous against several health disorders [2,3]. The relationship that exists between people and plants is scientifically defined as Ethnobotany [4]. This knowledge is passed from generation to generation in populations around the world, usually by word of mouth and/or cultural rituals [5].

About 80% of the world population, both in developing and developed countries, uses TM for the maintenance of good health [6,7]. Its use is widespread mainly in countries of Africa, Asia and Latin America, where the economic situation is too critical for obtaining potent and effective drugs. [8-10]. In Africa, TM is applied mainly in the treatment of malaria [11], given that this country carries the highest level of infection by the *Plasmodium* species responsible for this disease [12]. TM can be also a source of income, as it occurs in China and India, where traditional health practices have evolved and developed over the years and are accepted as alternative therapies [13,14].

Many plants are effective as anti-inflammatory [15,16], analgesics [17,18], antimicrobial and antispasmodics [19,20], antidiabetics [21], antiviral [22] and even antitumoral [23-26], possibly through a general antioxidant activity [27]. In fact, medicinal plants are a source for a wide variety of natural antioxidant compounds and may exert their effects *via* several mechanisms, including the inhibition of the activities of cyclooxygenase-2 (COX-2) and Nuclear Factor-Kappa B (NF- κ B), angiogenesis and activation of Nrf2-mediated antioxidant signaling [28].

South America: A green-gold rich land

In South America (e.g. Ecuador, Peru and Bolivia), herbal medicine is extensively practiced by ethnic groups and frequently used by a broad cross-section of the larger society [29,30], representing an alternative to expensive Western medicine [31]. In this zone, many factors

interfere with the vegetative growth, i.e. temperature, rain, radiation, persistent leaf wetness, high wind speeds, and others climatic factors; water, acidity, and nutrients are important as well [32,33]. In South America, there is a large ecosystem with a wide variety of natural and vegetative regions: the Andes, which are characterized by the presence of about 40,000 plant species, more than in tropical Africa and Asia together, representing 15% of the total in only 1% of earth's surface. Most of this diversity is found in the lowland and mid elevation of the Andean mountains [34,35]. Local populations, mainly indigenous groups, transmit their ethnobotanical knowledge from generation to generation maintaining their ancestral traditions in the use of natural remedies [29,30,36,37].

The variety of plants in this area and their peculiar habitat explain their medicinal potential [6,11,38]. The chemical compounds responsible for the pharmacological activity are known as secondary metabolites, small organic molecules that are often made in a restricted and limited number of plant species, a genus, a single family, or a few families, and are used as medicinal remedies through the consumption or as botanical formulations [7].

Within the Andes, Ecuador, including also the Galápagos Islands, is bordered by Colombia on the North, Peru on the East and South, and by the Pacific Ocean to the West, and possesses the highest biodiversity in the world. There are two important vegetative areas: Yasuní National Park, with an area of 9,820 km², located between the Napo and Pastaza provinces, at the north-western of this country; Podocarpus National Park, with an area of 1462.80 km², located in the provinces of Zamora Chinchipe and Loja, in the South-East of Ecuador, both with a large and rich variety of plant species [35,39,40].

Loja, a province located at the South Ecuador, is crossed by the Andean mountains, which give rise to an irregular topography with difficult access. Altitudes vary between 700 and 3700 m.a.s.l. The

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province shows a considerable variety of climates: a tropical dry climate in the Western region, a subtropical humid climate in the central region, and a temperate one in the Eastern region [30]. Loja is spread on 10,793 km², has about 400,000 inhabitants and is characterized by abundant hydrographic resources, especially rivers that flow into the Pacific catchment [29].

TM practitioners in Ecuador come from ethnic or indigenous groups that are distributed throughout this country and are generically known as Healers (*curanderos* in Spanish) or Cleaners (*limpiadores*), who use extensively magical plants for the treatment of supernatural folk illnesses as “Susto”, a fright sickness, and others [41,42]. Saraguros, an indigenous group located at the North of Loja Province are one of the best-organized ethnic groups in Ecuador, having their own culture, language, and social habits; they live on agriculture and cattle breeding, using ancestral techniques. Therefore, Saraguros are deprived of modern drugs, thus they are forced to use the only available medical resources, *i.e.* plants [29,43].

In 2006, Bussmann and Sharon [30] have described more than 75 families of plants with pharmacological properties just in Loja. Thereafter, in Loja and Zamora Chinchipe provinces, more than 270 species of plants with therapeutic uses have been listed in 2007 [29]. Some plants included in this long list have been already scientifically investigated, while others have not yet been studied in order to support its effectiveness against certain diseases.

As mentioned above, chemical compounds present in plants are responsible of their pharmacological properties. For example, *Gynoxys verrucosa*, a shrub belonging to the Asteraceae family, commonly known as Guangalo, is used in TM in Southern Ecuador by Saraguros tribe for the treatment of skin infections and wound healing by direct application to the skin [29,44]. This Asteracea contains an interesting compound called Dehydroleucodine (DhL), a guaiane-type sesquiterpene lactone, which has been demonstrated to prevent gastrointestinal damage elicited by necrosis-inducing agents and to exhibit anti-inflammatory action [45], thus explaining the anti-allergic activity of *Gynoxys verrucosa*. Moreover, DhL has an inhibitory effect on cytochrome P450 [46]. However, the bases of the pharmacological properties of DhL and *G. verrucosa* still remain to be elucidated.

At present, the use of herbal products in developing countries is a common habit and, generally, these products are mainly found in foods of daily consumption. Many vegetal compounds can be effective against a single type of disease, while other plants are used to treat various types of physical or mental disorders, such as intestinal and respiratory illnesses, fever, bacterial and viral infections, rheumatic, gynaecologic, and blood circulation problems, inflammation, pain, and folk illnesses or Culture-bound Syndrome. This latter is known as a combination of psychiatric and somatic symptoms, considered and accepted as a disease only within a specific society or context [47], like in the indigenous culture.

From the above considerations, it appears that Traditional Medicine is a practice used since centuries and still valid to face a number of diseases, often on the basis of ancient customs. The scientific community is actively involved in identifying the active principles of medicinal plants as well as in depicting the molecular mechanisms governing their beneficial activity. A joint effort is requested to combine the traditional knowledge with an accurate pharmacological and biochemical approach.

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