

# Medical plants: from Colonial Brazil to their indication by the National Single Health System – SHS

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**Abstract**— Traditional knowledge of medicinal plants contextualizes the history of humanity. Thus, this research aims to analyze the use of medicinal plants in Brazil, addressing the historical aspects, the regulatory framework, and the prospects of proof and indication by SHS. Human kind has always used medicinal plants, described 60,000 years ago B.C. and 5,000 years ago B.C. by Chinese medicine. In Brazil, due to the wide biological diversity of fauna, flora, and traditional communities, it is a historical representation of human interaction with ecosystems. Some naturalists who have traveled throughout Brazil during the Colonial and Imperial periods, resulting in works such as *Natural History of Brazil and Nature, Diseases, Medicine and Remedies of Brazilian Indians*, have described the reports on the use of plants. The field diaries and drawings produced by the travelers were essential for the development of research. Only in the twentieth century it was possible to perform more complex pharmacological tests, and the regulatory framework governing the production, use, and regularization of medicinal plants was subsequently approved, as well as in the National Program of Medicinal Plants and Phytotherapies, phytotherapeutic drugs were inserted into the treatment of diseases of the Single Health System. The interculturalization of traditional knowledge by the different cultures that make up Brazil is a unique factor in the dissemination of phytotherapy present in the national floristic diversity.

**Keywords**— Medical plants, National Single Health System, SHS.

## I. INTRODUCTION

The ethnobotanical knowledge involves a set of useful plants with multiple utilities, such as ornamental, timber, medicinal, among others (FLORENTINO; ARAÚJO; ALBUQUERQUE, 2007). Medicinal plants are used since the emergence of humankind for presenting therapeutic properties that help in the prophylaxis and cure of diseases, fulfilling an essential role in culture, medicine, and nutrition worldwide, an understanding value associated with the knowledge of traditional communities (ANTONIO; TESSER; MORETTI-PIRES, 2013).

The concept of traditional knowledge was widely defined by Littler (2010, p. 12) as knowledge belonging to indigenous peoples, agro-extractivist populations, quilombolas, riverbank dwellers, and other social groups called traditional. The experience of these communities has a historical, social, environmental, and cultural context such as lifestyle, struggle, and survival of people who have long been marginalized (GRZEBIELUKA, 2012).

Given the socio-cultural aspect, from primitive societies, the Middle Ages, the period of great navigations to the regulation and use by the Single Health System – SHS, there were frequent changes in the way of life, emphasizing the conservation of the use of medicinal plants by traditional communities (ROCHA *et al.*, 2015). According to Mota & Dias (2012), the knowledge is passed on orally and may be lost over time; generally, older people are the holders of knowledge about medicinal plants, because there is not always interest among younger people.

In general, there is little appreciation of younger people about the traditional knowledge related to the use of medicinal plants, in this aspect can infer in the loss of this local knowledge (OLIVEIRA; MENINI NETO, 2012). Significantly, there is a systematization of this knowledge, providing inter-scientificity. According to Giraldo & Hanazaki (2010), the use and understanding of medicinal plants is a decisive factor, for giving the strengthening of

local knowledge and direct contact with the flora.

In this sense, the neo-traditional knowledge addressed by Begossi (2000), presents characteristics of relative importance, as well as a baggage of new and emerging experience. That is, the neotraditional knowledge is in constant change, following the process of changes in traditional communities that may culminate in devaluation or gains for local identity.

For Zuchiwschiet *al.*, (2010; p 270), traditional knowledge is the contact of humans with natural resources, knowing that it is passed through generations and does not constitute a stabilized body, being particular forms of knowledge construction (CUNHA, 2009), which means that traditional knowledge is timeless, with only its traditional procedures, not the referents (SILVA, 2018).

Traditional knowledge is one of the most critical assets in the construction of the historical, cultural, and political identity of a people (DUTT; BHAGAT; PANDITA, 2015). Each community has a system based on beliefs particular to the local way of life. These principles are involved, because they emphasize a specific historical, environmental, spiritual, and social context, culminating in a diversity of knowledge and modes of relationship with the environment (LITTLE, 2010). The variety of expertise supports thousands of systems that must be studied to be valued.

Baptista (2010) states that public policies try to value cultural diversity, but some communities often insist that only scientific knowledge is valid. The scientific study of cultures is a critical factor for the appreciation of communities, resulting in empowerment and social struggles (SILVA, 2018). These set of knowledge in the field of ethnobotany when scientifically proven its effectiveness, contribute to the appreciation of local culture and ways of life of the population (AMOROZO, 2001).

Human relations with nature make up a system of beliefs and practices, called kosmos-corpus-praxis (k-c-p), the cosmos is related to the operation of ideas and cosmovisions, corpus is the system of systematized knowledge, and praxis is the system of practices and behaviors, in this triad science accepted the dialogue with the existence of other types of experience (TOLEDO; BARRERA-BASSOLS, 2009). The traditional knowledge is a perspective of the relationship of the individual with the environment, configured according to the particularities, needs, and perceptions experienced in community.

The interactions between traditional communities and plants in countries of broad biological diversity such as Brazil is the target of bioprospecting new molecules with pharmacological, agricultural, and industrial applicability

(SANTOS, 2012). Concerning the valuation of traditional knowledge, this research has the primary objective of analyzing the use of medicinal plants in Brazil, addressing the historical aspects, the regulatory framework and the prospects of proof and indication by SHS.

## II. MATERIALS AND METHODS

This research deals with exploratory, bibliographical, and documentary studies. In general, the sources of research and case studies represent a bibliographic survey on the subject according to Prodanov& Freitas (2013; 51-52). The composition was based on the search for studies indexed in databases such as Scielo, Google Academic, and Science Direct. The consultations to the journals had a chronological cut with timeless delimitation.

The literature review addresses topics related to the use of medicinal plants based on issues, according to reference researchers in the area. Historical aspects of the use of medicinal plants (PETROVSKA, 2012). Medicinal plants in imperial Brazil (DEAN, 1991; DEAN, 1992). Legislation regulating the use of medicinal plants in Brazil (BRAZIL, 2019) and the Policy and Program of Medicinal Plants (BRAZIL, 2019).

From this literature review, it was sought to contemplate official documents of the National Policy and Program of Medicinal Plants and Herbal Medicines, which guide the botanic control, microbiological, chemical, and pre-clinical and clinical trials of the drug<sup>1</sup>, to ensure the quality of the final product.

The data were qualitatively verified through content analysis. According to Bardin (2009), the study of the material requires its codification, i.e., the transformation of text data by clippings, aggregation or enumeration, until its codification reaches the representation of the content or its expression.

## III. RESULTS AND DISCUSSION

### 3.1 Historical Aspects of the Use of Medicinal Plants

Throughout the evolutionary process, the relationship of primitive man with floristic biodiversity led to adaptations for survival in the environment, with the domestication of species and knowledge of medicinal potential through experiences and instinctive observations in nature (PETROVSKA, 2012). Over the centuries, the use of medicinal plants is considered one of the oldest practices of humanity as a form of prevention and treatment of diseases from remote times to the use by SHS (FIRMO *et al.*, 2012).

Historical data show that from the existence of

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<sup>1</sup>Substance or raw material that has medicinal or sanitary purpose (Law nº 5991/73).

primitive societies, men began to cultivate plants with therapeutic and food properties (FRANCO; FERREIRA; FERREIRA, 2011). Contemporary society is formed by the cultural heritage of the Chinese, Babylonians, Assyrians, Hebrews, Greeks, Egyptians, and Hindus among other civilizations that reported the use of medicinal plants (PATWARDHAN *et al.*, 2015).

The use of medicinal plants precedes the appearance of writing, and there is no exact date of the first use of these plants. The management of nature for its own benefit is a biological, genetic, evolutionary, and adaptive mechanism, and medicinal plants have been used for the well-being of humankind since the beginning, about 60,000 years B.C. (ROCHA *et al.*, 2015). The history of medicinal plants is not only based on experiments over the years but contextualizes the historical aspects of humanity.

The first written evidence of the use of medicinal plants dates back approximately 5,000 years B.C., found in a clay slab in Nagpur Sumer, which contained twelve recipes for the preparation of drugs with more than 250 different plants, some with alkaloid therapeutic potentialities, such as poppy, henbane and mandrake (PETROVSKA, 2012; KELLY, 2009).

Around 2,500 B.C. the Chinese emperor Shen-Nung wrote the book “Pen T'Sao”, the paper addressed 365 remedies from the hard parts of medicinal plants, most of which are used until today as *Rheirhizoma*, *Theae folium* and *Podophyllum* (PETROVSKA, 2012). Shen-Nung considered the father of Chinese medicine, for being the holder of the knowledge of poisonous herbs used to worship Pan Ki, the God of Taoist creation (SANTOS *et al.*, 2006; FIRMO *et al.*, 2012).

With intertwined knowledge, medicinal plants were mystified, and some plants were considered divinities (DUARTE, 2018). In India, the sacred book of the Vedas reported the use of plants to treat diseases in the country (PETROVSKA, 2012). Among the medicinal herbs known worldwide of Indian origin are nutmeg, pepper, clove, and others.

In 1,500 B.C., a record of the use of medicinal plants was found in an Egyptian manuscript called “EbersPapyrus”, which contained information on 700 drugs and 811 prescriptions, the plant with most prominence was Ginseng (*Panax ginseng spp*), used in the pharmaceutical industry (DUARTE, 2006). These manuscripts consisted of the traditional design for better living conditions and human health.

According to Leite (2009), in Mesopotamia around 2,600 B.C. plants such as *Cedrus sp.* (cedar), *Glycyrrhizaglabra* (licorice) and *Papaver somniferum L.* (poppy) were used as a natural medicine, which is currently used for pathologies known in Yin-Yang, one of

the most critical natural therapeutic treatments of Chinese culture (PORTELINHA *et al.*, 2017).

In Homer, “The Iliad” and “The Odyssey”, major epic poems of ancient Greece, written around 800 B.C., mentioned 63 species of medicinal plants used in Assyrian, Mycenial and Egyptian pharmacotherapy, some plants were named with names of mythological characters of these epics, as in honor of Elena, the reason for the Trojan war was called the elecampane (*Inulahelenium L. Asteraceae*) (PETROVSKA, 2012).

Greek mythology also influenced the nomenclature of plants, listing Artemis, goddess of wild nature that means healthy, and naming the plant genus *Artemisia*, which was trusted to restore energy and improve health (WRIGHT, 2003). The Greek civilization stands out about the use of medicinal plants by the works of Hippocrates (459-370 B.C.), which contain more than 300 plants characterized by physiological action (MOITA, 2015).

Hippocrates, considered the father of medicine and the most famous doctor of antiquity, studied traditional medicine and healing through indications of medicinal plants, discarding supernatural approach to abnormal behavior of the physiological system (DE SOUZA; BAPTISTA, 2017). Greek medicine has changed the way it interprets disease with the health-disease binomial, which considers illness as an imbalance of natural forces that are inside and outside the person (FERNANDES; OLIVEIRA, 2016).

With Christianity, the Holy Bible describes passages in which God created plants and herbs for healing physical illnesses (II Kings 20:7; Psalms 51:7), as well as emotional ones (Genesis 43:11; Psalms 45:8; Song of Songs 2:5). Several biblical passages and the Jewish book Talmud expose the use of aromatic and incense plants during the rituals of treatment of diseases (DIMITROVA, 1999).

The Bible addresses the spiritual and ceremonial issue of healing plants. Thus, during the Middle Ages, knowledge about plant cultivation was assigned to monks who planted around monasteries and churches, usually as food and medicine, whose uses became frequent and effective (FUND AJ, 2009).

In the 21st century, studies around the world confirm that practices in Complementary Alternative Medicine (CAM) cover a significant percentage in developed countries. In Europe, the MAC has more and more followers, with 75% in France, 70% in Canada and 42% in the USA, with several natural pharmacies (FUND AJ, 2009; ZENI *et al.*, 2017; WHO, 2002). It is estimated that 80% of the world's population uses herbal medicine as an aid in the treatment of diseases together with conventional medicine (WHO, 2002).

In this perspective, the term herbal medicine is the specific adjective that addresses the use of medicinal plants, the same is of Greek origin *phyton*, which means vegetable and treatment therapy, the approach consists of treating diseases with medicinal plants *in natura* or processed in the form of medicines (ALVES; SILVA, 2003).

The history on the use of medicinal plants in remote Brazil the traditional communities that inhabited the Brazilian territory before the period of the great navigations, around the year 1500. However, research to systematize this knowledge began in the colonial period, with the presence of naturalists sent by the crown in the 16<sup>th</sup> to 19<sup>th</sup> centuries (ALVES, 2013).

The first report on Brazilian biodiversity was described on May 1, 1500, by the scribe Pero Vaz de Caminha to the king of Portugal, in which he wrote “the many, infinite waters”, reporting the landscape, the trees, some animals and the fertility of the newly discovered land with wealth of detail and admiration (DA COSTA, 2017).

In this letter, the presence of the Indians is something perceived with amazement because it is a new culture with different habits and customs, which in turn knew the local ecosystem. The Indians were described as “strong men” in the sense of being healthy. Before the arrival of the Europeans, the Amerindians exchanged information in the ethnomedical system between cultures. It is estimated that there were about 200 thousand semi-nomadic tribes (BARBOSA *et al.*, 2016). Besides, 274 indigenous languages were registered in Brazil (FUNAI, 2019), with 188 remaining (RODRIGUES, 2013).

The new colony was rich in biodiversity, and therefore the king of Portugal prohibited the entry of any other foreigner into Brazil, with the result that for three centuries local research on the biological aspects of flora, fauna, and soil was conducted only by Portuguese or people indicated by them (ALVES, 2013). At that time, the travelers were mainly naturalists, designers, and painters who produced various works.

Gabriel Soares de Souza was one of the main travelers of colonial Brazil, having, in 1569, from his travels through the Brazilian territory, written the book “O Tratado Descritivo do Brasil”. It is a work that clearly and meticulously records the geography of the Brazilian coast, its topography, colonization, agriculture, as well as the Indians, flora, fauna, and ethnography, especially in the state of Bahia (GUIMARÃES, 2018). He approached the Brazilian biodiversity with propriety and richness of details, according to the time he lived through.

Other famous travelers of the 17<sup>th</sup> century were the naturalist doctors Guilherme Piso and George Marcgrave, members of Mauricio de Nassau’s entourage, who were in

Brazil to colonize the northeastern part of Brazil. In this trip, Piso effectively tested several medicinal plants. In 1948, he wrote the first book on herbal treatments called “De Medicina Brasiliensis”, Piso, in partnership with Marcgrave, gave rise to the work entitled “Natural History of Brazil” (ALVES, 2013; ROSSA-FERES *et al.*, 2017).

Another prominent traveler and naturalist was Grigory Langsdorff, physician, botanist, and head of a Russian expedition on a scientific trip through Brazil, having traveled from Rio de Janeiro to the Amazon region in the first half of the 19<sup>th</sup> century (LUVIZOTTO, 2012). Besides this, we also had Carl Friedrich Phillip von Martius, who wrote the book “Natureza, Doenças, Medicina e Remédios dos Índios Brasileiros” in 1844 (SOUZA; HENNIG, 2017).

Auguste de Saint-Hilaire, French explorer, pteridologist, botanist, and mycologist who wrote several works and collected a 30 thousand-specimen herbarium composed of 7 thousand different species of plants (PIGNAL *et al.*, 2012). Theodoro Peckolt, naturalist and pharmacist, who together with Gustavo Peckolt, wrote in 1888 the book “Historia das plantas medicinaes e uteis do Brasil: I” (SIVA *et al.*, 2015). These works proved to be indispensable for the study of bioprospection of medicinal plants in Brazil (BERLINCK, 2012).

The scientific and philosophical expeditions developed by the European colonizers are characterized as the first milestone for the use and knowledge of the flora, as well as the general aspects that involve the natural wealth present in the Brazilian territory. From the information of these studies and aware of the profit that the colony could provide, the Portuguese royal court changed to Brazil in 1808, becoming an Empire in 1815 (CONCEIÇÃO; MEIRELLES, 2015).

The influence of European culture in colonial and imperial Brazil disseminated a combination of customs, knowledge, and beliefs, through the fusion of expertise from the sixteenth to nineteenth centuries, influenced socio-economic changes by immigration policies, by the marketing of slaves, agriculture and other forms of development of the time (SIKORA, 2014). For Alves (2013), after the arrival of the Portuguese royal family, the Brazilian biodiversity was studied systematically and scientifically.

In imperial Brazil, the junctions of indigenous, African, and European cultures spread the Brazilian identity. Regarding genetic traits and acquired customs, experiences with ethnozoology and medicinal plants are reported (ALVES, 2013). Grigory Ivanovich Langsdorff was a naturalist who was on expeditions to Brazil in the nineteenth century and headed a journey of over 10,000 km across the national territory (OSSENBACH, 2018).



The German botanist Carl Friedrich Phillip Von Martius, author of the work “Flora Brasiliensis”, composed of 15 volumes, had the collaboration of 65 botanists of 10 nationalities (XIMENES; COELHO, 2017). The following researchers began to worry about prospecting factors, as in 1889, the mastic tree (*Schinusterebinthifolius Raddi*), was already studied by Theodoro Peckolt who produced a work suggesting the chemical study of the plant (ALVES, 2013).

The 20<sup>th</sup> century was marked by the work of Mello-Leitão “A Biologia no Brasil”, written in 1937. In this work, the author reports the historical aspects of naturalism in Brazil over three centuries; during this period, chemistry made essential advances, especially in the areas of science and anthropology with the foundation of institutions, such as the National Museum, the Emílio Goeldi Museum in the state of Pará and the Paulista Museum (ALVES, 2013).

Since the 2000s, contemporary studies have presented an innovative scenario in the use of herbal medicines, based on ancient and universal aspects in the anthropological knowledge of medicinal plants. According to the Ministry of Health, in 2017, 66,445 phytotherapy consultations were recorded in 1,794 Primary Care facilities, distributed in 1,145 towns (BRASIL, 2018).

### 3.2 Brazilian legislation on medicinal plants

The incidence of the use of medicinal plants and herbal medicine is part of the historical and social context based especially on oral tradition (BRUNING; MOSEGUI; VIANNA, 2012), being part of the National Program of Medicinal Plants and Herbal Medicines. In Brazil, research in ethnobotany, with emphasis on ethno-pharmacology, has enabled the creation of laws that regulate the control of research from the collection of biological material to the experiments of more advanced laboratories.

Within the scope of the Brazilian legislation on control, use and release of medicinal plants and herbal medicines, Law No. 5991/1973 provides on the Sanitary Control of the Trade of Drugs, Drugs, Pharmaceutical Inputs and Related Products, especially the approach of this law is specific to the Federal Pharmacy Council –FPC, which has conniving responsibility in health care since the primary processes of manipulation of medicines (FPC, 2019).

At the federal level, one of the most impactful and necessary laws to protect Brazilian biodiversity is Law No. 13123/201, which defines standards that address access to genetic heritage and associated traditional knowledge (BRASIL, 2015). Within the scope of floristic biology of plants that have therapeutic properties, this law restricts access to genetic heritage and the country for research in

bioprospecting and technological development (VASCONCELOS, 2015).

Also known as the biodiversity framework, the new legislation established rules based on bioethics, aiming to protect Brazilian biodiversity as well as the associated traditional knowledge that is part of the human relationship with environmental and natural resources (CFBio, 2015). Concerning popular culture, this law addresses the obligation to share any economic benefits derived from the reproductive material developed from these studies (VASCONCELOS, 2015).

The Federal Council of Medicine - CFM n° 04/1992 recognizes herbal medicine as a therapeutic method (BARRETO, 2014). Years later, Decree No. 5.813/2006 approves the National Policy of Medicinal Plants and Herbal Medicines (BRAZIL, 2006), a factor that reinforces the insertion of medicinal plants within the Single Health System –SHS, addressing the use of the package leaflet (RDC No. 95/08) (BRAZIL, 2008) and professionals who prescribe these drugs (CFO Resolution No. 82/2008; CFF No. 586/2013) (CFO, 2008; CFF, 2013).

Normative Instruction No. 4/2014 determined the publication of the Guidance Guide for Registration of Herbal Medicines and Registration and Notification of Traditional Herbal Product, the No. 2/2014 published the “List of herbal medicines for simplified registration” and the “List of traditional herbal products for simplified registration”, highlighting the herbal medicine and traditional knowledge as a mechanism for prophylaxis and treatment of diseases (ANVISA, 2014; ANVISA, 2014).

Under the Single Health System – SHS, phytotherapy is a technique regulated by the National Health Policy, which in the year 2006, under the implementation of the National Policy on Medicinal and Herbal Plants of the Ministry of Health, and in 2008, with the National Program of Medicinal and Herbal Plants and its Management Committee, shows significant growth in SHS programs and the appreciation of traditional knowledge (RIBEIRO, 2019).

The beneficial effects of medicinal plants and herbal medicines are known, when used with caution, because any chemical substance in large quantities can cause harm to health (DE BARROS *et al.*, 2007). In this sense, many health professionals believe in the therapeutic effect, but do not prescribe the drug, agree with the initiative of this practice integrated with traditional medicine after training in the area (MATOS *et al.*, 2018).

With an increasing number of research with herbal medicine and the advancement of Brazilian legislation, health professionals do not prescribe herbal medicines because they do not know the National List of Essential Drugs (RENAME) in the Single Health System (SHS),

published in 2014, which presents twelve herbal medicines (DE ANDRADE *et al.*, 2017). The RENAME provides the user contact with its history, but the unavailability of the herbal medicine in the Health Units hinders the implementation of the program (MATOS *et al.*, 2018).

The Policy on Medicinal Plants and Herbal Medicines in the SHS has made little progress in the face of the difficulties of access to its use in the SHS. The distorted understanding of the efficacy and safety of these drugs are frequent challenges that hinder the functioning of the program (FIGUEREDO; GURGEL; GURGEL JUNIOR, 2014). The challenges are existent to be overcome, as shown by Ibiapina *et al.*, (2014), the positive aspects of the use of medicinal and herbal plants are diverse.

The insertion of herbal medicines in the SHS ensures low cost, lower incidence of side effects, high rate of acceptance among users, and approximation between scientific knowledge, and accessible expertise (IBIAPINA, 2014). The use of herbal medicine as a technique integrated with traditional, complementary and integrative medicine was the theme of the 72<sup>nd</sup> session of the World Health Assembly of the World Health Organization – WHO, which had the participation of 7 countries (WHO, 2019).

#### IV. FINAL CONSIDERATIONS

It can be said that imperial Brazil brought together the indigenous knowledge, present before the colonization and that it needs to be further studied and valued, the scientific knowledge, derived mainly from the traveling naturalists who aimed to investigate the traditional expertise of colonial Brazil and the African culture that was called Afro-Brazilian culture. The combination of these three primary cultures formed a unique ethno-knowledge in the dissemination of phytotherapy present in the Brazilian floristic diversity.

In the contemporary perspective, the insertion of phytotherapy is an innovative strategy within modern western medicine to reduce the consumption of medications highly harmful to human health, recognizing the effectiveness of phytotherapy and the validation of knowledge associated with traditional communities throughout the history of humanity. The future expectations in the theme approached demonstrate to be promising since the objective of ethnopharmacology is to study the widespread knowledge about drugs.

The legalization of the production, marketing, and indications of medicinal plants as a therapeutic form in Brazil was reinforced by other legal parameters, becoming an increasingly common method in national health programs. We hope that this research can contribute to

understand and strengthen the ethnobotany as a basis for studies and significant improvements to life in its diverse and varied forms, seeking respect and ties between traditional knowledge and scientific knowledge.

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