



## XV WORLD FORESTRY CONGRESS

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### The Potential Cure for COVID-19: The Role of Medicinal Non Wood Forestal Products and The Promising Public Policies for its use in Pandemics Times

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#### Abstract

*A new coronavirus (SARS-CoV2) had shocked our economy and our lives causing panic and chaos since February 2020. This novel disease locked us down at home and collapsed the Health System in Bolivia which caused thousands of deaths for the lack of prompt attention. This situation drove unprotected population to seek for alternative treatments under the favorable legislation for Ancestral Traditional Medicine using Non-Wood Forest Products, plants and trees. Traditional Medicine had been an alternative treatment for human diseases for centuries and its practices were transmitted by person to person. Nowadays, in the emergence of this new disease, the scientific research had noted that some NWFP and parts of plants and trees had striking effects on respiratory diseases such as SARS, MERS and SARS-CoV2. These studies showed promising results in inhibiting, preventing and coating against the new coronavirus with a wide variety of preparations and presentations. To show the latest research on Alternative Medicine, an accurate scientific literature review was made that allowed the classification in three Groups: (10) to prevent infection and enhance immunity, (14) essential oils for vaporization and (3) antiviral coating. On the Bolivian scenario, there are two groups of medicinal plants for respiratory diseases. The group of Infusions is composed by 21 species from 14 families. The group of vaporization is composed by 4 species from 4 families. Furthermore, the legal enabling environment in the Bolivian scenario with the Law No 459 Ancestral Traditional Medicine and the Alternative Treatment for the COVID-19 disease with Non Wood Forestal Products and parts of plants are novel public policies for all Bolivians.*

Keywords: [Non Wood Forestal Products, Respiratory diseases, Ancestral Traditional Medicine, favorable legal frameworks.]

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#### Introduction, scope and main objectives

The Novel Coronavirus SARS-CoV-2 (COVID-19) is a human to human disease and it is spread through droplets of saliva and aerosols from the nose and mouth. COVID-19 is an unavoidable pandemic, and physical measures (disinfection, social distancing, quarantines, isolation, and masking) were taken in many countries until a vaccine will be developed (Huang et al., 2020). During this pandemic, the chaos dominated the cities by four major issues: scarcity of staple foods, price speculation, scarcity

of PPE<sup>1</sup> (hand sanitizers, alcohol, masks), and the collapse of the medical health system (Rahimi et al., 2020). Due to these actions, people panicked and started to be susceptible to self-medication with not recommended treatments for the COVID-19 (Chlorine Dioxide) and products that were advertised through the social networks with no sanitary registration causing intoxication. As the numbers of infected and deceased people with COVID-19 increased in Bolivia, some local policy makers had to approve the use of traditional medicine for the prevention and treatment of COVID-19 with the support of the National Law of Traditional Medicine (Law No 459). The objective of this study was to describe the importance of a legal framework for the development of the Traditional Medicine that uses Non Wood Forestal Products (NWFP) and plants for the prevention and treatment of the new COVID-19 and other respiratory diseases. The specific objectives were: i) to identify scientific research on the use of NWFP for the prevention and treatment of respiratory diseases (e.g. influenza, SARS and SARS-CoV2) and ii) to describe the principal species to combat common and exotic respiratory diseases using NWFP in the Bolivian scenario.

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## **Methodology/approach**

An electronic literature search in the PUBLONS, RESEARCHGATE, LANCET and GOOGLE SCHOLAR webpages was made in order to find the most recent published articles related to the keywords such as: "Medicinal Plants", "Respiratory Diseases and "COVID-19" until March 25, 2020. No language restriction was imposed during the collection. Some of the required articles were downloaded for analysis.

A quantitative analysis was employed to search the term "Medicinal Plants for Respiratory Diseases" (FOR INTERNATIONAL SCENARIOS) in three scientific webpages that were selected due to their relevance in the COVID-19 scientific literature availability in April 2020. The first webpage was PUBLONS and six papers were found (6). The second was RESEARCHGATE (56) and the third webpage was THE LANCET which did not register any paper on Medicinal Plants (0). In order to be much more accurate in the search, the term "Medicinal Plants and COVID-19" was added and a selection of treatments was used as following: extract, oil, vaporization, infusions and coating which had registered 11 studies using the Google Scholar search engine. Then the findings were grouped into three classification groups: i) Dietary and supplementary to prevent infection and enhance immunity, ii) Essential oils for nebulization and disinfection and iii) Antiviral coating on masks. Furthermore, the legal Bolivian framework for the use of NWFP such as the Law No 459/13 Promotion of the Ancestral and Traditional Medicine and Law No 970/2020 Alternative Medicine for positive COVID-19 people . At National level, only three cases were found using the Google Scholar search.

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<sup>1</sup> Personal Protective Equipment (PPE)



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Table 1: Number of experiences found through search engines at two levels

Levels	Search engines			
	Publons	Researchgate	The Lancet	Google scholar
International	6	56	0	
National				3

## Results

### Forest can provide the cure to all illnesses

The importance of forests in the livelihoods of people is overwhelming. Forests can provide direct benefits such as: timber, labor and Non-Wood Forestal Products (NWFP) (Lopez and Shanly 2004). NWFP are natural resources that come from forest, agro-forestal systems, fruits, seeds, fungi and resins (Neunmann and Hirsh 2000). NWFP are important sources of subsistence and financial incomes for producers. Firstly, NWFP are subsistence means in order to provide direct food for producers and their families such as banana and cassava crops (Schereckenberg et al., 2006). Secondly, NWFP are complementary products to principal familiar incomes by the elaboration of handicrafts, hats, honey and medicines (Ndoye et al., 2017). Medicinal plants and NWFP are popular in rural and some urban scenarios due to their price and affordability. These plants have phytochemicals (alkaloids, tannins, and lignin), which had been reported to show their preventive and curative properties against respiratory infections (Panyod et al., 2020).

### Medicinal Non-Wood Forest Products (NWFP) Classification

Medicinal NWFP can be grouped in three: i) Dietary and supplementary to prevent infection and enhance immunity (2 papers), (Water extraction: 9 species, Powder:1, Bark extraction:1), ii) Essential oils for nebulization and disinfection (4 papers), (Vapour:2, Leaf oil: 3 species, Plant oil: 1 species) and iii) Anti-viral coating on masks (1 paper) (Alkaloids and terpenoids: 2 species, Alcoholic extraction: 13 species) (Table 2).

Table 2: Medicinal Non Wood Forestal Products, Scientific sources, Number of families, species and extraction techniques

GROUPS	Scientific sources	No Families	Sp.	Extraction technique
i) Dietary and supplementary to prevent infection and enhance immunity	1. Mc Donald and Holtz (2020) 2. El Alami et al (2020)	10	3	Water extract (9 species) Powder (1 species) Bark extraction (1 species)
ii) Essential oils for nebulization and disinfection	1. Gyebi et al (2020) 2. Jai Prem de la Riva (2006) 3. Boukhatem and Stzer (2020) 4. Phumthum and Bolslev (2020)	14	20	Vapor applications (2 species) Leaf oil (3 families, 3 species) Plant oil: (1 family, 1 species)
iii) Antiviral coating on masks	1. Panyat et al (2020)	3	3	Alkaloids and terpenoids (2 families and 2 species) Alcoholic extraction (10 families, 13 species)

### Enabling Legal Environment for Medicinal NWFP in the Bolivian Scenario

The Plurinational State of Bolivia had stepped out emitting the Law of The Ancestral Traditional Medicine. This Law No 459/2013<sup>2</sup> defines Natural Traditional Products as: “*Artesian medicinal preparations, or semi-industrial, that has therapeutic properties which components are obtained from the plants, minerals, animal tissues, in their natural states or preparations*” (Bolivia, 2015). This public policy classifies the Ancestral Traditional Medicine service providers in specialties (Table 3).

<sup>2</sup> The Supreme Decree No 2436 (July, 2015) establishes the regulation of the Law No 459/13 that establishes that the Ancestral Traditional Medicine must be incorporated into the health system (Public and Private) Art. 7 Parts I, II and III.

Table 3: Specialties and sub-specialties of the Ancestral Traditional Medicine

Specialties		Sub-specialties
I) Spiritual guides		Amawt'a <sup>3</sup> Yatiri <sup>4</sup> (Aysiri, Ch'amakani)
II) Traditional Medicine Doctors		Kallawaya <sup>5</sup>
2.1 Ancestral Traditional Medicine Doctors	Quilliri (Jampiri, Ipaye, Qhakori, Qhakojkuna, Mulliri,	Curanderos) Huesero Qápachaquera Milluri
2.2 Parteras y Parteros (Midwives)		
III) Traditional Naturists		hierberos <sup>6</sup> , materos <sup>7</sup>

## Discussion

### Bolivian Alternative Traditional Medicine

The Colonization process could not eradicate the ATM practices which were the alternative medicine for enslaved native dwellers during grueling times. As a matter of fact, these practices were preserved through generations as well as the coca leaves chewing. Since 1980, there was an expansion of the ATM through yatiris and callawayas that cured hopeless people who were excluded from the modern medicine. The creation of SOBOMETRA<sup>8</sup> fostered the reconnaissance of ATM and other institutions such as AMETRAC<sup>9</sup> identified 141 species employed for ATM practices (Vandebroek et al. 2003) which started the Bolivian research on ATM. Maldonado's research on medicinal plants identified 27 species and described the ways to prepare them to treat respiratory diseases (Table 4).

<sup>3</sup>Amawt'a: Recognized and respected elder Wiseman of a community

<sup>4</sup> Chaman, Shaman

<sup>5</sup> Recognized Traditional Medicine men in Aymara Language

<sup>6</sup> Herbs collectors

<sup>7</sup> Prepare herb infusions

<sup>8</sup> Sociedad Boliviana de Medicina Tradicional (Traditional Medicine Bolivian Society)

<sup>9</sup> Asociación de Médicos Tradicionales (Traditional Medicine Doctors Association)

Table 4. Medicine Plant, Treated diseases, common and scientific name and preparation of plant parts

Wira Wira ( <i>Achyrechine aequalifolia</i> ) Family: Compositaceae			
Diseases	Parts	Quantity	Preparation
Cough, bronchitis	leaves	6-7	Infusion
Lampazo ( <i>Actium lappa</i> ) (Sampara, Bardana, Lampaya) Family: Compositaceae			
Expectorant	leaves		concoction
Sillu Sillu ( <i>Alchemilla pinnata</i> ) (Tik'a Sora) Family: Rosaceae			
Sore throat	Fresh plant		extracts
Sawila ( <i>Aloe vulgaris</i> ) (Guazu, Karaguata) Family: Laminaceae			
Asthma	Leaves		extracts
Cough	flowers		Pulp+honey
Flu	Fresh flowers		
Altamisa ( <i>Artemisa vulgaris</i> ) Ajenjo, Artemisa, Uriuri Family: Astereacea			
Lungs	leaves		Poultice
Chillka ( <i>Bacharis punctulata</i> ) Iria Kowa Family: Compositacea			
Asthma	Plant		Infusion
Bronchitis	Fresh leaves		
Nustasa ( <i>Brasica campestris</i> ) Kita Amkiria, Nabo Juchcha Family: Cruciferas			
Tos	10-12 flowers		Infusion
Bronchitis			
Sore throat			
Andres Waylla ( <i>Cestrum parqui</i> ) Fernandillo, hierba santa, pulqui			
Pneumonia	leaves	Mild	Infusion

### Ancestral Traditional Medicine in the Plurinational State of Bolivia

In Bolivia, the use of the Ancestral Traditional Medicine is in the day-to-day activities. These pre-Columbian practices had survived Colonization efforts to eradicate it, but teachings from one generation to the next ones helped to preserve them. The Capitalist period (1825-2004) also tried to replace the Traditional Medicine by modern medicine and did not recognize the traditional actors (kallawayas, Yatiris). The socialist period (2005-2019)<sup>10</sup> emitted the most inclusive laws for the ATM practice in the country with its legal incorporation into the public and private medicine. In the middle of November 2019, a criminal Coup took the power in Bolivia and destroyed the Ministry of Cultures and expelled by force all ATM consultorios from the Bolivian Health System. In October 18, 2020, Bolivians recovered the democracy again in the middle of the COVID-19 pandemic and chose to continue into the socialism again, and the ATM was re-established again. The lack of a clear health policy of the Coup Government on COVID-19 drove to Bolivians to suffer from COVID-19 and had to return to the ATM practices in order to ameliorate signs and symptoms. The Mates and Hierbas consumption in the cities increased abruptly. Prices for Medicinal plants and NWFP such as Eucalyptus leaves for vaporization

<sup>10</sup>The legal and recognized socialist government of President Morales was until November 10th before his compulsory resignation due to the Military, Policial and Civic Coup.

increased overnight (US\$ 0.72/bunch), Wira Wira Flowers (US\$ 0.65/bunch). These products can be afforded on the streets and local fairs (Fig. 1).



Fig. 1: [Medicinal Non-Wood Forestal Products on street sale, Cochabamba City, Lopez Rosse 2020]

### Departmental Law No 970/20

In July 22, 2020, the Gobernación of Cochabamba emitted a complementary Law on the "Use of the Ancestral Traditional Medicine for the Treatment of the COVID-19 people" due to the lack of proper health attention of the *De facto* Government. To promote this Law, public service providers started to distribute medicinal plants and NWFP to people by free on the Plaza (Fig. 2).



Fig. 2: [Promotion of medicinal plants in the Plaza Principal of Cochabamba, 2020]

The present legal framework for the management of the Ancestral and Traditional Medicine consist in: 1) The ATM is controlled by the Ministry of Health, 2) the Vice-Ministry of ATM in charge of the

promotion, 3) SEDES<sup>11</sup> provides the permits, 4) INLASA<sup>12</sup> is in charge of monitoring the quality and safety of ATM products and 5) CONAMETRAB<sup>13</sup> and CODEMETRAB<sup>14</sup> are in charge of the political incidence and organization of the ATM service providers at National and local levels.

### Ancestral Traditional Medicine centers

The Law No 459 recognizes three types of commercial centers: Boticaria, Attention Centers, and Consultorios. The legal requirements of these centers can be showed in Fig 3.

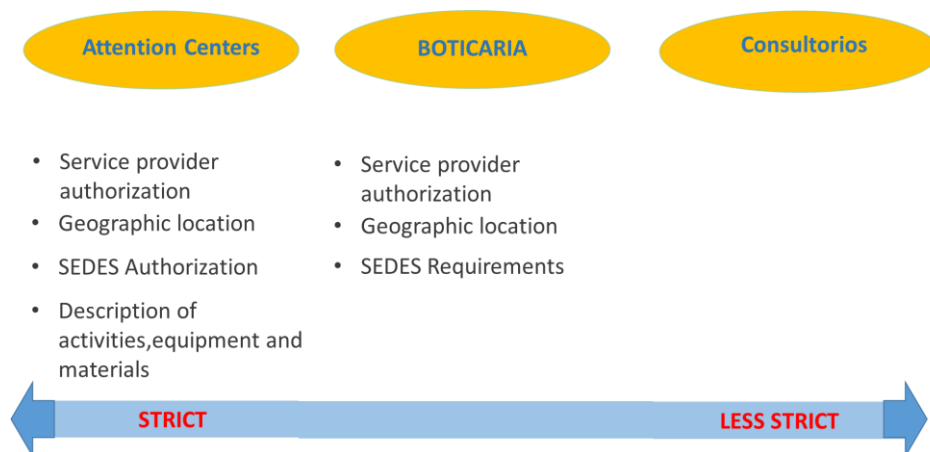


Fig. 3: [Commercial activities for expending ATM services and requirements to obtain permits]

### RUMETRAB

All ATM service providers must have the RUMETRAB<sup>15</sup> which is a compulsory registration (Art. 5) and it is emitted by the Ministry of Health. Once you have your REMETRAB, the SEDES and INLASA can inspect your commercial activity and take some samples to labs.

### Research on ATM

The Ministry of Health and Sports is responsible of the ATM research and must adopt an inclusive approach (Fig 4).

<sup>11</sup>Servicio Departamental de Salud (Departmental Health Service)

<sup>12</sup>Instituto Nacional de Laboratorios de Salud (National Institute of Health Laboratories)

<sup>13</sup>Consejo Nacional de la Medicina Tradicional Ancestral Boliviana (The Ancestral Traditional Medicine National Council)

<sup>14</sup>Consejo Departamental de la Medicina Tradicional Ancestral Boliviana ( The Ancestral Traditional Medicine Departmental Council)

<sup>15</sup>Registro Unico de la Medicina Tradicional Boliviana (Bolivian Traditional Medicine Unique Registration)





Fig. 4: [Ancestral Traditional Medicine Research Approach]

The research on ATM must include The Mother Earth as the center, the Living Well Philosophy as the noble way for harmonic balance (men-nature) and the local knowledge or Cosmovisions (Worldviews). Not only the Ministry of Health is involved in research, but also the Ministry of Education that must include the ATM as a subject for scholar and University levels.

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## Conclusions/ wider implications of findings

There are populations in many regions of The World that are using Ancestral Medicine for the prevention of COVID-19, because these plants are more readily available than modern medicine. In this regard, a study is necessary to collect these experiences to summarize results that help to create synergies between the ATM and the modern medicine.

The potential use of Ancestral Traditional Medicine for respiratory conditions is acknowledged but more research is necessary to have solid evidence of their effectiveness and to isolate compounds with potential pharmacological use.

It is recommended to regulate the use of medicinal plants and NWFP in order to avoid the self-medication that can lead to misuse and put life in danger. The experience of the Mancomunidad de Municipios Region-Valles (Bolivia) is a good example in the elaboration of a Guide for the COVID-19 treatment with Traditional Medicine

The Bolivian scenario is good example for the development of a legal framework for ATM that can be useful for others

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