

Contribution of African Phytotherapy in the Prophylaxis of COVID-19, in the City of Bukavu (DRC) and Its Surroundings: Preliminary and Ethnobotanical Investigation

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Abstract: *It is undoubtedly that COVID-19, has become an important cause of death in the world of the 21st century. The situation in the DRC remains worrying. The fight against this pandemic is registered as a priority and emergency in health zones and everywhere else where; this should serve as a panorama for the prevention of the latter. In this study, particular emphasis is placed on the different strategies that must be implemented to reduce the transmission of COVID-19 and to mitigate the social and economic repercussions of this transmission on individuals, communities and countries. It defines the framework for implementation and the mechanisms for integrating strategies into primary health care policy.*

Keywords: African phytotherapy, prophylaxis, COVID-19

1. Introduction

The coronavirus (Covid-19) appeared in early December in 2019, in the region of Wuhan, epicenter of the epidemic, through the pangolins (vectors). It has caused thousands of deaths and outbreaks as SARS, mainly on five continents.

In the Alma-Ata declaration of September 1978, primary health care requires and promotes maximum self-responsibility for the community and for individuals, as well as their participation in the organization, operation and control of primary care. primary health care by drawing as much as possible from local, national and other resources, by promoting to this end, through appropriate education and the ability of communities to participate.

Community participation is therefore the Achilles tendon of the health system because it provides several benefits to communities, including:

- Clear conception of the state of health rather than with fatalism which encourages them to take preventive measures;
- Investment of manpower, time, money and materials in health promotion activities
- Integration of knowledge and health education;
- Community self-promotion (Haile Marian K, and Ali Berman, 1999, p53).

In the Democratic Republic of Congo, the policy in the fight against respiratory infections is based on the strategy for the treatment of contagious diseases which is spread by air, which is essentially based on community participation. It is a question in this work of showing whether only the community contributions are sufficient for the Sustainability of activities to combat COVID-19 and what are the natural

recipes indicated in dietetics in relation to the prevention of this scourge?

It is true that from the dawn of its existence, the Congolese learned to understand what could bring him the vegetable kingdom and this remains massively used by a good part of his communities, like: materials, fibers, food plants, traditional medicines conventional, poisonous plants for hunting and war, magic plants for ritual use. The same plants can also have a multiform use.

Medicinal plants can be cultivated species but in most cases wild species: hence the need for precise identification of the plants used. The preparations can be obtained by maceration, infusion or decoction.

The problem with plants in Congolese medicinal use is the scarcity of studies focusing on their activity (Braca, 2003).

The overexploitation of natural resources and the orientation of the activity towards export, depriving the local populations of the benefits remain among the consequences to be noted in the controversies and criticisms.

The present research falls within the same context with the aim of knowing the pharmacological researches of the plants which offer the savannas and the forests of the DR Congo.

- For this purpose, we have recency and retain honey and eleven plants: *Sterocarya birrea*, *Moringa oleifera*, *Citrus limona*, *Zingibere Officinalis*, *Solanum muricatum*, *Solanum melenge*, *Discorea alata*, onion, *Ctronelle*, *Eucalptus*, *Aloe verra*, *Quinquina*. Their availability in the city of Bukavu and its surroundings, and the good testimony of their therapeutic properties provided by the traditional healers militated in favor of this choice. This is a preliminary investigation.

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- In view of the above, the following questions can be asked:
- Are these recipes really active?
- What organs can contain the activity?

2. Context and challenges

The mysterious epidemic is spreading, concern is growing and now affects several cities in the countries.

According to Chinese authorities, the epidemic has so far been confined to Wuhan, a metropolitan area in the center of some 11 million inhabitants where the virus, from the same family as SARS, appeared in recent months. The concern is now perceptible abroad, where prevention measures are multiplying, as in the United States, Thailand or Hong Kong, Turkey, Japan, Italy, France, USA, South Africa, Kenya, Rwanda, Uganda, DR Congo, ...

a) Mode of spread of COVID-19

The Covid-19 virus (Coronavirus), however, is spread from person to person and can be neutralized in everyday life. Infection with the virus does not cause a cold with runny nose or a fatty cough, but a dry cough is the easiest thing to recognize. And for those who can do it, it is recommended to expose you to the sun!

It should also be noted that:

- 1) The size of the virus is quite large (diameter of about 180-500 nanometers), so wearing specific masks to stop it is essential to avoid contamination of the sick to healthy people. On the other hand, the situation is different for doctors and health professionals who are exposed to high viral loads and must use special equipment.
- 2) When the virus is found on metal surfaces, it survives for about 12 hours. So when you touch metal surfaces such as doorknobs, household appliances, bus bars, etc., wash your hands well and disinfect them thoroughly.
- 3) The virus can live nested in clothes and fabrics for about 6/12 hours: normal detergents can kill it. For clothes that cannot be washed every day, you can leave them in the sun for a long time, the Covid 19 will not resist.

How the Covid 19 manifests:

- 1) The virus first settles in the throat, causing inflammation and a feeling of dry throat: this symptom can last 3/4 days.
- 2) The virus then travels through the moisture present in the respiratory tract, descends into the trachea, then settles in the lungs, causing pneumonia. This stage lasts approximately 5/6 days.
- 3) Pneumonia occurs with high fever and difficulty breathing, but is not accompanied by conventional shivering. If you feel like you are choking, contact your doctor immediately.

b) Prevention mode

How can you avoid it?

The virus is mainly transmitted by direct contact, by touching fabrics or materials on which the virus is present: it is essential to wash your hands frequently. The virus only

survives on your hands for ten minutes, but in ten minutes, a lot can happen: rub your eyes or scratch your nose for example, and thus let the virus enter your throat. In addition, Covid19 may not show signs of infection for many days, during which time it is not known whether a person is infected or not. But when you have a fever and / or cough, your lungs are usually already 50% clear. Experts therefore suggest doing a simple check that you can do yourself every morning: Take a deep breath and hold your breath for more than 10 seconds. If you do this without coughing, feeling oppressive, etc., it shows that there is no fibrosis in the lungs, which basically indicates the absence of infection.

At such critical times, check this every morning in a clean air environment.

This is simple information and advice from doctors who treat COVID-19 cases.

Another simple tip, we must make sure to keep the throat moist, at least as dry as possible. Drink a few sips of water at least every 15 to 20 minutes.

WHY? Even if the virus gets into your mouth ... water or other fluids will carry it through the esophagus and into the stomach. Once in the stomach, stomach acid will kill the virus. If you don't drink enough water regularly, the virus will be able to get into your lungs more easily.

c) Progressive health status of covid-19 infection

1st to 3rd day

- Symptoms almost similar to normal cold
- A slight sore throat
- No temperature, no fatigue. Appetite remains normal

4th day

- Sore throat and body discomfort
- Hoarsely
- Temperature, about 36.5 * C
- Anorexia
- Mild headache
- Slight diarrhea or digestive issues

5th day

- Sore throat and hoarse voice
- Temperature varies between 36.5-36.7 * C
- Fatigue, body pain, joint discomfort

6th day

- Fever vary between 37 * C
- Cough with mucus (fatty cough) or dry cough
- Throat irritation
- Fatigue, desire to doze
- Breathing difficulties
- Pain in fingers
- Diarrhea and vomiting

7th day

- No more fever, between 37.4-37.8
- No more coughing, with mucus (fatty cough)
- Body and headache

- Chronic diarrhea
- Vomiting

8th Day

- Fever, greater than or equal to 38 °C
- Breathing difficulty
- Cough continues
- Headache, joint pain and waist pain

9th Day

- Worsening of the situation
- Temperature increase
- Increased cough, purer than before
- Pneumonia
- The more dilated mucosa

d) Fundamental principles

To accomplish the assigned mission from our perspective, all levels must be involved in the fight against CORONAVIRUS, giving priority;

- Reinforcement of security and prevention measures against this structural pandemic
- Respect the rules of hygiene against this great monkey considered as the most poaching
- Use of hydro-alcoholic disinfectants (gel)
- Supported by emerging economies
- Solicitation of support from partners
- Respond to specifications
- Take the necessary measures according to the evolution of the crisis and the availability of funds
- Budget revision allocate to the fight against this scourge
- Self-isolation or compliance with the incubation period which is 14 days for the comers on the aromas
- Border closings, ports, stadiums, bars, grouping games to avoid oversaturations
- Wearing masks recommended for nursing staff and contaminated people and not for healthy people. The lifespan of a mask is 2 to 3 hours, after it becomes infected and may cause respiratory problems to the person who wears it all day.
- Rewrite health rules and measures while thinking of health care workers and emergencies and crises
- To have an operation which makes it possible to satisfy the agents in the companies.
- Deferral of charges, taxes, Urssaf of caregivers, liberals, small, medium and large companies
- Disinfect the surface with vinegar

e) To avoid during this period of crisis:

The consumption of peanuts

- Bananas
- Proximity and massive gathering
- Unprotected sneezing

3. Goals**3.1 Main objective**

The overall objective of this work is focused on determining the active principles capable of preventing the spread of CODIV-19 in the DRC in particular and everywhere else, of

reducing virulence, of promoting the socioeconomic and cultural values of phytotherapy in Africa.

3.2 Specific objectives

- Carry out a study on CODIV-19 in the city of Bukavu which can be used by nursing staff, the sick, healthy people and other researchers as a reference tool.
- To also produce a support which could be useful for the regional authorities in particular and the politico-administrative authorities of health sector in general. It is a question of recommending the creation of a phytotherapeutic structure bringing together the different representatives of each service sector, finally ensuring the promotion of local knowledge, setting up a monitoring system and favoring community initiatives, investing in research into local public health and the environment.

To achieve these objectives, the following methodology will be discussed:

- Conduct an ethnobotanical survey of traditional healers using a formulated questionnaire, observing the practices
- Carry out preliminary chemical and biological research in order to identify the most active species against hyperglycemia.

This study is divided into two main parts apart from the introduction and the Conclusion

The first will talk about bibliographic data concerning generalities on plants CODIV-19

The second presents the samples, the material, the methods, the operating methods use

4. Description of the medicinal plants under study**4.1 Sclerocarya birrea**

Family: Anacardiaceae

Chemical composition: This plant species is made up of traces of alkaloids in all organs, tannins and saponins in the stem.

Habitat: Savannahs with trees and clear forest,

Botanical description: Tree 8-15 (20 °) high, cylindrical, tortuous, up to 12 m long and 0.80 m in diameter, large cracked rhytidoma, quadrangular plaques, purplish gray; fairly smooth bark, 1 cm thick, reddish gray to whitish, with a red slice, spreading branches forming a fairly clear irregular crown; (Morrea F., 1954)

4.2 Moringa oleifera

Moringa oleifera, often called simply moringa, is the most cultivated species of the genus Moringa of the monotypic family of Moringaceae

Family: Moringaceae

Class: Magnoliopsida

Botanical description: Moringa is a native tree of the Himalayan plains, its trunk is thick, it is a cultivated species

and used for its benefits and its nutritional virtues, (Chancelier C., 2018)

4.3 Citrus limona

Botanical family: Rutaceae

Common Name: Lemon

It is recognizable by its fresh and tangy smell. Lemon essential oil is known for its many amazing health benefits, well-being and beauty (antiseptic, antibiotic, antiviral, protection of the liver, kidney, bladder and pancreas, protection of the cardiovascular system, circulation blood.

4.4. Zingiber officinalis

Family: Zingiberaceae

Scientific name: Zingiber officinale

Higher classification: Zingiber

Ginger is a species of plant native to India, of the genus Zingiber and of the family Zingiberaceae, the rhizome of which is used in cooking and in traditional medicine.

4.5 Solanum muricatum and Solanum mengilifera

Family: Solanaceae

Scientific name: Solanum muricatum

Botanical description: Shrubby plant, also called Pápino, cultivated for its fruits with a taste similar to pear and melon. Frost plant

4.6 Discorea alata leaf

Family: Dioscoreaceae

Order: Liliales

Subclass: Liliidae

The winged yam, large yam or camber have the distinction of having non-parallel secondary veins, a branch, petiolate leaves

4.7 Onion

Allium cepa

The onion or onion, pronounced, is a species of biennial herbaceous plants of the family Amaryllidaceae, widely and long cultivated as a vegetable for its bulbs of strong flavor and smell or for its leaves. The term also designates the bulb of this plant harvested as a vegetable.

Scientific name: Allium cepa

Rank: Species

Higher classification: Allium

Foliage and inflorescence.

The onion is used both as a vegetable and as a condiment.

The onion bulb consists of thickened bases of leaves wrapped in each other. In general, we speak of an onion for all liliaceous bulbs, such as tulips.

4.8 Lemongrass

Cymbopogon citratus

Lemongrass, or lemongrass from India or Madagascar or Java, is a tropical herbaceous plant of the Poaceae family,

(grasses), cultivated for its aromatic stems and leaves (lemon flavor). It contains citronellol.

Scientific name: Description

Lemongrass, verbena from India, or lemongrass, is a tropical herbaceous plant of the Poaceae family, sub-family of Panicoideae, tribe of Andropogoneae, cultivated for its stems and leaves with aromatic qualities. It contains citronellol.

Scientific name: Cymbopogon citratus

Upper classification: Cymbopogon

Rank: Species

Order: Poales.

Categories: Flora (vernacular name) - Poaceae - Condiment plant:

- Lemongrass is a tropical herb that comes from Asia Lemongrass is a popular flavoring ingredient in Asian cuisine. We use the white and fleshy base of the stems to flavor soups, sauces, ...
- Finally, the name of lemongrass is associated with various plants (sagebrush, lemon balm, lemon verbena) ... Buy very green stems in an exotic market
- Lemon balm is a condiment, aromatic and medicinal plant ... Its flowers are particularly melliferous and have many erect stems and
- Lemongrass, or lemongrass from India or Madagascar or Java, is a tropical herbaceous plant of the Poaceae family (grasses), cultivated for its stems and leaves with aromatic qualities (lemon flavor). It contains citronellol.

Scientific name: Cymbopogon citratus (DC.), Family Poaceae, subfamily Panicoideae, tribe of Andropogoneae.

Common name: lemongrass, lemon herb, verbena from India, fragrant rush. from: Zitronengras, in: lemongrass, es: zacate limón.

Use

The base of the fresh stems, cut into slices, chopped, is used to flavor raw vegetables, salads, marinades, soups ... It is an ingredient respecting the traditions of the cuisine of Southeast Asia (India, Thailand, Vietnam, Indonesia ...). Thai or Vietnamese cooks use the lemongrass stems to give a lemon flavor to their dishes. We only consume the softest part of this "fragrant rush", 6 to 7 cm from the base. Remove the outer leaves and cut the two ends of the stem - use the center. It is best to cut the lemongrass into large pieces so that you can easily remove them after cooking.

In northern Morocco, it is used to flavor mint green tea. Its dried leaves are also particularly used in Malaysian, Indonesian and Chinese cuisine for fish marinades or grilled meats. It is also found, fresh in some French recipes.

It goes well with ginger, coconut, garlic, shallots and chili peppers.

It also extracts a main oil used as a mosquito repellent.

It is more and more used by bartenders for the creation of creative cocktails.

In Central Africa, lemongrass is most commonly planted around homes because its odor repels mosquitoes.

4.9 Eucalyptus

Eucalyptus are a very rich group of plants of the genus Eucalyptus, of the family Myrtaceae, which until 1995 included the genus Corymbia. Eucalyptus are native to Australia, so they are native to the Australian continent, where they dominate 95% of the forests.

Scientific name: Eucalyptus

Upper classification: Eucalyptae

Rank: Gender

Order: Myrtales

Indications

- Treat chronic bronchitis.
- Treat asthma in addition to steroids.
- Treat inflammation of the respiratory tract, relieve rheumatic pain and
- Contribute to the maintenance of good oral hygiene.
- Treat sore throat, headache, neuralgic pain, otitis, sinusitis,
- Asthma, bronchitis, skin infections, urinary tract infections; keep biting insects away.

4.10 Cinchona leaf and bark

Cinchona immediately brings to mind the aperitif wine from which we can still distinguish the traces of old advertisements painted on the walls for Dubonnet or Byrrh for example, but it is also the small tree of the Rubiaceae family, from which quinine is extracted, still used in medicine, today more in the form of synthetic molecules.

Quinine is a very powerful anti malaria. It is active against the insane virus, it has activity against the influenza virus and it is suspected that it has activity against COVID-19. In vitro evaluation studies are needed to compare its activity with that of hydroxychloroquine to confirm this hypothesis.

However, according to the WHO, it seems that the combination of hydroxychloroquine and azythromicine gives an expected therapeutic yield while respecting the dosage.

Obviously, Chloroquine (NIVAQUINE) and hydroxychloroquine (PLAQUENIL) are molecules obtained by chemical synthesis, while Quinine is bio synthesized naturally in the barks of cinchona; at the same time, chloroquine exhibits anti malaria properties but also a moderate antiviral activity with COVID-19, hydroxychloroquine is rather an anti-inflammatory whose anti COVID-19 activity is powerful.

4.11 Honey

Honey is a sweet liquid made by bees using the nectar from flowers. It is graded by color, with the clear, golden amber honey often fetching a higher retail price than the darker varieties.

The flavor of a particular type of honey will vary based on the types of flower from which the nectar was harvested.

Both raw and pasteurized forms of honey are available. Raw honey is removed from the hive and bottled directly, and as such will contain trace amounts of yeast, wax, and pollen. Consuming local raw honey is believed to help with seasonal allergies, due to repeated exposure to the pollen in the area. Pasteurized honey has been heated and processed to remove impurities.

Honey has high levels of monosaccharides, fructose, and glucose, and it contains about 70 to 80 percent sugar, which provides its sweetness. Honey also has antiseptic and antibacterial properties. Modern medical science has managed to find uses for honey in chronic wound management and combating infection.

4.12 Citronnelle

Antispasmodic, digestive and calming tonics: treatment of digestive and intestinal disorders; decreased flatulence and cramps. Bactericidal, anti-inflammatory and hypotensive properties (decoction): against fever and colds or flu-like conditions.

Ethnobotanical survey data and testimonies collected from traditional healers and people consulted

Table 1: In relation to the plant species, organs used, diseases treated and methods of preparation

Plant species (Family)	Vernacular names of the plant	Part used	Lesions, symptoms and conditions treated	Method of preparation and dosage
<i>Sclerocarya birea</i>	Muhongo (Bemba)	Root	Dry cough, Anorexia, type 2 diabetes Type 2 diabetes, enteritis, cancer sheets.	Decoction of the leaves of 60 g of powder
<i>Moringa oleifera</i>	Moringa	Feuilles	Fruit Type 2 diabetes, Asthma, bronchitis Dry Cough Root, Colds, sore throat, breathing disorder	Infusion, oral, 1 tablespoon per day
<i>Citrus limona</i>	Ndimu (swahili)	Fruit	Diabetes, low back pain, angina Leaf Pneumonia, asthma, cold, Hypotension	Infusion, Oral use, half glass 3 × / D
<i>Zingiber officinalis</i>	Tangawis (swahili)	Root	Dry cough, Anorexia, type 2 diabetes Type 2 diabetes, enteritis, cancer sheets.	Maceration and decoction, half glass 3 × / D
<i>Citronelle</i>	Majani chai(Swahili)	Leaf	Leaf chronic bronchitis, asthma in addition to steroids, inflammation, High pression	Steam suction by inhalation 3 × / D
<i>Eucalyptus</i>	Eucalyptus	Leaf	Leaf chronic bronchitis, asthma in addition to steroids, inflammation of the respiratory tract, relieve rheumatic pain; contribute to the maintenance of good oral hygiene, sore throat, headache, neuralgic pain, otitis, sinusitis, asthma, bronchitis, skin infections, urinary tract infections; keep biting insects away.	Steam suction by inhalation 3 × / D

<i>Quinghao Artemisia</i>	Quinquina	Bark, leaf	Antimalarial, antiviral	Infusion, Oral, half glass 3 ×/ D Steam suction by inhalation 3 × / D
<i>Honey</i>	Asali (Swahili)		Antimalarial, antiviral Dry cough, Cold, angina, respiratory disorder Diabetes, low back pain, angina Diabetes Leaves, Dry Cough, Colds, angina, respiratory disorder	Infusion, half glass 3 × / d
<i>Aloe vera</i>	Bigembe gembe (Swahili)	Feuilles	Diabetes, low back pain, Angina Dry cough, Cold, angina, respiratory disorder Diabetes, low back pain, Angina Sinusitis leaves, dry cough, Colds, intestinal worms, angina, respiratory disorder Diabetes, low back pain, angina	Infusion, half glass 3 × / d
<i>Solanum muricatum et Solanum melengena</i>	Kechu (Swahili)	Leaf	Diabetes, low back pain, Angina Dry cough, Cold, angina, respiratory disorder, Diabetes, low back pain, Angina Sinusitis leaves, dry cough, Colds, intestinal worms, angina, respiratory disorder Diabetes, low back pain, angina	Infusion, half glass 3 × / d
<i>Onion,ai</i>	Litungulu (Swahili)	Leaf	Diabetes, low back pain, Angina Dry cough, Cold, angina, respiratory disorder Diabetes, low back pain, Angina Sinusitis leaves, dry cough, Colds, intestinal worms, angina, respiratory disorder Diabetes, low back pain, angina	Infusion, half glass 3 × / d

5. Conclusion

This study was conducted from January to March 2020, while COVID-19 is in full swing; and concerned 50 traditional healers out of the 89 identified during the pre-surveys carried out. It was based on ethno-medical surveys based on the descriptive method.

This study does not pretend to have dealt comprehensively with a problem as complex as this; nevertheless it claims that with the raw materials mentioned above, this investigation covers the study of pharmacological tests for the reduction of the viral load (in vitro) of COVID-19.

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