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Ethnobotanical survey of some Cameroonian plants used for treatment of viral diseases

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In this study, five species (*Enantia cholorantha Oliv.*, *Pteleopsis hylodendron Mildbr.* and *Spathodea campanulata P. Beauv.*, *Costus afer Ker-Gawler* and *Mormodica charantia L.*) belonging to five families were used for treatment of viral diseases including chicken pox, measles, influenza, shingles and viral hepatitis. The ethnobotanical survey of plant medicine was conducted in the Centre and South regions of Cameroon. The study aim was to obtain information on the use of plants in the treatment of viral diseases, the plant organs used, method of preparing herbal antiviral remedies and how it is administered, with a view to contribute to the search of new natural antiviral medicines. Results showed that traditional prescription of viral diseases generally included drinking, purging and steam bathing of the aqueous herbal preparations until symptoms of the disease disappear. This study shows the need for the enlightenment of traditional healers and the public in general on selective use of plants for the treatment of viral diseases.

Key words: Ethnobotanical survey, viral diseases, medicinal plant, traditional healers.

INTRODUCTION

Overviews

Since ancient times, several societies have resorted to nature, mainly to plants as medical and health sources. Today, a great percentage of the world population, in particular in developing countries, uses plants for facing primary needs of medical assistance (Tene et al., 2007).

According to the WHO (2001), 80% of the world population uses natural remedies and traditional medicines and Cameroon is not an exception. In recent times, despite all the advances made in modern and orthodox medicine, traditional medicine has gained renewed interest in health care services of Cameroonians.

This may be attributable to increased awareness in the potential and curative ability of the alternative medicines and particularly as a result of the various shortcomings revealed for several synthetic drugs (Ugbogu and Odewo, 2004). In Tropical Africa, inadequate access to western medicine and physicians coupled with high procurement cost for drugs have led to about 70% of the population to rely greatly on different plants to meet their traditional health care services (Ugbogu and Odewo, 2004; Oni, 2010).

Viral infections occupy an important place in the global incidence of transmissible diseases, countless of the fact that they are almost always followed by secondary bacterial infections. In some countries, the currently available antiviral treatment and vaccines show good results (WHO, 1983).

However; due to the high cost of available antiviral drugs and their toxic side effects, the problem of viral

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resistance coupled with viral latency and conflicting efficacy in recurrent infection in immunocompromised patients, viral diseases remain a perpetual burden for hospitals and pharmaceutical research laboratories.

Therefore, development and search of novel and effective antiviral agents, which in addition should be less toxic and also overcome resistance, have become very important issues. Natural substances could come up to these criteria, this justifies the number of research works carried on the plants and their antiviral properties till date (Betancur et al., 2002; Huerta et al., 2004; Cordeiro et al., 2006).

The objective of the present study was to obtain information on the use of plants in the treatment of viral diseases, the plant organs used, method of preparing herbal antiviral remedies and how it is administered, with a view to contribute to the search of new natural antiviral medicines.

Botany and ecology of the studied plants

Costus afer Ker-Gawler: member of the Costaceae family, it is an eternal land grass, non aromatic, with fleshy rhizomes. Its commonly simple stalks are often 2 m high. The leaves are simple and smooth, sparkling and have a length of 15 to 18 cm. Flours, when they appear in bunch on the top of the plant are white at their basis, but wine-colored around the top. *C. afer* is well spread in Cameroon. It is equally found in Gabon, Nigeria and Equatorial Guinea (Dongmo, 2005).

Enantia chlorantha Oliv., belonging to the Annonaceae family, is widely distributed along the coasts of West and Central Africa. It is also very common in the forest regions of Cameroon. It is an ornamental tree which may grow up to 30 m high, with dense foliage and spreading crown. The outer bark which is thin and dark brown is fissured geometrically while the inner bark is brown above and pale cream beneath. The stem is fluted and aromatic while the elliptic leaves are about 14 - 15 cm long and 5 - 14 cm broad (Atta-ur-Rahmnam and Choudhary, 2002; Adesokan et al., 2008).

Momordica charantia L., member of the Cucurbitaceae family, is a rapidly growing plant. It is a slender vine of 3 to 4 m high, sprinkled with flowers between July and August which then develop into cucumber fruits. The fruits measure 4 to 6 cm, they are green when still immature and yellowish orange once matured. Their leaves are palm-like lobbed and give off a strong scent when ground: they measure 5 to 6 cm and have 5 to 7 lobes each. *M. charantia* is a wide spread forest species, which is found in Cameroon, Gabon, Guinea Conakry, Ivory Coast and Asia (Atta-ur-Rahmnam and Choudhary, 2002).

Pteleopsis hyloedendron Mildbr. is a 30 m long tree belonging to the Combretaceae family. The branches are found towards the top of the tree. The leaves are simple and resistant, and measure 5 to 7 cm: they harden when

matured and fall. *P. hyloedendron* is a rather rare forest species but found in Cameroon and most rarely in Ivory Coast, Gabon and Democratic Republic of Congo (Dongmo, 2005).

Spathodea campanulata P. Beauv., also called Gabonese tulip, is a member of the Bignoniaceae family. It is a resistant tree with persistent foliage; it could reach 25 m length. The branches are thick and the leaves are 20 cm length. The flowers are dark-orange and much dispersed between branches. This tree is found in Cameroon, Uganda, Togo, Gabon and Congo Brazzaville (Dongmo, 2005).

Chemical and/or preclinical studies

The chemical composition of *M. charantia* (bitter melon) is a combination of saponins, charantin, peptides and steroidal alkaloids which contribute to its hypoglycemic effects. A study carried out by Takemoto (1983) revealed that MAP₃₀ proteins of bitter melon could prevent type I herpes virus replication and also could reduce its capacity of plaque formation. Laboratory works carried out by Lee (1998) showed that alpha proteins and β -mormodins contained in this melon have an effect on HIV virus and cell proliferation.

Phytochemical investigations led to the isolation and characterization of 3,4-methylenedioxy-3'-O-glycoside ellagic acid and a pteleoellagic acid derivative compound (Cordell et al., 1991).

Phytochemical analysis of the leaf extracts of *Spathodea campanulata* revealed the presence of flavonoids, alkaloids, terpenoids, saponins, tannins, steroids and cardio amino glycoside. The ethanol fraction exhibited very good antiplasmodial activity against both chloroquine sensitive and resistant *Plasmodium falciparum* isolates followed by the butanol and chloroform extracts. Further studies can be carried out for the isolation of active principle and elucidation of chemical structure with an objective of exploring the possibility of using the component as oral/parenteral drug for treating malarial infection (Dhanabalan et al., 2008).

Biochemical studies shown antihepatitis (A, B, C and D) properties of protoberberin, an alkaloid derived from *Enantia chlorantha* (Virtanen et al., 1988).

MATERIALS AND METHODS

Study areas and collection of medicinal plants

The study was conducted in the damp tropical forest in the Centre and South regions of Cameroon (Fig. 1). The residents are mostly farmers. Majority of these communities lack the usual social amenities and have a low density population. Areas on the other hand, are communities of civil servants and traders with high density of population. The community has social facilities such as electricity supply and pipe borne water. The residents of these areas belong majorly to the Ewondo and Bulu ethnic groups.

The plants were collected in the localities, such as Nanga-Eboko

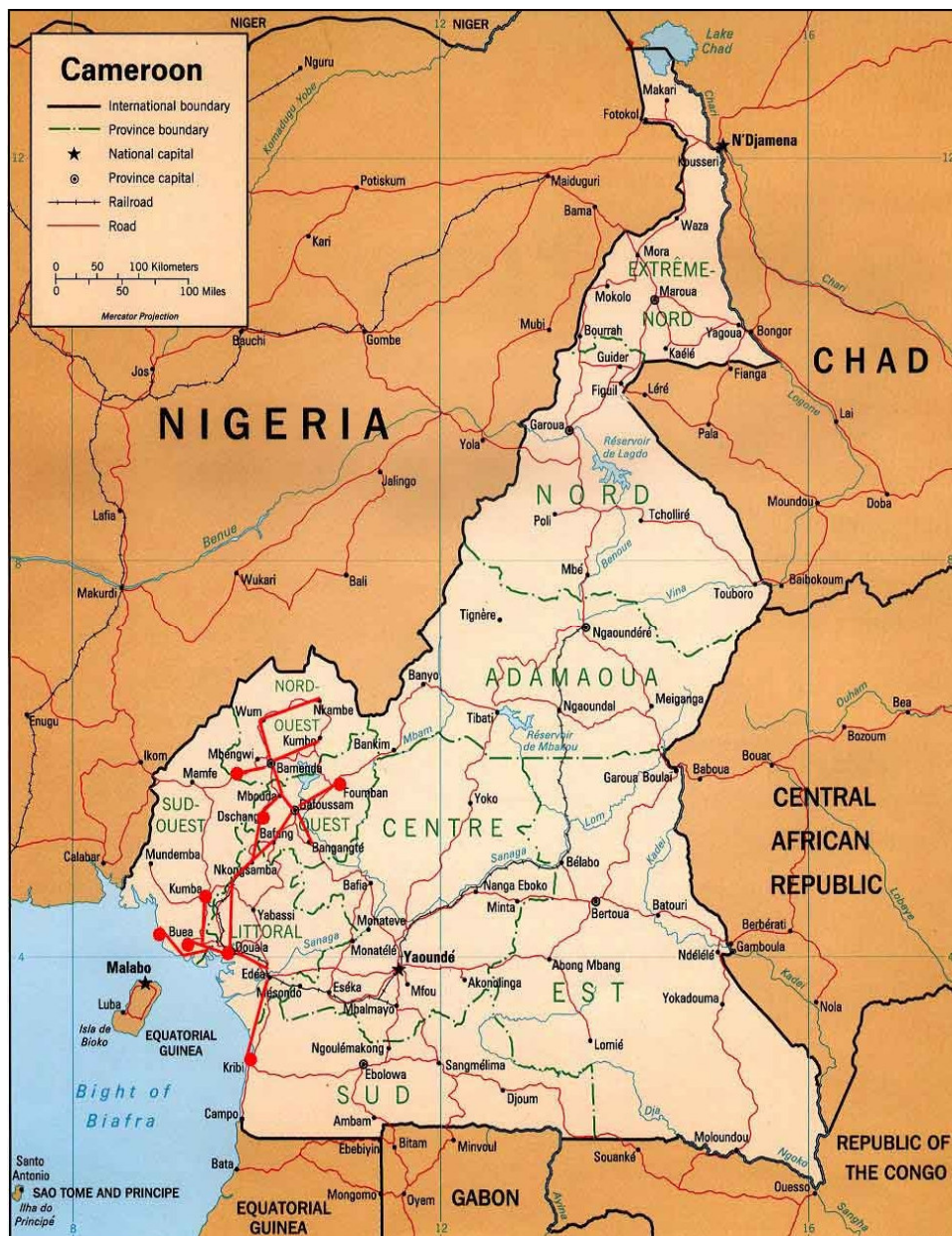


Figure 1. Geographic map of Cameroon.

(Haute-Sanaga Division), Mbeyengue I (Mbankomo Sub-Division, Mefou and Akono Division), Ebolowa (South Region) (Figures 1 to 4). The survey was conducted exclusively during the rainy season (from August to September 2008). The interesting parts of these plants (stalk, leaves and bark) and the entire plant when it was possible were collected, then dried in shadow and preserved for subsequent identification and use.

Selection of the plants

Once the plants were collected, those having different local names but pointing to the same plant were put aside, as well as those found in the three sites of collection and used for the treatment of the same disease.

Identification

The collected plants were identified at the Cameroon National Herbarium (Yaoundé), the corresponding reference numbers of identification are given in Table 1. For a judicious identification, as much organs as possible for each plant were collected, then dried and conditioned and the collection sites were specified. This identification was done on the basis of morphological and ecological characters of each plant and also using botanical encyclopedia.

Informed consent

The purpose of the study was explained to the local traditional herb sellers, farmers, structures and other persons who use plants and



Figure 2. Collection site: Nanga-Eboko.



Figure 3. Collection site: Mbankomo.

natural products to treat diseases. We went precisely to the Green Man Association (Douala), “Santé et Vie” pharmacy (Douala), LABOTHERA Sarl (Yaoundé) traditional therapists. Informed consent was obtained from each of the participants. An approval for the study was obtained from the traditional heads of the communities.

RESULTS AND DISCUSSION

A total of 5 medicinal plant species from 5 genera and 5

families used for treating about 6 health problems were identified in the survey. The plant parts frequently used and mentioned in this study are stated in Table 1. The plants mentioned in the present study were collected in the Centre (Nanga-Eboko and Mbeyengue I) and South (Ebolowa) regions of Cameroon. *C. afer*, *S. campanulata* and *M. charantia* were found both in Ebolowa and Mbeyengue I, while *P. hylo dendron* and *E. chlorantha* were found in Mbeyengue I and Ebolowa respectively. *C. afer* were found to be the mostly used antiviral plant,

Table 1. Medicinal plants used to treat viral diseases.

Species/Identification numbers	Family	Local name	Collection site	Parts used	Traditional Medicinal uses	Method of use and traditional dosage
<i>Costus afer</i> Ker-Gawler49537 HNC	Costaceae	Nmian (Bulu, Ewondo, Nanga)	Ebolowa Mbeyengue I Nanga-Eboko	Stalk	Chicken-pox Measles Influenza Genital herpes	Chicken-pox: Take a bath with a decoction of mixture of ground stalk of <i>C. afer</i> and the barks of <i>P. hylodendron</i> and <i>S. campanulata</i> (morning and evening for 15 days associated to purging with 250 ml of this solution); or take a decoction of ground stalk of <i>C. afer</i> (bathing twice a day) in association with water or palm wine-macerate of <i>M. Charantia</i> (a spoonful twice a day) Measles: take a decoction of ground stalk of <i>C. afer</i> (bathing morning and evening, and purge with this solution in the evening) Influenza: Take a macerate of ground stalk of <i>C. afer</i> (drink 100 ml two to three times a day and put some drops of the solution in nostrils) Genital herpes: Take a bath with a decoction of ground stalk of <i>C. afer</i> and the bark of <i>S. campanulata</i> and purge with a decoction of <i>C. afer</i> for one week
<i>Enantia chlorantha</i> Oliv. 45569 HNC	Annonaceae	Mfol (Bulu)	Ebolowa	Stem	Hepatitis A,B; C and D	Take 200 ml of a decoction of the trunk of <i>E. chlorantha</i> every morning for adults, 100 ml every morning for a child beyond 4 years old and a spoonful every morning for a child of less than 4 years old)
<i>Momordica charantia</i> L. 42520 HNC	Cucurbitaceae	Ota-zom (Bulu) Oyal-zom (Ewondo)	Ebolowa Mbeyengue I	Entire plant	Chicken-pox Measles Genital herpes Shingles	Chicken pox: take a palm wine macerate of <i>M. Charantia</i> (a spoonful twice a day) Measles: take water-macerate of <i>M. Charantia</i> (a spoonful twice a day associated with bathing twice a day) Genital herpes: bathing with a decoction of <i>M. Charantia</i> for one week Shingles: soak a pieces of cotton wool with juice of <i>M. charantia</i> then hang it on the skin inflammation
<i>Pteleopsis hylodendron</i> Mildbr 1309 SFRK	Combretaceae	Sikong (Ewondo)	Mbeyengue I	Bark	Chicken-pox	See <i>C. afer</i>
<i>Spathodea campanulata</i> P. Beauv. 50085 HNC	Bignoniaceae	Evouvou (Bulu) Evovon (Ewondo, Nanga)	Ebolowa Mbeyengue I Nanga-Eboko	Bark	Chicken-pox Genital herpes	Chicken pox: see <i>C. afer</i> Genital herpes: see <i>C. afer</i>



Figure 4. Collection site: Ebolowa.

used by the traditional healers of these three regions for treatment of genital herpes.

Literature data on the plants harvested in the rain forest of Cameroon show that the trees *P. hylo dendron*, *S. campanulata* and *E. chlorantha* are at least 15 m high, while the herbs *C. afer* and *M. charantia* are at least 2 m high. These plants are equally found in other countries in the tropical region of Africa including Gabon, Ivory Coast, Equatorial Guinea, Guinea Conakry, Democratic Republic of Congo and Congo Brazzaville.

Traditional dosage for treatment of these viral diseases consists of taking orally, usually day and night, a decoction of the part of the plant used. Some healers rather recommend bathing, purging day and night with these decoctions. Another treatment technique used by these healers consists of soaking a piece of cotton wool with a juice of the plant then dressing (example: in the treatment of Shingles).

The ethnobotanical survey and other uses show that these plants are also used to treat illnesses other than viral diseases. For example *C. afer* treats pains and hemorrhoids; *E. chlorantha* is used for treatment of malaria, fever; and typhoid fever (Betti, 2004). *M. charantia* treats hemorrhoids, fever and tumors; *P. hylo dendron* is used for treatment of female infertility and sexually transmitted infections (Dongmo, 2005). *S. campanulata* treats malaria and diabetes (N'guessan et al., 2009; Dhanabalan et al., 2008).

The antiviral properties of these plants are directed against a wide variety of viral species. *M. charantia* acts on measles, chicken-pox, genital herpes and shingles viruses, which are members of the Herpesviridae family. *P. hylo dendron* acts on chicken-pox virus; *C. afer* acts on measles, chicken-pox, influenza and genital herpes

viruses. *S. campanulata* is effective against chicken-pox and genital herpes viruses; and *E. chlorantha* acts on hepatitis A, B, C and D viruses.

Conclusion

This study shows the need for the enlightenment of traditional healers and the public in general on selective use of plants for the treatment of viral diseases. However, study on the effectiveness of these plants in the treatment of diseases as indicated by the traditional healers needs to be scientifically checked.

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