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Ethnobotanical Study of Some Medicinal Species Used in Kimvula City (Kongo Central/ RDC)

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Abstract

This study has been conducted at Kimvula city. The goal was to investigate the medicinal plants used in that city. Thus, any ethnobotanical survey has been realized on the use of the plants in six towns by direct interviews among 180 peoples with an average of age comprise between 17-70 years old with high representatives of women. This study has allowed us to establish a floristic list of 188 medicinal species belonging in 158 genera and 69 families where *Fabaceae* dominant group. Anemia was indications mostly cited as a sickness threated by using plants. Concerning the characteristics of the treatment preparation, leaves are the plant's organs mostly used; decoction is the preparation way cited and the oral admistration is the administration way for those medicinal drugs. *Morinda morindoides, Ocimum gratissimum,*

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Disphania ambrosioïdes and *Moringa oleifera* have the VAUs superior or eaual to 1.10. There is not a link concerning the use of plants between the inhabitant of group 1 and the inhabitant of group 2. By the wah, that there is a link concerning the use of plants between the Lona, Winda, Pado, Revolution and Kinata neighborhoods (Group 2). Three sspcies characterized the group 1 like: *Clematis hirsuta*, *Saccharum officinarum* and *Voacanga africana*, and four especies *Ceiba pentandra*, *Indigofera paracapitata*, *Maprounea africana* and *Ochna afzelii* characterized the group 2.

Keywords: Medicinal plants, ethnobotanic, threated sickness, Kimvula city, DR Congo

1. Introduction

Medicinal plants constitute a precious resource for a hug majority of rural population in Africa, where more than 80% use it to assure health care (OMS, 2004; Jiofack et al., 2009, 2010; Dibong et al., 2014; Sylla et al., 2018; Ngbolua et al., 2019). The natural resources of traditional medicine are very diverse; this medicine draws minerals, animals and especially plants, the remedies necessary to restore the patient's health (Ould Mohamed et al., 2009; Caroline G., 2013; Nzuki, 2016; Intissar A.O., 2016).

For a long time, the use of plants has enabled the various cultures of the world to guarantee to a large extent the health of their populations (Bastien, 1987a; Milliken et al., 1992; Geissler et al., 2002; Milliken and Albert, 1997; Milliken, 1997a; Heinrich et al., 1998b; Alexiades, 1999; Bennett et al., 2000; Leonti et al., 2002; Casagrande, 2002; Voeks, 2004). WHO (2002) and Augereau (2008) estimate that approximately less than half of the population in developing countries has regular access to essential medicines. According to Kerharo et al. (1974), WHO (1983), OAU (1985), Sofowora (1996), WHO (2002) and Augereau (2008), 75 to 80% of the populations of the countries of the dependent African countries linked to traditional medicine and more than those preparations based on local medicinal plants. Likewise, Adjanohoun (1993) points out that in rural areas where health facilities are often lacking, the population is 100% dependent on medicinal plants. As Balée (1994) points out, Phillips et al. (1994), Augereau (2008) and Ilumbe (2010), the use of plants varies from one ethnic group to another, because a plant perceived as of great use by an ethnic group can be considered useless by another group (Ilumbe, 2014).

Admittedly, various ethnobotanical studies have been carried out in the different ethnic groups of the different provinces of DR Congo such as Lingola (2001), Masiala (2002), Toirambe (2002), Lumbu (2005), Makumbelo et al. (2008 and 2018), Ilumbe (2006, 2010), Magilu (2007), Gafuene (2009), Bikandu (2007), Bikandu et al. (2018), Lassa (2007, 2012), Mato (2005) and

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Musuyu (2006). Some ethnobotanical studies have been carried out in the province of central Kongo, such as those of Kimbungu (2003), Lathan (2007) and Lukoki (2011), on the other hand very few studies or nothing at all have been done on ethnobotanical surveys in the city of Kimvula.

In this study, the working hypotheses have been summarized as follows: "traditional folk medicine constitutes one of the poles of ethnobotanical knowledge; the people of the city of Kimvula use the same plants to cure diseases, they use the same organs, they use the same methods of preparation and administration and they form the same community in the use of medicinal plants."

During this study, the main objective to contribute of the knowledge about plants using as medicinal species in Kimvula. To achieve this objective, surveys were carried out with local informants to find out which medicinal plants are used by local populations to enhance their value.

To achieve this overall objective, we have set ourselves the following specific objectives:

- Conduct ethnobotanical surveys on medicinal plants in the city of Kimvula;
- Give the general characteristics of the recipes;
- Group all the districts (Kinata, Lona, Mvula nlondi, Pado, Revolution and Winda) using a hierarchical ascending classification method (CHA) to check if all the districts use the same plants,
- Assess the cultural significance of the medicinal plants in the city of Kimvula.

2. Area, Material and Methods

2.1. Study Area

The city of Kimvula is located in the Guinean-Congolese and Zambian transition zone of White (1980) or the Sudano-Zambian region dominated by clear forests and savannas, according to Lebrun (1947).

The geographic coordinates are 5˚42 'to 5˚44' South; 15˚57's to 15˚59's East; 561 to 567 m above sea level (Anonymous, 2002). This altitude contrasts with the 920 m altitude of Kingoma in the north-west and the 650 to 785 m altitude of the Lubisi sector in the south-east (Figure 1).

The city of Kimvula is located 165 km (as the crow flies) southeast of the city of Kinshasa (Encarta, 2005). At the level of the village Kinzala on the road axis (national no. 16) connecting Kimvula to Kisantu is the limit separating the territory of Kimvula from the territory of Madimba to the West.

The Kimvula region enjoys an Aw4 type climate according to the Köppen classification. There is a rainy season that lasts 8 months, from mid-September to mid-May and a dry season of 4 months from mid-May to mid-September. Figure 1 shows a view of the city of Kimvula.

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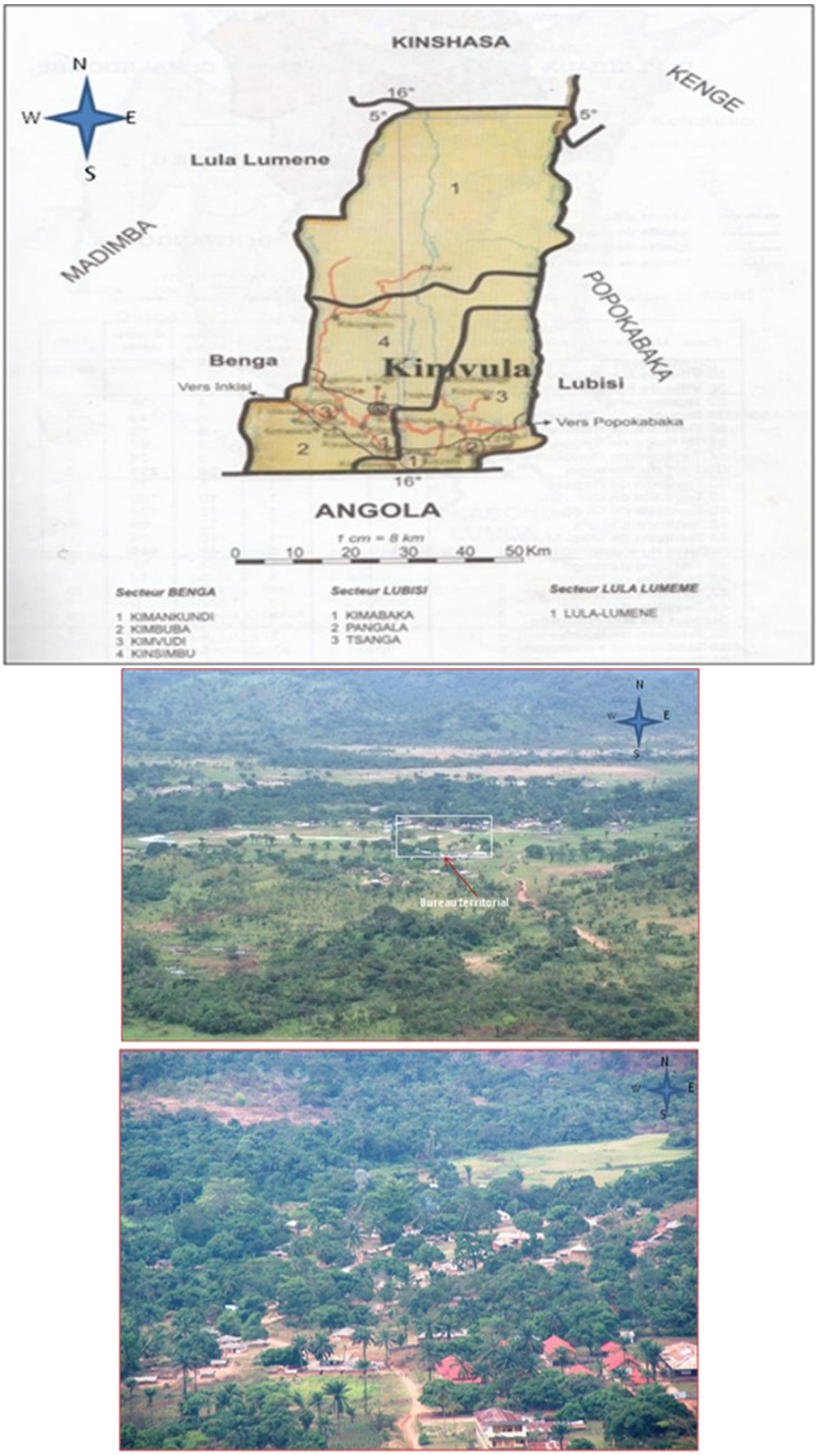

Figure 1: Location of the City of Kimvula in a deep valley between several hills (a) and City of Kimvula, Revolution district where we see in the foreground the general hospital and the convent of the sisters with red sheet metal roof (b)

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2.2. Material

The biological material that was used in this study consists of samples of plants collected in the City of Kimvula. So these are the parts of the plants (root, stem, bark, sap, rhizome, flower bud, leaf, resin, whole plant, fruit, seed ...). Harvesting the plants at the city of Kimvula required the following equipment: Digital camera (Canon Power Shot A720 IS), field notebook, pen, pencil, press, herbarium paper, cardboard and harvesting knife.

2.3. Methods

The preparation of a reference herbarium is a necessary basis for any study of botanical inventory. The plants were harvested in the city of Kimvula to constitute a herbarium. For a correct determination of the plants, the flora of the Belgian Congo and the main floristic works of the neighboring countries of Central Africa: Flora of Gabon, Flora of Central Africa and Flora of Cameroon were used.

The verification of determinations was made by comparison with the specimens kept at the Herbarium of Kinshasa "IUK" at the University of Kinshasa, in the Department of Biology.

Some traditional healers but also some young girls and boys who inherited some knowledge generally from their parents on the use of medicinal plants in the city of Kimvula, are among those interviewed.

The present study was carried out from a series of ethnobotanical surveys using semi-structured interview using a pre-developed questionnaire, and the information sought concerned the plants they use to treat diseases, the organs of the plant used, the method of preparation of the recipes and the method of administration (Martin, 1995; Kalanda et al., 1995; Ilumbe, 2014; Alexiades, 1996; Zerbo et al., 2007). Questions were asked in local languages, Lingala and Kikongo. A total of 180 people were interviewed between the ages of 17 and 72. Data processing began by entering the plant lists by neighborhood and by interview, followed by the encoding of various general characteristics of the recipes. Then, the data were processed using the software: MS Word, Excel and MVSP.

To better interpret the medicinal cultural value of plants, the Use Agreement Value Index (VAUs) (Ilumbe, 2010 and 2014) which combines the Use Value Index (VUs) (Philips et al. , 1993) and the confirmation index proposed by Byg and Balslev (2001) was used.

$$VAUs = VUs \times ICs \quad (1)$$

The usage value index VUs is expressed by:

$$\mathbf{VUs} = \frac{\sum_{i=1}^{n} Uis}{ns} \quad (2)$$

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Where VUs equals the number of uses of the species s mentioned by the informant i and ns equals the number of people who cited this species.

One technique that takes into account the consensus of participants and can thus be used to assess the cultural importance of plants is the proportion of informant agreement (Trotter et al. And Logan, 1986;Thomas et al., 2009). For the present study, the original formula proposed by Byg and Balslev (2001) has been interpreted to express the consensus of informants or confirmation index of medicinal plants. Thus, the consensus of informants is calculated as follows:

$$\mathbf{ICs} = \frac{Na}{Nt} \quad (3)$$

Where ICs is the confirmation index, Na = number of people who cited this species and Nt = total number of people interviewed.

For the determination of groupings and ordination, the hypothesis that the users of medicinal plants living in the city of Kimvula form the same community in the use of plants in traditional medicine will be verified; an obtained similarity matrix from the Jaccard similarity coefficient will be used to build hierarchies for the classification of surveys or informants by district for this case. The different uses of plants can be made between neighborhoods in general, depending on the presence / absence of plants using the similarity measure. Thus, the calculation of a similarity coefficient makes it possible to quantify the degree of association of two species, or even the level of similarity between the districts taking into account their floristic composition, for example (Kent and Coker, 1996; Legendre and Legendre, 1998; Stokes et al., 2000; Magurran, 2004). Thus, the chosen Jaccard index focuses on the double presences(a), that is to say on the plants observed as used by the successive districts. The maximum similarity is equal to 1, 0 being the minimum value. The visualization of the content of these matrices is done in the form of dendrograms.

3. Results and Discussions

3.1. Floral Composition

To better understand the medicinal floral of the city of Kimvula on a botanical level, a list of plant species has been drawn up from ethnobotanical surveys. And then an arrangement of families and genera represented in this floral was made. In total, 188 species used as medicinal plants have an inventory was built in the six neighborhoods surveyed in the city of Kimvula, these are divided into 158 genera and 69 families. The distribution of genera and species in botanical families is given in Table 2. The botanical identification showed that among the 69 families identified, the most

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represented are the *Fabaceae* 17 genera (10.76%) and 22 species (11. 70%), the *Rubiaceae* 10 genera (6.33%) and 11 species (5.85%), the *Euphorbiaceae* 10 genera (6.33%) and 10 species (5.32%), the *Malvaceae* 9 genera (5.70%) and 9 species (4.79%) and the *Asteraceae* 8 genera (5.06%) and 8 species (4.26%). Betti (2001) in the markets of Yaoundé, Souâda et al. (2007) in the region of Rabat and Paulin et al. (2006) in the Niangoloko classified forest in Burkina Faso also confirm the predominance of the *Fabaceae* family in their investigations.

3.1.1. Distribution of species in botanical families

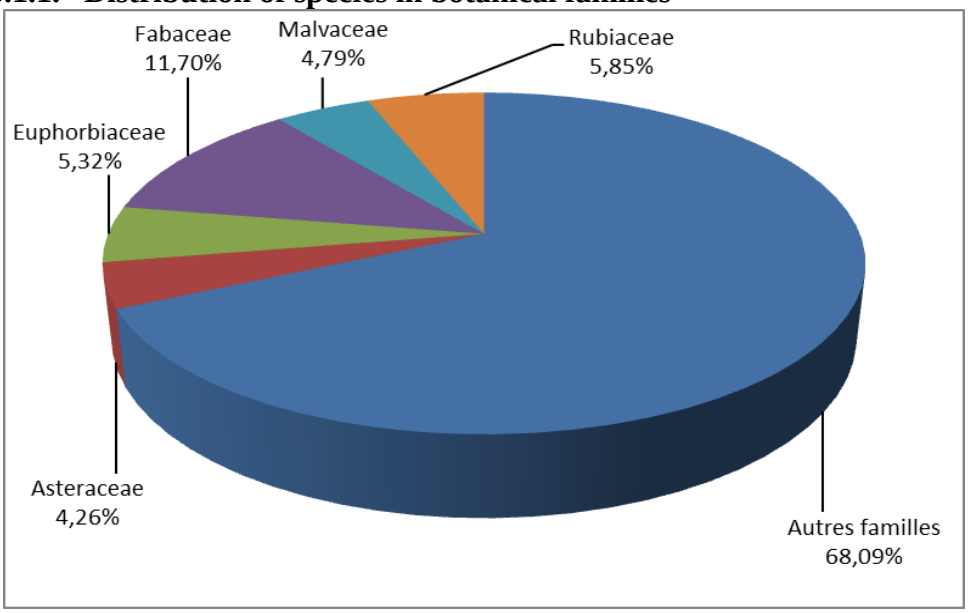

Figure 2: distribution of species in botanical families

3.2. Interviewed People

A total of 180 people were interviewed during this study in 6 neighborhoods in the city of Kimvula (Table 2). Overall, there are 47 men and 133 women. Table 2 reveals the low participation of men in the use of medicinal plants, especially in the Kinata, Lona, Mvula nlondi and Révolution districts.

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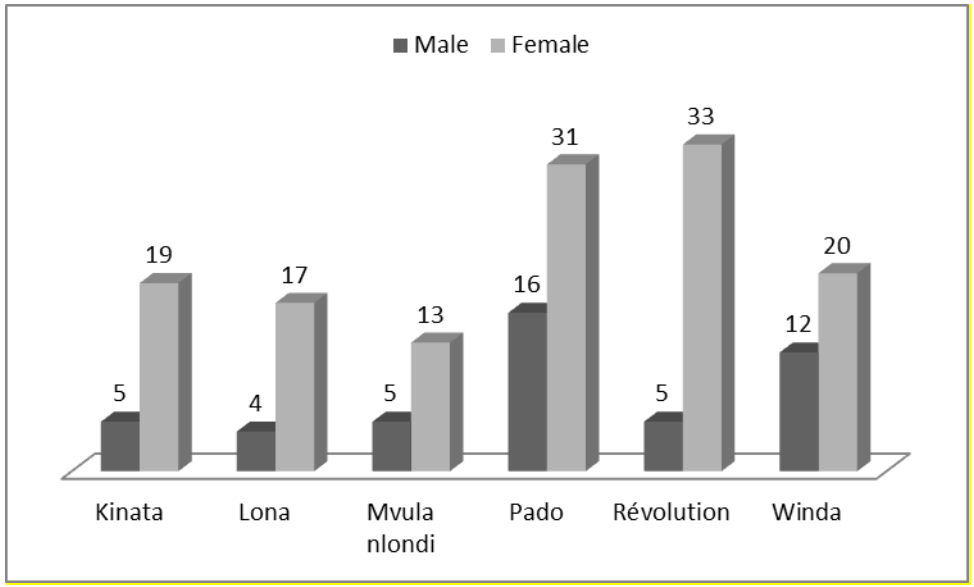

Figure 3: Number of people interviewed on medicinal plants in the city of Kimvula

3.3. Ethnobotanical and Pharmacological Aspects

3.3.1. Ailments Treated by Medicinal Plants

A better understanding of the traditional treatments practiced in the city of Kimvula has made it possible to list around a hundred diseases treated by medicinal plants. The results obtained show that most plants are involved in the treatment of anemia (11.81%), cough (11.39%), fever (10.27%), stomach aches (7.64%), spleen disorders (6.24%), general pain (5.26%), back pain (4.37%) and malaria (4.01%) (Figure 4).

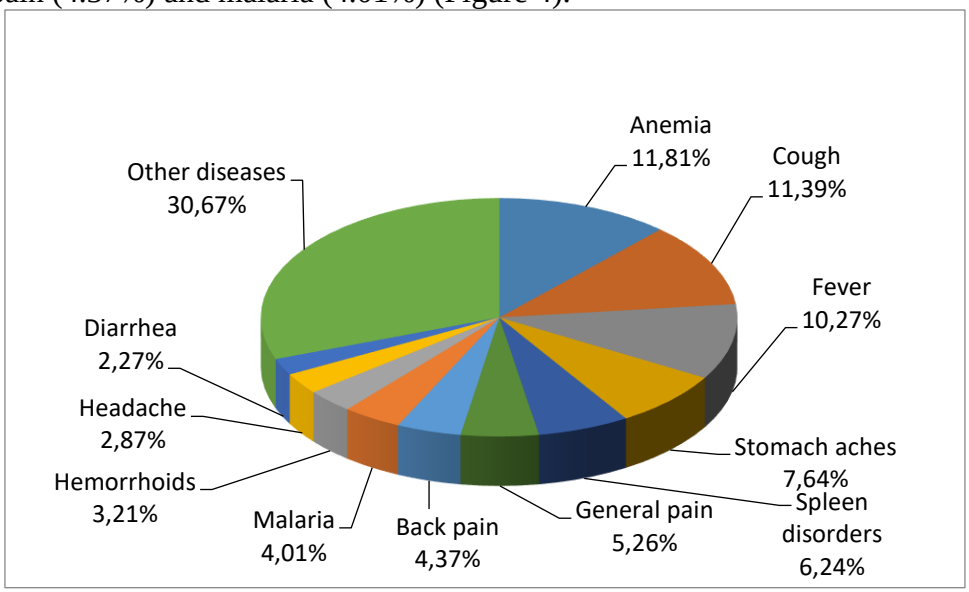

Figure 4: Main disease well-groomed in Kimvula city

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3.3.2. Vegetable organs used in recipes

The preparation of phytotherapeutic recipes involves 31 plant organs often used in herbal medicine in the city of Kimvula when the plant is not fully used. The leaf is the organ most used with 3298 citations (59.82%) followedy the root with 813 citations (14.75%), the stem bark with 385 citations (6.98%) and the seed with 338 citations (6.13%). The other organs have little interest (Figure 3).

Ilumbe (2006, 2010 and 2014), Wome (1985), Mabika (1983), Benlamdini et al. (2014), Mato (2005), Magilu (2006 and 2007), Dibong et al. (2011), Fézan et al. (2008), Koffi et al. (2009), Ould (2009), Souad et al. (2010), Bitsindou (1996), Kawukpa and Angoyo (1994) also note the frequent use of the leaves in traditional remedies. For Musuyu (2006), Lubini (1990) and Bitsindou (1996), on the other hand, the barks are the most used organ in the preparation of recipes. As for Lassa (2012), the roots constitute the first organ most used in the preparation of different recipes.

As reported by Bitsindou (1996) and Ilumbe (2010), the importance of the uses of the leaves and stem bark could be explained by the fact that they are generally the seat of biosynthesis and sometimes the storage of metabolites secondary responsible for the biological properties of the plant. Diafouka (1997) argues that the importance of the bark is often due to the ease of harvesting. However, the species for which the leaves are used are less vulnerable than those for which the bark of stems and / or roots is used. It is desirable to encourage the use of leaves in relation to the bark of roots or stems.

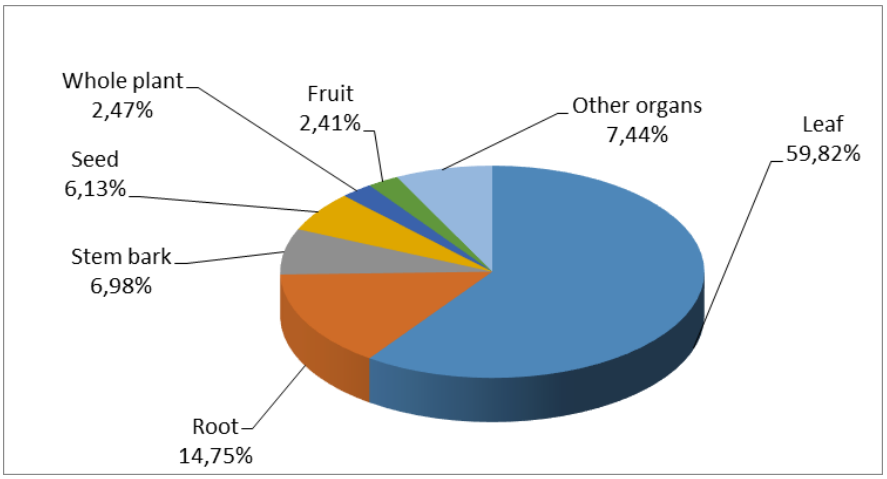

Figure 5: Plant organs used

3.3.3. Mode of preparation of recipes

In this study, the proportions of different methods of preparing plants are listed in Table 3. Among all the methods of preparation listed with

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Kimvula's traditional therapists, decoction and pounding are the most common. They collect respectively 2326 citations and 2292 citations, or 42.19 and 41.57%. The other modes of preparation are slightly cited as indicated in Table 1.

The results of this study are consistent with those obtained by Musuyu (2006), Ataholo (1988), Lassa (2012) in DR Congo; Bitsindou (1996) in Congo-Brazzaville in Kindamba, Dibong et al. (2011) in the markets of Douala in Cameoun; Benlamdini et al. (2014) in Morocco, in the Eastern High Atlas (Haute Moulouya) and Koffi et al. (2009) in Côte d'Ivoire in the Krobou country. However, they differ from those obtained by Ilumbe (2006); Mabika (1983); Wome (1985); Magilu (2007) in DR Congo; Fézan et al. (2008) in Côte d'Ivoire, Bitsindou (1996) in Congo-Brazzaville in the Odzala National Park; Dibong et al. (2011) in Cameroon in the Douala markets; Oumar et al. (2014) in Senegal to Khossanto and Souad et al. (2010) in Morocco in the city of Kenitra. For these authors, maceration is the most used mode in the preparation of recipes. Whereas for Kawukpa and Angoyo (1994) among the Batiabetuwa of Mbiye Island in Kisangani (DRC), it is rather the infusion and the drying which are most appreciated in the preparation of the recipes.

Table 1: Mode of preparation of recipes
(**Number of cit**: number of citation and %: percentage)

Mode of preparation	**Number of cit**	**%**
Burn	90	1,63
Heat up	86	1,56
Cooking	12	0,22
Decoction	**2326**	**42,19**
Oven drying	1	0,02
Shead condition drying	2	0,04
Solar drying	1	0,02
Crease	152	2,76
Rub	144	2,61
Scratch	11	0,20
Roast	15	0,27
Infusion	1	0,02
Pounding	**2292**	**41,57**
Plant	1	0,02
Without preparation	370	6,71
Break up	8	0,15
Sap leaf	1	0,02
General Total	**5513**	**100,00**

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3.3.4. Administration Modes

The different modes of administration are represented in figure 6. The oral route is the most used mode of administration with 2511 of citations (45.55%) followed by the anal route with 1217 of citations (22.08%) and skin topical with 419 citations (7.60%). The other routes of administration are poorly cited.

Similar results were also obtained in Bobangi (Ilumbe, 2006); in Kasaï-Occidental (Mabika, 1983); in the markets of the city of Kinshasa (Lassa, 2012); in the southwest of the Salonga National Park (Musuyu, 2006); among the Pende populations of the periphery of the INERA forest reserve of Kiyaka, (Magilu, 2007); in Cameroon in the Douala market (Dibong et al., 2011); Kindamba and Odzala National Park (Bitsindou, 1996); in Ivory Coast in the country Krobou, (Koffi, 2009). While in Kisangani, Wome (1985) noted the importance of the rectal route as a whole. Kawukpa and Angoyo (1994) among the Batiabetuwa of Mbiye Island in Kisangani, Lubini (1990) among the Yansi of between Kwilu-Kamastha and Magilu (2006) in Kisangani and Gungu also noted the predominance of the anal route during their investigations. According to Mato (2005) on the outskirts of the southwestern part of Salonga National Park, local application and the oral route are the most common directions for use.

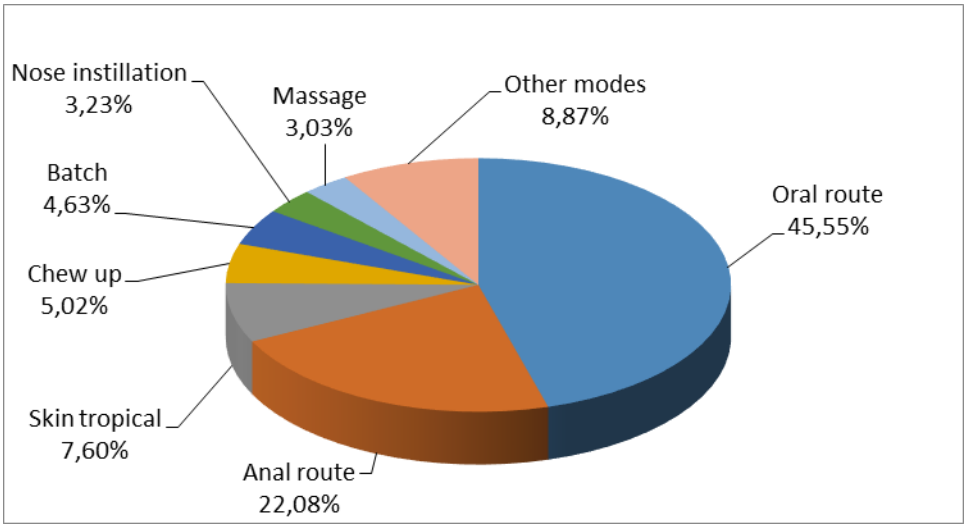

Figure 6: Mode of administration of drugs in Kimvula city

3.4. Cultural Importance of Local Plants

The medicinal plants used in the city of Kimvula with their values of the VUs, ICs and VAUs indices are presented in table 3 in the appendix.

The value-based cash arrangement (VUs) gives different results compared to the informant consensus value-based arrangement (ICs). If the classification based on VUs favors plants used for several uses, that based on

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the values of the index of consensus of informants favors plants used or known in several districts.

The classification made from the values of the index of the value of use of the species puts in first position the species *Quassia africana* (4.83), *Canarium schweinfurthii* (3.20), *Moringa oleifera* (2.50) with values greater than or equal to 2.50. By classifying the species according to the confirmation index (ICs), they are the species *Ocimum gratissimum* (0.78), *Morinda morindoïdes* (0.74), *Disphania ambrosioïdes* (0.73), *Senna occidentalis* (0.72), *Persea americana* (0.61), *Boerrhavia diffusa* (0.60), *Brillantaisia owariensis* (0.60), *Ocimum americanum* (0.56), *Securidaca longepedunculata* (0.53) and *Pentadiplandra brazzeana* (0.50) values greater than or equal to 0.50. By combining the values VUs and ICs into a use agreement value (VAUs), the plant species with a high use agreement value are *Morinda morindoides* (1.58), *Ocimum gratissimum* (1.23), *Disphania ambrosioïdes* (1.20) and *Moringa oleifera* (1.13) with values greater than 1.10.

3.5. Intra and Inter District Relations About Used of Medicinal Plants

The lists of plants cited during the various interviews across the six districts were subjected to ascending hierarchical classifications. This in order to seek links between the different people interviewed across the different districts on the medicinal plants used in traditional medicine in the city of Kimvula.

3.5.1. Classification based on criteria « used species in traditional medicine »

This classification on the basis of the methods Nearest Neighbour of 6 districts and 188 plant species it possible to observe, 2 groups formed for the use of medicinal plants (figure 7). The first group (G1) is composed of the district inhabitant Mvula nlondi and the second group (G2) is composed of the districts inhabitant Kinata, Lona, Pado, Révolution and Winda. Analysis of the figure below shows that there is not a link concerning the use of plants between the inhabitant of group 1 and the inhabitant of group 2. By the wah, that there is a link concerning the use of plants between the Lona, Winda, Pado, Revolution and Kinata neighborhoods (Group 2). Three espcies characterized the group 1 like: *Clematis hirsuta*, *Saccharum officinarum* and *Voacanga africana*, and four especies *Ceiba pentandra*, *Indigofera paracapitata*, *Maprounea africana* and *Ochna afzelii* characterized the group 2.

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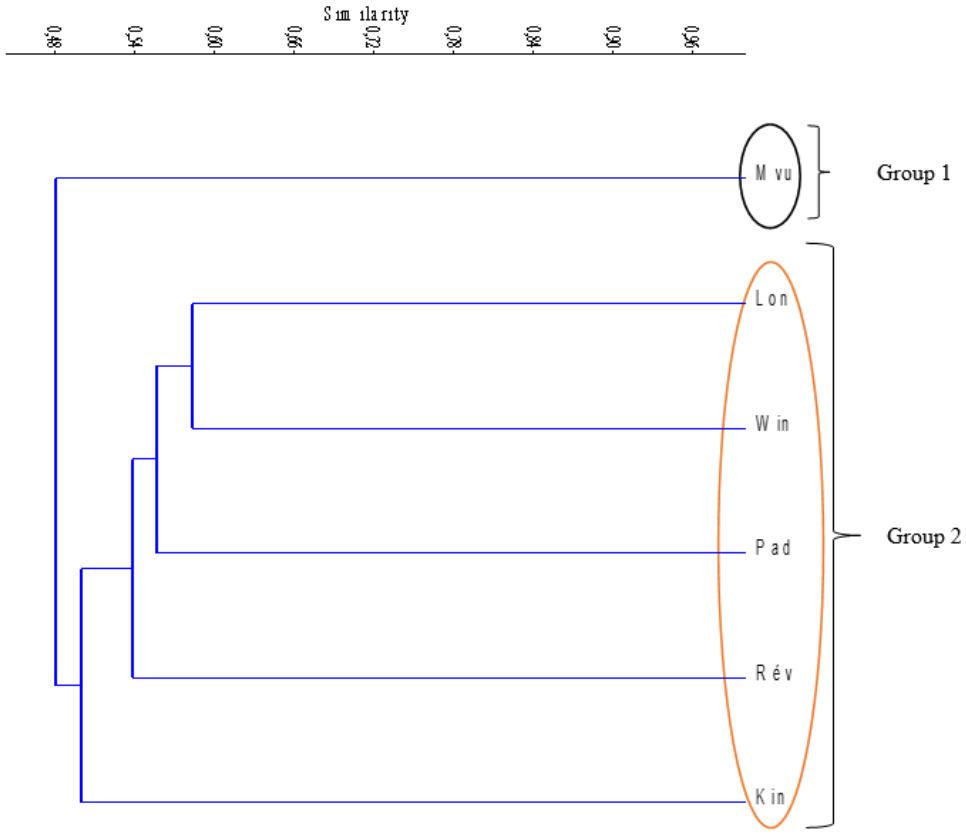

Figure 7: Dendrogram showing the different groups formed by the populations of different districts in the use of plants in traditional medicine according to the nearest neighbor method and Jaccard coefficient (Kin: Kinata, Lon: Lona, Mvu: Mvula nlondi, Pad: Pado, Rev: Revolution and Win: Winda

Conclusion

This study has revealed the relative importance of traditional medicine in the primary health system in the city of Kimvula and at the same time confirms that the use of medicinal plants in the therapeutic field still persists despite the popularity of medicine modern. The ethnobotanical study of medicinal plants showed the presence of 188 medicinal species divided into 158 genera and 69 families. The most represented families are *Fabaceae* (22 species), *Rubiaceae* (11 species), *Malvaceae* (9 species) and *Asteraceae* (8 species). The leaf (59.82%) is the most cited part and in the majority of cases, the plant parts are used fresh in the preparation of medicinal recipes; these are more usually made by decoction (42.19%). As for the method of administration, the oral route is the most cited (45.55%).The species with a high use agreement value are *Morinda morindoïdes* (1.58), *Occimum gratissimum* (1.23), *Disphania ambrosioides* (1.20) and *Moringa oleifera*

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(1.13). The medicinal species are used especially against diseases which constitute a real health problem such as anemia, cough, fever, stomach aches, spleen disorders, general pain, back pain, malaria, hemorrhoids, headache and diarrhea. However, despite their effectiveness, these therapeutic products have not been scientifically validated and the problems still lie in unwanted side effects, chronic toxicity and contraindications. These species deserve sustainable management because they are the most widely used and treat several indications or diseases. They can be integrated into sustainable management so that its plant resources exist for future generations. It would be desirable that sustainable management measures be taken to conserve these species.

Well will offer some of them to pharmacists and chemists for the control of therapeutic or toxic effects in order to select the truly effective plants. Mainly plants and popular recipes; it will be necessary to determine the indications and the dosage for each of them, this can be done through pharmacological monitoring of patients where the healer and the health worker or doctor work together; and to create gardens of medicinal plants to cultivate interesting species, and also to consider chemical and phytochemical studies with a view to determining the properties of these plants for their better use or the substitution of plant organs which regenerate with difficulty.

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Appendix

Table 2: Distribution of genera and species in botanical families

Botanical Family	Number of genera	%	Number of species	%
Acanthaceae	2	1,27	2	1,06
Amaranthaceae	2	1,27	2	1,06
Amaryllidaceae	1	0,63	1	0,53
Anacardiaceae	2	1,27	2	1,06
Anisophyllaceae	1	0,63	1	0,53
Annonaceae	2	1,27	3	1,60
Apocynaceae	5	3,16	6	3,19
Araceae	4	2,53	4	2,13
Arecaceae	2	1,27	2	1,06
Asparagaceae	2	1,27	2	1,06
Asteraceae	**8**	**5,06**	**8**	**4,26**
Bignoniaceae	1	0,63	1	0,53
Brassicaceae	1	0,63	1	0,53
Burseraceae	2	1,27	2	1,06
Caricaceae	1	0,63	1	0,53
Cecropiaceae	1	0,63	1	0,53
Celastraceae	1	0,63	1	0,53
Chrysobalanaceae	1	0,63	1	0,53
Clusiaceae	1	0,63	2	1,06
Combretaceae	1	0,63	2	1,06
Commelinaceae	1	0,63	1	0,53
Connaraceae	1	0,63	1	0,53
Convolvulaceae	1	0,63	1	0,53
Costaceae	1	0,63	2	1,06
Crassulaceae	1	0,63	1	0,53
Cucurbitaceae	5	3,16	5	2,66
Cyperaceae	1	0,63	1	0,53
Dioscoreaceae	1	0,63	3	1,60
Ebenaceae	1	0,63	1	0,53
Euphorbiaceae	**10**	**6,33**	**10**	**5,32**
Fabaceae	**17**	**10,76**	**22**	**11,70**
Gisekiaceae	1	0,63	1	0,53
Hypericaceae	2	1,27	2	1,06
Hypolepidaceae	1	0,63	1	0,53
Iridaceae	1	0,63	1	0,53
Lamiaceae	3	1,90	5	2,66
Lauraceae	1	0,63	1	0,53
Loganiaceae	1	0,63	4	2,13
Malvaceae	**9**	**5,70**	**9**	**4,79**
Marantaceae	1	0,63	1	0,53
Menispermaceae	1	0,63	1	0,53
Moraceae	3	1,90	4	2,13
Moringaceae	1	0,63	1	0,53
Musaceae	1	0,63	2	1,06
Myrtaceae	3	1,90	4	2,13

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Nyctaginaceae	1	0,63	1	0,53
Nymphaeaceae	1	0,63	1	0,53
Ochnaceae	2	1,27	2	1,06
Olacaceae	1	0,63	1	0,53
Passifloraceae	2	1,27	2	1,06
Pedaliaceae	1	0,63	2	1,06
Pentadiplandraceae	1	0,63	1	0,53
Phyllanthaceae	2	1,27	3	1,60
Piperaceae	1	0,63	1	0,53
Poaceae	5	3,16	6	3,19
Polygalaceae	1	0,63	1	0,53
Ranunculaceae	1	0,63	1	0,53
Rubiaceae	**10**	**6,33**	**11**	**5,85**
Rutaceae	1	0,63	3	1,60
Salicaceae	1	0,63	1	0,53
Scrophulariaceae	2	1,27	2	1,06
Simaroubaceae	1	0,63	1	0,53
Solanaceae	5	3,16	8	4,26
Talinaceae	1	0,63	1	0,53
Theaceae	1	0,63	1	0,53
Verbenaceae	3	1,90	3	1,60
Vitaceae	1	0,63	1	0,53
Xantorrhoeaceae	1	0,63	1	0,53
Zingiberaceae	2	1,27	3	1,60
Total	**158**	**100**	**188**	**100**

Table 3: List of species used in the city of Kimvula with their use agreement values. NI: number of informants, NQ: number of neighborhoods, NM: number of diseases, NR: number of recipes, NC: number of citations, VUs: use value of the species, CIs: confirmation index and VAUs: use agreement value.

Species	**N.I**	**N.Q**	**N.M**	**N.R**	**N.C**	**VUs**	**ICs**	**VAUs**
Abelmoschus esculentus (L.) Moench (Malvaceae)	4	2	2	2	4	1,00	0,02	0,02
Abrus precatorius L. (Fabaceae)	6	3	1	5	6	1,00	0,03	0,03
Acanthospermum hispidum DC. (Asteraceae)	39	5	8	22	59	1,51	0,21	0,32
Aframomum alboviolaceum (Ridl.) K. Schum. (Zingiberaceae)	70	6	12	34	100	1,43	0,38	0,54
Aframomum melegueta K. Schum.(Zingiberaceae)	1	1	1	1	1	1,00	0,01	0,01
*Albizzia adianthifolia (*Schum.) W. Wight (Fabaceae)	7	3	6	6	9	1,29	0,04	0,05
*Alchornea cordifolia (*Schum & Thonn.) Müll. Arg. (Euphorbiaceae)	54	6	7	21	62	1,15	0,29	0,33
Allium sativum L.(Amaryllidaceae)	5	2	4	4	9	1,80	0,03	0,05
Aloe congolensis De Wild & T. Durand. (Xantorrhoeaceae)	83	6	6	20	94	1,13	0,45	0,51

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Anchomanes difformis (Blume) Engl. (Araliaceae)	4	1	1	1	4	1,00	0,02	0,02
Anisophyllea quangensis Engl. ex Henriques (Anisophyllacee)	4	2	1	1	4	1,00	0,02	0,02
Annona senegalensis Pers (Annonaceae)	71	5	10	28	82	1,15	0,38	0,44
Arachis hypogaea L. (Fabaceae)	38	6	13	26	44	1,16	0,20	0,24
Argocoferosus capensis L. (Rubiaceae)	1	1	2	2	2	2,00	0,01	0,01
Barteria fustilosa (Mast.) Sleumer (Passifloraceae)	4	2	4	4	5	1,25	0,02	0,03
Bidens pilosa L. (Asteraceae)	56	6	11	26	92	1,64	0,30	0,49
Boerrhavia diffusa L. (Nyctaginaceae)	111	6	10	23	178	1,60	**0,60**	0,96
Brassica oleracea L. (Brassicaceae)	2	1	1	1	2	1,00	0,01	0,01
Bridelia ferruginea Benth. (Phyllanthaceae)	31	5	8	16	37	1,19	0,17	0,20
Brillantaisia owariensis P. Beauv. (Acanthaceae)	111	6	22	58	159	1,43	**0,60**	0,85
Bryophyllum pinnatum (Lam.) Oken (Crassulaceae)	16	3	5	8	18	1,13	0,09	0,10
Cajanus cajan (L.) Millsp. (Fabaceae)	1	1	1	1	1	1,00	0,01	0,01
Camelia sinensis L. (Theaceae)	3	1	1	1	3	1,00	0,02	0,02
Canarium schweinfurthii Engl. (Burseraceae)	5	3	7	9	16	**3,20**	0,03	0,09
Capsicum frutescens L. (Solanaceae)	42	5	14	29	56	1,33	0,23	0,30
Capsicum velutinum L. (Solanaceae)	3	2	3	1	2	0,67	0,02	0,01
Carica papaya L. (Caricaceae)	28	4	11	17	40	1,43	0,15	0,22
Catharanthus roseus (L.) G. Don (Apocynaceae)	9	1	8	13	21	2,33	0,05	0,11
Ceiba pentandra (L.) Gaertn (Malvaceae)	31	5	2	11	31	1,00	0,17	0,17
Celosia trigyna (L.) R. King & H. (Amaranthaceae)	1	1	1	1	1	1,00	0,01	0,01
Chromolaena odorata L. (Asteraceae)	44	6	18	35	73	1,66	0,24	0,39
Cissus aralioides (Welw & Baker) Planch (Vitaceae)	10	4	6	9	12	1,20	0,05	0,06
Citrus limon (L.) Burn.F. (Rutaceae)	13	4	4	7	14	1,08	0,07	0,08
Citrus reticulata Blanco (Rutaceae)	1	1	1	1	1	1,00	0,01	0,01
Citrus sinensis (L.) Burn.F. (Rutaceae)	7	2	3	6	7	1,00	0,04	0,04

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Clematis hirsuta Guill & Perr (Ranunculaceae)	1	1	1	1	1	1,00	0,01	0,01
Clerodendrum uncinatum Schinz (Verbenaceae)	2	1	1	1	2	1,00	0,01	0,01
Cnestis ferruginea DC. (Connaraceae)	5	2	2	2	5	1,00	0,03	0,03
Coffea canephora Pierre & Fröhner (Rubiaceae)	22	5	7	14	27	1,23	0,12	0,15
Cogniauxia podoleana Baill. (Cucurbitaceae)	6	2	5	5	10	1,67	0,03	0,05
Cola acuminata (P. Beauv.) Schott et Endl. (Malvaceae)	24	6	12	15	40	1,67	0,13	0,22
Colocasia esculenta (L.) Schott (Araceae)	3	2	2	2	3	1,00	0,02	0,02
Combretum psidioides Welw. (Combretaceae)	4	3	5	5	5	1,25	0,02	0,03
Combretum racemosum P. Beauv. (Combretaceae)	3	1	1	1	3	1,00	0,02	0,02
Costus afer Ker-Gawel (Costaceae)	35	6	17	31	66	1,89	0,19	0,35
Costus lucanusianus J. Braun & K. Schum. (Costaceae)	21	5	11	15	29	1,38	0,11	0,16
Cratespermum laurinum (Poir.) Benth (Rubiaceae)	1	1	1	1	1	1,00	0,01	0,01
Crossopteryx febrifuga (Afzel.) Benth (Rubiaceae)	11	4	7	8	17	1,55	0,06	0,09
Croton angolensis Müll.Arg. (Euphorbiaceae)	12	4	6	6	15	1,25	0,06	0,08
Cryptolepis angolensis Welw. ex Hiern (Apocynaceae)	1	1	1	1	1	1,00	0,01	0,01
Cucumeropsis mannii Naud. (Cucurbitaceae)	1	1	1	1	1	1,00	0,01	0,01
Cycnium camporum Engl. (Scrophulariaceae)	3	2	2	2	3	1,00	0,02	0,02
Cymbopogon citratus (DC.) Stapf. (Poaceae)	34	6	10	14	76	2,24	0,18	0,41
Cymbopogon densiflorus (Steud.) Stapf. (Poaceae)	27	5	7	11	32	1,19	0,15	0,17
Cyperus articulatus L. (Cyperaceae)	6	3	3	3	6	1,00	0,03	0,03
*Dacryodes edulis (*G. Don) H.J. Lam. (Burseraceae)	28	5	4	9	31	1,11	0,15	0,17
Dalbergia rufa G. Don (Fabaceae)	4	2	3	2	4	1,00	0,02	0,02
Dalechampia scandens L. (Euphorbiaceae)	7	2	5	5	8	1,14	0,04	0,04
Datura stramonium L. (Solanaceae)	10	2	7	10	16	1,60	0,05	0,09
Dialium pachyphyllum Harms (Fabaceae)	13	2	8	9	16	1,23	0,07	0,09

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Dichrostachys cinerea (L.) Wight & Arn. (Fabaceae)	2	2	4	4	4	2,00	0,01	0,02
Dioscorea bulbifera L. (Dioscoreaceae)	1	1	1	1	1	1,00	0,01	0,01
*Dioscorea dumetorum (*Kunth) Pax. (Dioscoreaceae)	2	1	1	1	2	1,00	0,01	0,01
Dioscorea praehensilis Benth. (Dioscoreaceae)	3	1	2	2	6	2,00	0,02	0,03
Diospyros heterotricha (B.L. Burtt) F. (Ebenaceae)	2	1	1	1	2	1,00	0,01	0,01
Dysphania ambrosioides (L.) Mosiyikin & Clements (Amaranthaceae)	136	6	10	37	224	1,65	**0,73**	**1,20**
Dracaena acutissima Hua (Asparagaceae)	4	2	2	3	4	1,00	0,02	0,02
Elaeis guinneensis L. (Arecaceae)	67	6	15	34	85	1,27	0,36	0,46
Eleusine indica (L.) Gaertn (Poaceae)	10	3	6	8	16	1,60	0,05	0,09
Emilia coccinea (Sims) G. Don (Asteraceae)	16	5	4	7	18	1,13	0,09	0,10
Erythrophloeum africanum (Welw.) Harms (Fabaceae)	3	2	3	3	3	1,00	0,02	0,02
*Erythrophloeum suaveolens (*Guill. Et Perr.) Brenan (Fabaceae)	7	2	8	9	13	1,86	0,04	0,07
Eucalyptus globulus Labil. (Melastomataceae)	2	1	1	1	2	1,00	0,01	0,01
Euphorbia trigona Haw. (Euphorbiaceae)	4	3	2	3	4	1,00	0,02	0,02
Ficus exasperata Vahl. (Moraceae)	2	1	1	1	2	1,00	0,01	0,01
Ficus thonningii Blume (Moraceae)	7	4	6	6	10	1,43	0,04	0,05
Garcinia huillensis Welw. ex Oliv. (Clusiaceae)	10	4	4	6	15	1,50	0,05	0,08
Garcinia kola Heckel (Clusiaceae)	33	6	15	19	58	1,76	0,18	0,31
Gardenia ternifolia Schumach & Thonn. (Rubiaceae)	7	2	4	4	8	1,14	0,04	0,04
Gisekia pharmacioides L. (Gisekiaceae)	1	1	1	1	1	1,00	0,01	0,01
Gladiolus gregarius L. (Iridaceae)	1	1	1	1	1	1,00	0,01	0,01
Gossypium barbadense L. (Malvaceae)	7	2	4	5	10	1,43	0,04	0,05
Gymnanthemum amygdalinum (Delile) Sch. Bip ex Walp. (Asteraceae)	12	5	9	10	21	1,75	0,06	0,11
Hallea stipulosa (DC.) Leroy (Rubiaceae)	17	6	11	14	25	1,47	0,09	0,13

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Harungana madagascariensis Lam ex Poir. (Hypericaceae)	38	6	8	16	52	1,37	0,20	0,28
Heinsia crinita (Afzel) G. Tayl. (Rubiaceae)	28	6	13	19	40	1,43	0,15	0,22
Hibiscus acetosella Welw. ex Hiern (Malvaceae)	4	1	2	2	4	1,00	0,02	0,02
Hymenocardia acida Tul. (Phyllanthaceae)	26	5	15	19	43	1,65	0,14	0,23
Hymenocardia ulmoïdes Oliv. (Phyllanthaceae)	13	4	9	10	20	1,54	0,07	0,11
Hyptis suaveolens Poit. (Lamiaceae)	10	2	4	8	12	1,20	0,05	0,06
Indigofera paracapitata Gillett. (Fabaceae)	78	5	2	19	80	1,03	0,42	0,43
Ipomoea batatas Poir (Convolvulaceae)	2	1	2	2	4	2,00	0,01	0,02
Jatropha curcas L. (Euphorbiaceae)	25	5	15	19	29	1,16	0,13	0,16
Justicia secunda Vahl. (Acanthaceae)	77	6	3	19	77	1,00	0,41	0,41
Lagenaria brevifolia (Benth) Roberty (Cucurbitaceae)	2	1	1	1	2	1,00	0,01	0,01
Lagenaria siceraria (Molina) Standley (Cucurbitaceae)	1	1	1	1	1	1,00	0,01	0,01
Landolphia lanceolata (K.Schum) M. Pichon (Apocynaceae)	6	2	4	5	7	1,17	0,03	0,04
Landolphia parvifolia (K. Schum) (Apocynaceae)	9	4	3	4	13	1,44	0,05	0,07
Lannea welwitschii (Hiern) Engl. (Anacardiaceae)	4	2	2	2	4	1,00	0,02	0,02
Lantana camara L. (Verbenaceae)	3	1	1	1	3	1,00	0,02	0,02
Lasimorpha senegalensis Schott (Araceae)	2	2	2	2	2	1,00	0,01	0,01
Leptoderris congolensis De Wild. (Fabaceae)	1	1	1	1	1	1,00	0,01	0,01
Limnocharis flava (L.) Buchenan (Butomaceae)	7	2	2	3	7	1,00	0,04	0,04
Lippia multiflora L. (Verbenaceae)	41	6	12	17	84	2,05	0,22	0,45
Macaranga angolensis Müll. Arg. (Euphorbiaceae)	4	2	2	2	4	1,00	0,02	0,02
Mangifera indica L. (Anacardiaceae)	84	6	10	27	128	1,52	0,45	0,69
Manihot esculenta Grantz (Euphorbiaceae)	40	6	12	31	74	1,85	0,22	0,40
Maprounea africana Müll. Arg. (Euphorbiaceae)	13	5	3	7	14	1,08	0,07	0,08
Markhamia tomentosa (Benth.) K. Schum. (Bignoniaceae)	4	2	1	2	4	1,00	0,02	0,02

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Megaphrynium macrostachyum (Benth) Milne-Redhead (Marantaceae)	1	1	1	1	1	1,00	0,01	0,01
Micrococca mercurialis (L.) Benth. (Euphorbiaceae)	7	4	2	4	7	1,00	0,04	0,04
Milicia excelsa (Welw.) C. Berg. (Moraceae)	7	4	3	5	7	1,00	0,04	0,04
Millettia drastica Welw. ex Baker (Fabaceae)	6	4	5	5	8	1,33	0,03	0,04
Millettia eetveldeana (Micheli) Hauman (Fabaceae)	4	2	3	3	4	1,00	0,02	0,02
Millettia laurentii De Wild. (Fabaceae)	1	1	2	2	2	2,00	0,01	0,01
Millettia versicolor Welw. ex Baker (Fabaceae)	9	5	4	6	9	1,00	0,05	0,05
Mimosa pudica L. (Fabaceae)	4	1	2	2	8	2,00	0,02	0,04
Mitracarpus villosus (Sw.) DC. (Rubiaceae)	2	1	1	1	2	1,00	0,01	0,01
Momordica charantia L. (Cucurbitaceae)	3	2	3	4	7	2,33	0,02	0,04
Mondia whitei (Hook. F.)Stapf. (Apocynaceae)	11	6	6	6	25	2,27	0,06	0,13
Monodora myristica (Gaertn) Dunal (Annonaceae)	29	6	10	17	40	1,38	0,16	0,22
Morinda lucida Benth. (Rubiaceae)	33	6	13	27	54	1,64	0,18	0,29
Morinda morindoides (Baker) Melne. Redh. (Rubiaceae)	138	6	24	35	294	2,13	**0,74**	**1,58**
Moringa oleifera Lam. (Moringaceae)	84	6	23	54	210	**2,50**	0,45	**1,13**
Musa paradisiaca L. (Musaceae)	4	1	4	4	6	1,50	0,02	0,03
Musa sp2 (Musaceae)	1	1	1	1	1	1,00	0,01	0,01
Musanga cecropioïdes R. Br. (Cecropiaceae)	2	1	1	1	2	1,00	0,01	0,01
Nicotiana tabacum L. (Solanaceae)	3	2	3	4	6	2,00	0,02	0,03
Nymphaea lotus L. (Nymphaeaceae)	2	2	1	1	2	1,00	0,01	0,01
Ochna afzelii R.Br. (Ochnaceae)	41	5	3	10	42	1,02	0,22	0,23
Ocimum americanum L. (Lamiaceae)	104	6	16	39	174	1,67	**0,56**	0,94
Ocimum basilicum L. (Lamiaceae)	3	2	2	2	3	1,00	0,02	0,02
Ocimum gratissimum L. (Lamiaceae)	145	6	13	43	229	1,58	**0,78**	**1,23**
Olax viridis Oliv. (Olacaceae)	4	2	4	4	5	1,25	0,02	0,03
Oncoba welwitschii (Oliv.)Gilg. (Salicaceae)	8	4	7	7	10	1,25	0,04	0,05
Oryza sativa L. (Poaceae)	4	2	1	2	4	1,00	0,02	0,02

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Pachira glabra (Pasquale) A. Robyns (Malvaceae)	1	1	1	1	1	1,00	0,01	0,01
Palisota ambigua (P. Beauv.) (Commelinaceae)	2	1	1	1	2	1,00	0,01	0,01
Parinari capensis Harv. (Chrysobalanaceae)	11	3	3	5	12	1,09	0,06	0,06
Paropsia brazzeana Baill. (Passifloraceae)	6	2	4	4	7	1,17	0,03	0,04
Pauridiantha dewevrei (De Wild. & Th. Dr. (Rubiaceae)	1	1	2	2	2	2,00	0,01	0,01
Pentaclethra macrophylla Benth. (Fabaceae)	4	2	2	2	4	1,00	0,02	0,02
Pentadiplandra brazzeana Baill. (Pentadiplandraceae)	93	6	11	28	170	1,83	**0,50**	0,91
Persea americana Mill. (Lauraceae)	114	6	8	43	129	1,13	**0,61**	0,69
Piper nigrum L. (Piperaceae)	22	5	6	14	32	1,45	0,12	0,17
Psidium guajava L. (Myrtaceae)	39	6	4	13	45	1,15	0,21	0,24
Psophocarpus scandens (Endl.) Verdc. (Fabaceae)	8	2	5	6	11	1,38	0,04	0,06
Psorospermum febrifugum Spath. (Hypericaceae)	17	4	3	9	19	1,12	0,09	0,10
Pteridium aquilinium L. (Hypolepidaceae)	6	3	2	3	6	1,00	0,03	0,03
Quassia africana (Baill.) Baill. (Simaroubaceae)	6	3	13	18	29	**4,83**	0,03	0,16
Raphia textilis Welw. (Arecaceae)	2	1	2	2	2	1,00	0,01	0,01
Rhabdophyllum arnoldianum (De Wild & T. Durand) (Ochnaceae)	2	2	4	4	4	2,00	0,01	0,02
Saccharum officinarum L. (Poaceae)	62	6	6	11	78	1,27	0,32	0,41
Salacia pynaertii De Wild. (Celastraceae)	2	1	1	1	2	1,00	0,01	0,01
Sanseviera trifasciata Train (Asparagaceae)	2	1	2	2	4	2,00	0,01	0,02
Schwenckia americana L. (Solanaceae)	25	6	7	12	26	1,04	0,13	0,14
Sclerocroton cornutus (Pax) Krujt & Roebers. (Euphorbiaceae)	27	5	3	7	28	1,04	0,15	0,15
Scoparia dulcis L. (Scrophulariaceae)	1	1	1	1	1	1,00	0,01	0,01
Securidaca longepedunculata Fresen (Polygalaceae)	99	6	14	29	139	1,40	**0,53**	0,75
Senna occidentalis (L.) Link (Fabaceae)	133	6	9	34	167	1,26	**0,72**	0,90
Sesamum orientale L. (Pedaliaceae)	1	1	1	1	1	1,00	0,01	0,01
Sesamum radiatum Schumach & Thonn. (Pedaliaceae)	32	5	8	11	39	1,22	0,17	0,21

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Sida cordifolia L. (Malvaceae)	3	2	2	2	3	1,00	0,02	0,02
Solanum aethiopicum L. (Solanaceae)	4	3	3	4	8	2,00	0,02	0,04
Solanum lycopersicum Mill. (Solanaceae)	32	6	9	16	47	1,47	0,17	0,25
Solanum macrocarpon L. (Solanaceae)	3	2	1	1	3	1,00	0,02	0,02
Sterculia tragacantha Lindl. (Malvaceae)	3	2	2	2	3	1,00	0,02	0,02
Stomatatens africanus (Oliv. et Hirn) R.H. King. (Asteraceae)	2	2	3	4	4	2,00	0,01	0,02
Strychnos cocculoides Baker (Loganiaceae)	39	6	4	14	44	1,13	0,21	0,24
Strychnos icaja L. (Loganiaceae)	17	6	8	13	36	2,12	0,09	0,19
Strychnos pungens Soler. (Loganiaceae)	2	2	3	3	3	1,50	0,01	0,02
Strychnos spinosa Lam. (Loganiaceae)	4	2	2	2	4	1,00	0,02	0,02
Syzygium guineense (Wild.) DC. (Myrtaceae)	5	2	2	3	5	1,00	0,03	0,03
Syzygium malaccense (L.) Merr. (Myrtaceae)	1	1	2	2	2	2,00	0,01	0,01
Talinum fructicosum (L.) A. Juss. (Talinaceae)	3	1	1	1	3	1,00	0,02	0,02
Tephrosia lupinifolia DC. (Fabaceae)	4	3	5	6	6	1,50	0,02	0,03
Tephrosia vogelii Hook.f. (Fabaceae)	2	1	1	1	2	1,00	0,01	0,01
Treculia africana Decne (Moraceae)	2	1	1	1	2	1,00	0,01	0,01
Triclisia dyctyophilla Diels. (Menispermaceae)	4	2	1	1	4	1,00	0,02	0,02
Tridax procumbens L. (Asteraceae)	14	4	5	9	20	1,43	0,08	0,11
Urena lobata L. (Malvaceae)	25	6	7	19	37	1,48	0,13	0,20
Vernonia potamophila Klatt (Asteraceae)	71	6	9	18	88	1,24	0,38	0,47
Vigna unguiculata (L.) Walp. (Fabaceae)	1	1	1	1	1	1,00	0,01	0,01
Vitex madiensis Oliv. (Lamiaceae)	32	5	10	19	47	1,47	0,17	0,25
Voacanga africana Stapf. (Apocynaceae)	1	1	1	1	1	1,00	0,01	0,01
Xylopia aethiopica (Dunal) A. Rich. (Annonaceae)	61	6	14	37	85	1,39	0,33	0,46
Zea mays L. (Poaceae)	1	1	1	1	1	1,00	0,01	0,01
Zingiber officinale Roscoe (Zingiberaceae)	16	6	7	13	22	1,38	0,09	0,12

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Table 4: List of indications types treated by medicinal plants
(Nber de cu: number of citation and %: percentage)

Indications	**Nber cu**	**%**
Abscess	32	0,58
Abdominal pain	2	0,04
Against abortion	9	0,16
Against evil espirits	9	0,16
Against incurable diseases	1	0,02
Against lightning	6	0,11
Against the night husband	2	0,04
Against the rain	10	0,18
Against the serpent	5	0,09
Against wizards	11	0,20
Agalactia	1	0,02
Halicire	63	1,14
Amoebic dysentery	2	0,04
anemia	**651**	**11,81**
Angina	5	0,09
Ankylomiasis	6	0,11
Antiphlogistic	10	0,18
Aperitif	15	0,27
Appendicitis	13	0,24
Aprodisiac	10	0,18
Ascariasis	2	0,04
Ascites	32	0,58
Asthma	33	0,60
Backache	**241**	**4,37**
Belly ringing	2	0,04
Bronchitis	14	0,25
Bug the stomach	49	0,89
Burn	5	0,09
Cardiopathy	17	0,31
Cataract	13	0,24
Chickenpox	43	0,78
Chronic gastritis	93	1,69
Chronic rhinitis	61	1,11
Colic	8	0,15
Complications of pregnancy	6	0,11
Confusion in children	1	0,02

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Congestion of the lungs	2	0,04
Conjonctivitis	3	0,05
Constipation	3	0,05
Continual fever	1	0,02
Cough	**628**	**11,39**
Cries in the child	6	0,11
Deafness	1	0,02
Dehydrated	73	1,32
Dental caries	75	1,36
Diabetes	31	0,56
Diarrhea	**125**	**2,27**
Disinfectant	2	0,04
Dizzy spells	2	0,04
Drunkenness	3	0,05
Dysmenorrhoea	9	0,16
Dystocia	3	0,05
Ear sores	4	0,07
Earache	22	0,40
Elephantiasis	19	0,34
Epilepsy	40	0,73
Eye disease	3	0,05
Facial paralysis	7	0,13
Fainting fit	2	0,04
Fever	**566**	**10,27**
Filariosis	8	0,15
Flu	62	1,12
Fracture	2	0,04
General infection	1	0,02
General pain	**290**	**5,26**
Genital infection in woman	1	0,02
Geography legs	3	0,05
Gonorrhoea	3	0,05
Gonorrhoea infection	1	0,02
Headache	**158**	**2,87**
Headaches in children	1	0,02
Healing wounds	2	0,04
Hearing fond	3	0,05
Heart attack	3	0,05

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Hemorrhoids	**177**	**3,21**
Hepatitis	4	0,07
Hernia	6	0,11
Hiccups	2	0,04
High blood pressure	17	0,31
Hypogalactia	3	0,05
Infertility in woman	4	0,07
Insecticide	13	0,24
Kwashiorkor	7	0,13
Language	1	0,02
Layer suites	28	0,51
Leg pain	11	0,20
Loss of weight	3	0,05
Low blood pressure	13	0,24
Lumbago	1	0,02
Madness	4	0,07
Malaria	**221**	**4,01**
Malnutrition	4	0,07
Measles	73	1,32
Meningitis	11	0,20
Microbial infection	3	0,05
Mumps	1	0,02
Mycosis	18	0,33
Neck	6	0,11
Non-suppurative otitis media	4	0,07
Nutritional athrepsy	2	0,04
Odontalgia	1	0,02
Ophtalmia	7	0,13
Otalgia	1	0,02
Otitis externa	3	0,05
Pain after childbirth	2	0,04
Poliomyelitis	8	0,15
Poor-quality	8	0,15
Prostate	2	0,04
Psychic trouble	14	0,25
Purgative	2	0,04
Rash	22	0,40
Remains	1	0,02

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Rheumatism	24	0,44
Ringworm	10	0,18
Scabies	48	0,87
Sexual impotence	11	0,20
Sinusitis	8	0,15
Smallpox	30	0,54
Smell	1	0,02
Sore throat	15	0,27
Sores in the baby's mouth	1	0,02
Spleen disorders	**344**	**6,24**
Sprain	20	0,36
Stomach aches	**421**	**7,64**
Stomach pain	9	0,16
Stomatitis	2	0,04
Testicle	13	0,24
Tetanus	4	0,07
To facilitate the conception of the child	6	0,11
To facilitate walking in children	42	0,76
To promote divorce	1	0,02
To promote domination	8	0,15
To promote memory	1	0,02
To promote the fight	4	0,07
Tonic	6	0,11
Traumatism	2	0,04
Typhoid fever	4	0,07
Udder sores	2	0,04
Unspecified site urinary tract infection	3	0,05
washing of hair	2	0,04
Water purification	1	0,02
Whitlow	11	0,20
Whooping cough	2	0,04
Wound	33	0,60
Wound with pain	2	0,04
Yellow fever (Jaundice)	63	1,14
General total	**5513**	**100,00**