Ethnobotanical survey of herbs used in the management of diabetes mellitus in Southern Katanga Area/DR Congo

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Abstract

Introduction: Diabetes is becoming a public health burden for sub-Saharan countries due to its prevalence which is growing rapidly. Traditional medicine is more and more used to treat diabetes in RD Congo as well as in other African countries. This study was undertaken in order to list plants used in the management of diabetes by traditional healers in four agglomerations of southern area of Katanga in the Democratic Republic of Congo. Methods: Forty-nine traditional healers were randomly met and interviewed about diabetes treatment in traditional medicine. The survey concerned the plant identification, their part used, method of preparation and the route of administration. The inquest concerned also traditional medicine users. Results: Ninety-five plants from 47 families were indicated as antidiabetic. Fabaceae (24.2%), Euphorbiaceae (7.4%), Apocynaceae and Strychnaceae (4.2 each) are the more representative families. This inventory showed that the root is the most used part of the cited plants, the decoction with water as the main preparation method and the oral administration as the principal way to give antidiabetic traditional formulations. Conclusion: In Lubumbashi region, many plant species are used to treat diabetes either through traditional praticians or by anyone from well-known ancestral knowledge.

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Introduction

Diabetes mellitus is a metabolic syndrome characterized by chronic high-blood glucose concentrations resulting from defects in insulin secretion, insulin action or both and having consequences on lipids and proteins metabolism [1,2]. According to the International Federation of Diabetes (IDF) there were 415 million people in the world with diabetes in 2015 and this is projected to increase to 642 million by 2040 [3]. In the Democratic Republic of Congo the prevalence of diabetes mellitus is rapidly growing up [4,5]. From 2003 to 2013 the number of diabetic patients has increased alarmingly from 552 thousands to 1.6 million; and the proportion of people with undiagnosed diabetes may reach 75% due to resource-limited health care [6,7]. On one side the limited access to conventional drugs and health care system, the faith on ancestral culture healing practices on the other hand, bring more people to traditional medicine where herbal drugs are widely used. Traditional medicine is still the mainstay of millions Congolese as well as other Africans [8]. In light of that, we decided to collect information about the plants used traditionally in the treatment of diabetes mellitus in southern Katanga area, DRC.

Methods

This ethnobotanical survey was realized by interviews conducted with the help of a guide-questionnaire in the town of Lubumbashi, and in the cities of Kasumbalesa, Kipushi and Likasi, in the southern area of Katanga province, in the Democratic Republic of Congo from September 2005 to July 2007, according to principles stated by the Declaration of Helsinki on personal data [9]. To be sure of the information veracity, each traditional healer was met at least three times to answer the same questions at different moments. From the collected sample, the plants pointed out as providing antidiabetic properties had been identified by their scientific name at the herbarium of Kipopo (30km far from Lubumbashi town to the North), by Professor Jean Lejoly of the Free University of Brussels.

Results

About fifty traditional healers were visited and interviewed on their knowledge and on diabetes treatment after their assent. The data obtained from different traditional healers on their knowledge and on vegetable species used in the management of diabetes are given in Table 1 and Annex 1. Table 1 gives information about traditional practitioners (tribe, age, sex and how he or she became healer). Annex 1 gives information about plant species: local name, plant parts used, methods of preparation, administration and different diseases treated. Scientific names were given after botanical identification of harvested samples and listed in the table in alphabetical order. As indicated in the Table 1, 49 traditional healers allotted between twelve tribes, whose 16 women (32.65 %) and 33 men (67.34 %) were interviewed. Without accurate sociological information on these different tribes, it is not easy to explain clearly why there are more men traditional healers than women. However, we think that three reasons would explain that: (i) the will of advertising (use of poster, streamer, cartoon) that is more remarkable to men than to women; (ii) the fact that during the inquest time, more women than men are absent for field work would explain why there are more men traditional healers known than women; and (iii) it is possible that the practice of traditional medicine is guided by socio-cultural characteristics such as kinship system (patriarchy or matriarchy) as observed in the Mafa tribe of Cameroun [10]. As it can be observed the main source of traditional medicine knowledge remains the ancestral transmission way from old people to young ones (39/49). This may be explained by the fact that, traditional medicine is a cultural component which spread through generations from ascendants to descendants and based on oral transmission in Africa [8,11,12]. We notify that the Luba and Bemba tribes are the most representative tribes among the traditional practitioners respectively with 28.57% and 16.32%, only because they are the most numerous in the areas of inquiry [13] Annex 1. The information about the plants used in managing diabetes collected from different traditional medical practitioners is gathered in the following table. In this study, the data show that, 95 plants from 47 families were indicated as traditionally used to treat diabetes. Fabaceae (24.2%), Euphorbiaceae (7.4%), Apocynaceae and Loganiaceae (4.2 each) are the most representative botanical families. The ethnobotanical survey revealed that the root (41.3% of citation) is the most used organ of plant followed by the leaves (28.6%) and the stem bark (20.6%). The decoction found to be the main way to prepare recipes (62.2%) and the oral administration (92%) as the principal way to give antidiabetic traditional formulations. The present study showed that, apart from diabetes, the 95 plants mentioned by traditional healers are also used in the treatment of others several diseases or symptoms (more than forty) such as diarrhea, rheumatism, infections and abdominal pain. Each

Annex 1

Table 1 gives information about plant species: local name, plant parts used, methods of preparation, administration and different diseases treated. Scientific names were given after botanical identification of harvested samples and listed in the table in alphabetical order. As indicated in the Table 1, 49 traditional healers allotted between twelve tribes, whose 16 women (32.65 %) and 33 men (67.34 %) were interviewed. Without accurate sociological information on these different tribes, it is not easy to explain clearly why there are more men traditional healers than women. However, we think that three reasons would explain that: (i) the will of advertising (use of poster, streamer, cartoon) that is more remarkable to men than to women; (ii) the fact that during the inquest time, more women than men are absent for field work would explain why there are more men traditional healers known than women; and (iii) it is possible that the practice of traditional medicine is guided by socio-cultural characteristics such as kinship system (patriarchy or matriarchy) as observed in the Mafa tribe of Cameroun [10]. As it can be observed the main source of traditional medicine knowledge remains the ancestral transmission way from old people to young ones (39/49). This may be explained by the fact that, traditional medicine is a cultural component which spread through generations from ascendants to descendants and based on oral transmission in Africa [8,11,12]. We notify that the Luba and Bemba tribes are the most representative tribes among the traditional practitioners respectively with 28.57% and 16.32%, only because they are the most numerous in the areas of inquiry [13] Annex 1. The information about the plants used in managing diabetes collected from different traditional medical practitioners is gathered in the following table. In this study, the data show that, 95 plants from 47 families were indicated as traditionally used to treat diabetes. Fabaceae (24.2%), Euphorbiaceae (7.4%), Apocynaceae and Loganiaceae (4.2 each) are the most representative botanical families. The ethnobotanical survey revealed that the root (41.3% of citation) is the most used organ of plant followed by the leaves (28.6%) and the stem bark (20.6%). The decoction found to be the main way to prepare recipes (62.2%) and the oral administration (92%) as the principal way to give antidiabetic traditional formulations. The present study showed that, apart from diabetes, the 95 plants mentioned by traditional healers are also used in the treatment of others several diseases or symptoms (more than forty) such as diarrhea, rheumatism, infections and abdominal pain. Each
of the 95 plants cited was mentioned at least by one respondent. Some species such as: *Albizia adianthifolia* (Schum.) WF Wight, *Antidesma venosum* Meyer, *Cassia occidentalis* L, *Jatropha curcas* L and *Strychnos spinosa* Lam, were known as antidiabetic by two or more traditional healers (Annex 1).

**Discussion**

This is a first report of an ethnobotanical survey of species used as antidiabetic in the study area. The predominance of Fabaceae, Euphorbiaceae as major botanical families comprising more species used in traditional medicine was also mentioned in a similar study in the same area [14,15]. This study has shown that the root is the most widely used organ for the preparation of recipes. Cheikhyoussef et al [16] as well as Tabuti et al [17], found also in their studies that root and leaves have been more used than other plant organ. The large use of decoction and oral administration respectively as the main preparation mode and the principal route to give traditional herbal drugs are generally observed in other African communities. The use of the different plants in the management of diabetes and other ailments demonstrates the importance of traditional medicine that is known to be a component of everyday life in many areas of the world and particularly in Africa [8,18]. When comparing this study with others, some resemblance can be pointed out: among 306 vegetables species cited as antidiabetic plants used in the treatment of diabetes in Mexico [19], 11 plants are identified in our study: *Allium cepa* L, *Aloe vera* L, *Ananas comosus* L, *Arachis hypogaea* L, *Bident pilosa* L, *Carica papaya* L, *Catharanthus roseus* L, *Persea americana* Mill, *Psidium guajava* L, *Ricinus communis* L, *Senna occidentalis* L as used by traditional healers in the management of diabetes. In the ethnobotanical investigation conducted by Abo, Fred-Jaiyesimi and Jaiyesimin in the South Western Nigeria area [20], 31 plants had been reported to be used traditionally as antidiabetic agents and *Carica papaya* cited in our study is revealed in that study. *Allium cepa*, *Allium sativum*, *Bident pilosa*, *Catharanthus roseus*, *Lantana camara*, *Musa sapientum* and *Psidium guajava* identified in this investigation are documented as antidiabetic used traditionally in other studies [21,22]. The antidiabetic properties of some species identified in this investigation have been experimentally demonstrated in the in vivo and in vitro diabetic models: *Allium cepa*, *Allium sativum* [23], *Aloe vera*, *Bident pilosa* [19,24]; *Catharanthus roseus* [25-27], *Lantana camara* [23,28], *Musa sapientum* [29,30]. Compared to another ethnobotanical survey of plants used as antidiabetic in Kisangani, Eastern province of DRC, 10 species cited in this study are also mentioned by Katemo et al [31].

**Conclusion**

In this study tradipraticians cited both medicinal herbs already known for their antidiabetic effect (34 plants, 35.8% of citations) and so far un-cited herbs that must be evaluated for hypoglycemic and antihyperglycemic and other diabetic related symptoms; so that they may possibly be used in the management of diabetes.

- **What is known about this topic**
  - For this topic, it is known that the population of Lubumbashi and its surroundings uses traditional medicine to treat various diseases. It is also known that in most cases, this traditional medicine exploits plant resources as a source of medicines. Some of these plants are used in the treatment of diabetes.

- **What this study adds**
  - The novelty of this study is summarized in that: (i) this study lists for the first time the plants used against diabetes in Lubumbashi and its surroundings; (ii) Among the inventoried species, some have not yet been studied in this field and are probably a particularity of Congolese traditional medicine; (iii) For the first time, the profile of providers of traditional diabetes care in Lubumbashi is given.

**Competing interests**

The authors declare no competing interests.

**Authors’ contributions**

All the authors have read and agreed to the final manuscript.
Table

Table 1: Information about the 49 traditional healers’ identity and source of knowledge

Annex

Annex 1: Plants used traditionally in the management of diabetes at Kasumbalesa, Kipushi, Likasi and Lubumbashi

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| Site       | N.A | Tribe and Sex | Age (year) | Source of knowledge                                      |
|-----------|-----|---------------|------------|----------------------------------------------------------|
| Kasumbalesa | 6   | Bemba 1F      | 49         | Ancestral                                               |
|           |     | Kabinda 1F    | 52         | Initiation of another tribe                             |
|           |     | Luba 1M       | 70         | Dreams                                                  |
|           |     | Round 1F      | 49         | Ancestral                                               |
|           |     | Tshokwe 1F; 1M| (71, 103)  | Initiation of another tribe; Ancestral                 |
| Kipushi   | 16  | Bemba 3M      | (63, 63, 50)| Ancestral                                               |
|           |     | Kabinda 2M    | (52, 70)   | Ancestral                                               |
|           |     | Luba 2F; 2M   | (68, 48, 50, 36)| Ancestral; dreams                                      |
|           |     | Luba- Kasai 3F; 2M| (59, 60, 49, 53, 69)| Ancestral; initiation of another tribe |
|           |     | Rega 1M       | 51         | Ancestral                                               |
|           |     | Tshokwe 1M    | 40         | Ancestral                                               |
| Likasi    | 5   | Bemba 1F      | 41         | Ancestral                                               |
|           |     | Luba 2M       | 71, 75     | Ancestral; spirits                                       |
|           |     | Lunda 1F      | 75         | Ancestral                                               |
|           |     | Tshokwe 1F    | 57         | Spirits                                                  |
| Lubumbashi| 22  | Bemba 3M      | 53, 66, 50 | Ancestral; spirits                                       |
|           |     | Bembe 2M      | 47, 40     | Ancestral                                               |
|           |     | Hemba 1F; 3M  | 51, 88, 46, 50f| Ancestral                                               |
|           |     | Lélé 1M       | 27         | Ancestral                                               |
|           |     | Luba 1F, 7M   | 42, 35, 45, 39, 55, 70, 55, 47| Ancestral; spirits; dreams |
|           |     | Luba- Kasai 1F; 1M| 45, 60     | Ancestral                                               |
|           |     | Sanga 1M      | 51         | Ancestral                                               |
|           |     | Tshokwe 1F    | 41         | Ancestral                                               |

N.A: Number of Answers (respond); M= male; F=female
### Annex 1: Plants used traditionally in the management of diabetes at Kasumbalesa, Kipushi, Likasi and Lubumbashi

| Scientific name                          | Local names                        | Family        | U.P            | Treated diseases                          | Preparation and administration | Site          | References |
|------------------------------------------|------------------------------------|---------------|----------------|-------------------------------------------|-------------------------------|---------------|------------|
| *Acacia karroo* Hayne                    | Munga (Luba), Mutonge (Sanga)      | Fabaceae      | Leave, Stem bark | Diabetes, vaginal infections, jaundice    | Decoction/per os              | Kasumbalesa   | T41        |
|                                          | Muguniga (Hemba)                   |               |                |                                           |                               |               |            |
| *Adansonia digitata* L.                  | Mululu punga (Bemba)              | Bombaceae     | Stem bark      | Diabetes                                  | Decoction/per os              | Lubumbashi    | T37        |
|                                          |                                    |               |                |                                           |                               |               |            |
| *Adenia gummiifera* (Harv.) Harms        | Komboponoke (Lamba), Kimboyi (Lala)| Passifloraceae| Stem bark      | Diabetes, birth troubles, infections      | Infusion/per os               | Lubumbashi    | T35        |
| *Adenia venenata* Forssk.                | Mafula (Luba)                      | Passifloraceae| Root, Leave    | Diabetes                                  | Decoction/per os              | Likasi        | T4         |
| *Afromosia angolensis* Harms.            | Mubanga (Bemba), Mubanga kyulu (Luba) | Fabaceae      | Root           | Diabetes, abdominal pain                  | Decoction/per os              | Kasumbalesa   | T40        |
| *Albizia adiantifolia* (Schum.) W. F. Wight | Kasikeaze (Tshokwe), Kapeta nzovu (Bemba), kapeta nzovu (Luba), Kampetanzevu(Tshiluba) | Fabaceae      | Root           | Diabetes, syphilis, diarrhoea, blennorhoea, indigestion | Decoction/per os              | Likasi, Kipushi, Lubumbashi | T7; T37; T42; T44; |
| *Allium cepa* L.                         | Matungulu sumu (Swahili)           | Alliaceae     | Seed           | Diabetes, High blood pressure             | Maceration/per os             | Kipushi       | T36        |
| *Allium sativum* L.                      | Ali (Français)                     | Alliaceae     | Bulb           | Diabetes, abdominal pain                  | As a meal/per os              | Lubumbashi    | T2         |
| *Aloe vera* L                           | Chigaka (Mashi)                    | Asphodelaceae | Leaves         | Diabetes, dye, cancer                     | Maceration /per os            | Lubumbashi    | T19        |
| *Ananas Comisus* Schult. F.              | Nanasi (Swahili), Ananas (Français)| Bromeliaceae  | Fruit          | Diabetes, indigestion                     | Decoction/per os              | Lubumbashi    | T7         |
| *Anisophylla boehmii* Engl.              | Fungo (Sanga), Lufunga (Tabwa)     | Rhizophoraceae| Root           | Diabetes, abdominal pain                  | Decoction/per os              | Kipushi       | T6         |
| *Antidesma venosum* (Tul.) E. Mey.       | Kifubia (Luba), Musambafwa (Lamba) | Euphorbiaceae | Stem bark      | Diabetes, gastrite, blennorhoea           | Decoction/per os              | Lubumbashi, Kasumbalesa | T18 ; T50  |
| *Arachis hypogaea* Lam.                  | Mbaa (Bemba), mwema (Bembe)        | Fabaceae      | Leaves         | Diabetes, infections                      | Decoction/per os              | Lubumbashi    | T5         |
| *Aristolochia hockii* De Wild.           | Kapanganganga                      | Aristolochiace | Root           | Diabetes, measles,                        | Decoction/per os              | Likasi        | T8         |
| Name                                      | Plant Family | Part Used            | Conditions                  | Preparation          | Place of Use          | Code(s) |
|-------------------------------------------|--------------|----------------------|-----------------------------|----------------------|-----------------------|---------|
| Asparagus africanus Lam.                  | Asparagaceae | Leaves Root          | Diabetes, syphilis, haemorrhoid | Decoction/per os    | Likasi, Kasumbalesa   | T18 ; T33 |
| Azanza garckeana (F. Hoffman) Excell & Hillc. | Malvaceae    | Leaves Stem bark     | Diabetes, oedema of the lower extremities, epilepsy | Decoction/per os Infusion/per os | Kasumbalesa | T40 |
| Balanites aegyptiaca (L.) Delile          | Balanitaceae | Root                 | Diabetes, sexual impotence, diarrhoea | Decoction/per os    | Lubumbashi            | T37 |
| Bidens pilosa L.                          | Asteraceae   | Leaves               | Diabetes, hemostatic, urinary infections | Decoction/per os    | Lubumbashi            | T19 |
| Bougainvillaea spectabilis Wild           | Nyctagynaceae| Flowers              | Diabetes                    | Maceration/per os   | Lubumbashi            | T3 |
| Brassica oleracea L.                     | Brassicaceae | Leaves               | Diabetes, skin diseases     | Infusion/per os     | Kasumbalesa, Kipushi  | T15 ; T36 |
| Brillantaisia patula T. Anderson          | Acanthaceae  | Stem bark            | Diabetes, gastrite          | Decoction/per os    | Lubumbashi            | T45 |
| Canarium schweinfurthii Engl.             | Burseraceae  | Leaves               | Diabetes, haemorrhoid       | Decoction/per os    | Lubumbashi            | T5 |
| Carica papaya L.                          | Caricaceae   | leaves Root          | Diabetes, worms, infections | Decoction/enema     | Lubumbashi            | T3 ; T9 |
| Cassia occidentalis (L.) Link             | Fabaceae     | Seed Leaves Root     | Diabetes, worms, constipation | Decoction/per os Maceration/enema | Lubumbashi, Kipushi | T3 ; T27 |
| Cassia petersiana Bolle.                  | Fabaceae     | Root                 | Diabetes, sexual impotence  | Maceration/per os   | Lubumbashi            | T11 |
| Cassia sieberiana DC.                     | Fabaceae     | Leaves               | Diabetes, worms              | Decoction/per os    | Lubumbashi            | T31 |
| Catharanthus roseus (L.) G.Don             | Apocynaceae  | Leaves Root          | Diabetes, High blood pressure, worms, cough, malaria, cancer | Decoction/per os Maceration/enema | Kasumbalesa, Kipushi, Lubumbashi | T22 ; T23 ; T29 |
| Latin Name                        | Common Name (Idioma)               | Family       | Part Utilized | Indications                                      | Preparation/Route | Location | Code |
|----------------------------------|------------------------------------|--------------|--------------|-------------------------------------------------|-------------------|----------|-------|
| *Citrus limon* (L.) Burm. F.     | Citronier (français)              | Rutaceae     | Root         | Diabetes, cough, fever                          | Decoction/per os | Kasumbalesa | T15   |
| *Citrus sinensis* Osbeck.        | Ndimu (Swahili)                    | Rutaceae     | Root         | Diabetes, fever                                 | Decoction/per os | Lubumbashi | T11   |
| *Coleus kilimandschari* Guerke.  | Mcubya (Bembe), Mulavumba (Swahili)| Lamiaceae    | Leaves/Root  | Diabetes, haemorrhoid, malaria, abdominal pain,| Decoction/per os | Kipushi   | T23 ; T27|
| *Combretum celastroides* Exell & Garcia | Lukondambo (Luba), Mwina kyulu (Sanga) | Combretaceae | Leaves/Stem bark | Diabetes, skin diseases                          | Decoction/per os | Kipushi   | T16   |
| *Crossopteryx febrifuga* (G.Don)Benth. | Mutoshi (Tshiluba), Konsekonse (Lamba, Bemba) | Rubiaceae | Leaves/Root | Diabetes, abdominal pain                        | Maceration/per os | Lubumbashi | T39   |
| *Crotalaria spinosa* (Benth) Hutch. | Kabalala (Sanga)                  | Fabaceae     | Stem bark/Root | Diabetes, venereal diseases                     | Decoction/per os | Kupishi   | T21   |
| *Croton macrostachyus* (Delile) Hochst. | Mutara mutshi (Bemba)             | Euphorbiaceae | Leaves       | Diabetes, blennorrhoea, dysmenorrhoea           | Decoction/enema   | Likasi    | T4    |
| *Cucumis sativus* L.             | Concombre (Français)              | Cucurbitaceae | Fruit        | Diabetes                                         | As a meal/per os | Lubumbashi | T12   |
| *Cyperus alternifolius* L.       | Ndao (Luba)                       | Cyperaceae   | Stem bark    | Diabetes, asthma, abdominal pain                | Decoction/per os | Lubumbashi | T35   |
| *Dalbergia boehmii* Taub.        | Katembo mutshi (Lubakassai), Katembo (Zela, sanga) | Fabaceae | Leaves/Stem bark | Diabetes, abdominal pain, rheumatism, diarrhoea, carie dentaire, abortion threat | Decoction/per os | Lubumbashi | T 30 ; T48|
| *Diplorhynchus condylocarpon* (Muell.Arg) Pichon. | Mwenge (Swahili)                  | Apocynaceae  | Root         | Diabetes, blennorrhoea                          | Decoction/per os | Lubumbashi | T37   |
| *Droogmansia munamensis* De Wild. | Mununganunga (Bemba), Mulundeni (Lala) | Fabaceae | Leaves/Stem bark | Diabetes, dysentery                             | Decoction/per os | Lubumbashi | T38   |
| *Elaeis guineensis* Jacq.        | Ekaci (Bembe)                      | Arecales     | Root         | Diabetes, sterility                             | Decoction/per os | Lubumbashi | T31   |
| Common Name | Local Name | Family | Part Used | Conditions | Preparation Method | Place Used | Code |
|-------------|------------|--------|-----------|------------|-------------------|------------|------|
| **Entada abyssinica** (Steud.ex A.Rich) Gilbert | Kipungu (Sanga) | Fabaceae | Root | Diabetes, haemorrhoid | Decoction/per os | Lubumbashi | T7 |
| **Erythrina abyssinica** Lam. | Kisongwa (Hemba) ; Kisungwa (Bemba) | Fabaceae | Root | Diabetes | Decoction/per os | Kasumbalesa | T22 ; T45 |
| **Erythrophleum africanum** (Benth.) Harms | Kayimbi (Tshiluba) | Fabaceae | Leaves Stem bark | diabetes, cancer, rheumatism | Decoction/per os Maceration/per os | Kipushi | T20 |
| **Faurea saligna** Harv. | Mulemu (Sanga) | Proteaceae | Root | diabetes | Decoction/per os | Kipushi | T21 |
| **Ficus sycomorus** L. | Mukunyu (Swahili), Tshikuvi (Luba) | Moraceae | Leaves Stem bark Root | Diabetes, Diarrhoea | Decoction/per os | Kipushi | T25 ; T39 |
| **Garcinia huillensis** (Oliv.)Welw. | Mungindu (Tchokwe) | Clusiaceae | Root | Diabetes, rheumatism, gastro-intestinal troubles | Decoction/per os | Kasumbalesa | T34 |
| **Gladiolus klattianus** Hook. | Kitala (Bemba), Kitokatoka (Luba) | Iridaceae | Bulb | Diabetes, blennorhoea, fever | Maceration/per os | Lubumbashi | T38 |
| **Glycine max** (L.) Merr. | Soja (swahili) | Fabaceae | Leaves | Diabetes | Decoction/per os | Lubumbashi | T31 |
| **Grewia flava** DC. | Bungwe (Luba) | Tiliaceae | Leaves Stem bark | Diabetes, hernia | Decoction/per os | Kasumbalesa | T18 |
| **Harungana madagascariensis** Lam.ex Poir. | Mukuta (Tshiluba) | Hypericaceae | Stem bark Root | Diabetes, rheumatism, High blood pressure | Decoction/per os, enema | Kipushi | T13 |
| **Hymenocardia acida** Tul. | Kapembe (Bemba), Ambalanga (Hemba), Lupep (Tshokwe) | Hymenocardiaeae | Root | Diabetes, haemorrhoid | Decoction/per os | Kasumbalesa | T37 ; T16 |
| **Ipomoea spathulata** Hallier.f. | Mulapa (Sanga) | Convolvulaceae | Leaves | Diabetes, worms | Chewing/per os | Lubumbashi | |
| **Jatropha curcas** L. | Mbono (Swahili), Ntondondimba (Bemba), Kilembelembé (Luba) | Euphorbiaceae | Leaves Seed Root | Diabetes, gastrite, 10fricana10e, urinary infections | Pression/per os | Lubumbashi, Kipushi, | T32 ; T50; T46; T17; T2 |
| **Justicia flava** (Forssk.) Vahl | Luhe (Luba) | Acanthaceae | Stem bark | Diabetes, dysmenorrhoea, amibiase | Decoction/per os | Lubumbashi | T48 |
| **Kigelia africana** (Lam) Benth. | Kivungu (Luba) | Bignoniaceae | Stem bark | Diabetes, sexual | Decoction/per os | Lubumbashi | T48 |
| Scientific Name                        | Common Name            | Family      | Part Used  | Uses                                      | Preparation         | Place of Use | Code |
|---------------------------------------|------------------------|-------------|-----------|-------------------------------------------|---------------------|--------------|------|
| Lantana camara L.                     | Mavi ya kuku (Swahili) | Verbenaceae | Leaves    | Impotence, Vaginal diseases               | Decoction/per os   | Likasi       | T8   |
| Lonchocarpus katangensis De Wild.     | Chuya (Bemba)          | Fabaceae    | Stem bark | Diabetes, fever, cough, cephalgia         | Infusion/per os    | Kasumba      | T41  |
| Maesopsis eminii Engl.                | Ndunga (Luba)          | Verbenaceae | Leaves    | Diabetes, syphilis, dental carie          | Maceration/per os  | Kipushi      | T27  |
| Maprounea africana Müll. Arg.         | Kafula ndime (Luba)    | Euphorbiaceae | Root     | Diabetes, vaginal pain                    | Decoction/per os   | Kipushi      | T17  |
| Maytenus senegalensis (Lam.) Exell    | Tshingala mutshi (Luba)| Celastraceae | Leaves    | Diabetes, diarrhoea                       | Decoction/enema    | Lubumbashi   | T9   |
| Mucuna poggei Taub.                   | Mpesa (Tshiluba)       | Fabaceae    | Root      | Diabetes                                  | Decoction/per os   | Lubumbashi   | T51  |
| Musa sapientum L.                     | Bananier (français)    | Musaceae    | Bulb      | Diabetes, rheumatism                      | Decoction/per os   | Lubumbashi   | T31  |
| Olax obtusifolia De Wild.             | Kulokumo (Bemba)       | Olacaceae   | Root      | Diabetes, paralysis                       | Decoction/per os   | Lubumbashi   | T37  |
| Opuntia ficus-indica (L.) Mill.       | Cactus (Français)      | Cactaceae   | Leaves    | Diabetes, haemorrhage                     | Chewing/per os     | Lubumbashi   | T50  |
| Persea americana Mill.                | Ikipapai (Lamba), Avocatier (Français) | Lauraceae | Leaves    | Diabetes, fever, anemia                   | Decoction/per os   | Kasumba, Kipushi | T17 ; T40 |
| Phaseolus lunatus L.                  | Haricot (Français), Maharagi (swahili) | Fabaceae | Leaves    | Diabetes, abdominal pain                  | Décocction/per os, Infusion/per os | Kipushi, Lubumbashi | T11 ; T14 |
| Piliostigma thonningii (Schumach.) Milne-Redh. | Kifumbe (Bemba, Luba) | Fabaceae   | Root      | Diabetes, cough, anemia                   | Maceration/per os  | Kasumba      | T22 ; T45 |
| Protea obtusifolia Oliv.              | Mwinkala nikata (Tabwa) | Proteaceae | Root      | Diabetes                                  | Decoction/per os, enema | Lubumbashi   | T43  |
| Pseudolachnostylis maprouneifolia Pax. | Musangati (Swahili), Musangali (Bemba), Musaria (Tchokwe) | Euphorbiaceae | Leaves    | Diabetes, gastrite, digestion troubles, cough, diarrhoea, dysméenorrhoea | Decoction/per os, Chewing/per os | Lubumbashi, Kasumba | T34 T37 |
| Plant Name                          | Common Names          | Family       | Part Used    | Uses                          | Preparation  | Location | Reference |
|------------------------------------|-----------------------|--------------|--------------|-------------------------------|--------------|----------|-----------|
| *Psidium guajava* L.               | Lipela (Swahili)      | Myrtaceae    | Leaves/Root  | Diabetes, dysentery           | Decoction/per os | Lubumbashi | T51       |
| *Pterocarpus angolensis* DC.       | Mukundambazu (Tabwa), Muyanga (Bemba) | Fabaceae | Stem bark    | Diabetes, haemorrhoid         | Decoction /per os | Likasi | T4        |
| *Pterocarpus tinctorius* Welw.     | Mukula (Chokwe)       | Fabaceae     | Root         | Diabetes                      | Decoction/per os | Kasumbalesa | T34       |
| *Rauwolfia caffra* Sond.           | Mutalala (Bemba)      | Apocynaceae  | Leaves/Root  | Diabetes, malaria, snake’s bites | Decoction/per os | Kasumbalesa | T23       |
| *Rauwolfia vomitoria* Afzel.       | Pandanganga (Luba)    | Apocynaceae  | Root         | Diabetes, purgative           | Decoction/per os | Kipushi   | T17       |
| *Rhynchosia insignis* (O.Hoffm.) R.E.Fr. | Munkoyo (swahili)   | Fabaceae     | Root         | Diabetes, jaundice            | Maceration/per os | Kasumbalesa | T22       |
| *Ricinus communis* L.              | Lundimba ndimba (Luba), Mubalika (Bemba) | Euphorbiaceae | Root         | Diabetes                      | Decoction/per os | Lubumbashi | T46       |
| *Sesamum angolense* Welw.          | Kipalabwengo (Bemba)  | Pedaliaceae  | Root         | Diabetes                      | Decoction/per os | Lubumbashi | T37       |
| *Solanum seretii* De Wild.         | Impwa (Bemba)         | Solanaceae   | Root         | Diabetes, abdominal pain      | Decoction/per os | Lubumbashi | T47       |
| *Solanum subsessile* De Wild.      | Mutete (Luba)         | Solanaceae   | Leaves/Seeds | Diabetes, abdominal pain      | As meal/per os | Lubumbashi | T32       |
| *Solanum tuberosum* L.             | Pomme de terre (français) | solanaceae   | Tubercule    | Diabetes, anti acid           | As a meal /per os | Lubumbashi | T2        |
| *Strychnos cocculoides* Baker.     | Katongatonga (Luba), Bukoke (Hemba), Kisongole (Bemba) | Loganiaceae | Root         | Diabetes, abdominal pain, dysentery | Decoction/per os | Kasumbalesa, Lubumbashi | T41; T32; T35 |
| *Strychnos innocua* Delile.        | Kakomekone (Swahili)  | Loganiaceae  | Root         | Diabetes, blennorhoea         | Decoction/per os | Lubumbashi | T32       |
| *Strychnos spinosa* Lam.           | Kisongole (Bemba), Nsansa (Swahili) | Loganiaceae | Stem bark/Root | Diabetes, blennorhoea         | Decoction/per os | Lubumbashi, Kipushi, | T1; T24; T37; T44; T50 |
| *Strychnos stuhlmannii* Gilg.      | Mubanga Kyulu (Bemba), Nkanga kyulu (Zela) | Loganiaceae | Root         | Diabetes, Gangrene, syphilis  | Decoction/per os | Lubumbashi | T12 ; T24 |
| *Swartzia madagascariensis* Desv.  | Munienie (Luba), Mpampi (Tshiluba) | Fabaceae | Root         | Diabetes, Touthache           | Decoction/per os | Kipushi, Lubumbashi | T26 ; T50 |
| Plant Name                          | Common Name | Family       | Part Used  | Conditions       | Preparation  | Place of Use | Reference Numbers |
|-----------------------------------|-------------|--------------|------------|------------------|--------------|--------------|-------------------|
| *Syzygium guineense* (Willd) DC.  | Musanfwa (Bemba) | Myrtaceae    | Stem bark  | Diabetes         | Decoction/per os | Likasi       | T42; T43          |
| *Terminalia mollis* M.A. Lawson. | Kianga (Hemba), Tshibangu Mutshi (Tshiluba) | Combretaceae | Leaves Root | Diabetes, diarrhoea, syphilis | Decoction/per os | Lubumbashi, Kasumbalesa | T40; T28         |
| *Tithonia diversifolia* (Hemsley.) A.Gray. | Bilomalomba (Lélé) | Asteraceae | Leaves | Diabetes, abdominal pain | Chewing/per os Maceration/per os | Lubumbashi | T32               |
| *Uapaka kirkiana* Müll. Arg.     | Masuku (Bemba, Luba) | Euphorbiaceae | Stem bark  | Diabetes, diarrhoea, sterility, Headache | Decoction/per os | Likasi       | T8                |
| *Vernonia shirensis* Oliv. & Hiern. | Kilulukunja (Swahili), Muvurumen (Rund) | Asteraceae | Leaves Root | Diabetes, haemorrhoid, worms | Decoction/per os | Kasumbalesa | T23; T2; T1       |
| *Vigna sinensis* A.Rich.         | Lukunde (kikabinda) | Fabaceae    | Leaves Root | Diabetes, headache | Decoction/per os Maceration/per os | Kipushi | T36               |
| *Vitex madiensis* Oliv.          | Mufutu (Luba) | Verbenaceae  | Leaves Root | Diabetes         | Decoction/per os | Kipushi       | T34; T37          |
| *Vitis vinifera* L.              | Raisin (Français) | Ampelidaceae | Leaves | Diabetes         | Decoction/per os | Lubumbashi | T50               |
| *Zanthoxylum chalybeum* Engl.    | Mpupwe kiulu (Luba), Pupwe (Bemba) | Rutaceae | Leaves Stem Root | Diabetes, gastrite, cough, otitis, hip pain, sterility | Decoction/per os | Lubumbashi, Kipushi, Likasi | T10; T24; T49 |
| *Ziziphus mucronata* Wild.       | Kankona (Luba, Bemba, sanga) | Rhamnaceae  | Stem bark Root | Diabetes, dysentery, abdominal pain | Decoction/per os | Likasi       | T33               |