Ethnobotanical knowledge of medicinal values of Loranthaceae used to treat human diseases by local ethnic Agni Sanwi from Aboisso and Maferé in Côte d'Ivoire

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Abstract

Loranthaceae are hemiparasitic vascular plants that develop on other woody species. They are used in traditional medicine to treat various pathologies. The present study is a contribution to the knowledge of the medicinal potential of Loranthaceae used in care by Agni Sanwi of Aboisso and Maferé, in the South-East of Côte d’Ivoire. Ethnobotanical surveys were conducted with 50 herbalists and 17 traditional healers using semi-structured interviews. Three (3) species (Globimetula braunii, Phragmanthera capitata and Tapinanthus bangwensis) divided into 3 genera used to treat 35 diseases were identified. They have been cited in the formulation of several remedies. Malaria, typhoid fever, diarrhea and fontanelle were the most commonly reported conditions. Leaves and leafy twigs are the main organs used. The decoction has been predominant in the acquisition of remedies. The drink was the most cited as a method of administering treatments. The Frequency of Citations (FC) of the Loranthaceae employed in the care and medicinal Informant Agreement Ratio (med.IARs) of the respondents were determined. T. bangwensis had the highest FC (95.52%) and med.IARs (0.73). The therapeutic potentials of Loranthaceae have been highlighted and deserve to be popularized through complementary phytochemical investigations.

Keywords: Loranthaceae, ethnobotanical study, medicinal potential, diseases, phytochemical investigations

1. Introduction

In many Sub-saharan countries and especially in West Africa, the weak sanitary system and the lack of childcare facilities are leading people still economically deprived to turn to nature for essential herbal remedies [1, 2, 3 and 4]. Indeed, in West Africa, nearly 80% of people depend on traditional medicine through medicinal plants for their primary health care [7]. Medicinal plants remain the sources of preferred remedies. Among the many medicinal plants known and used in the treatment of human diseases, those of the family Loranthaceae are in great demand in many civilizations in Africa [7, 8, 9, 10 and 11]. These epiphytoids, chlorophyllian hemiparasites vascular plants have been exploited for a long time and the knowledge of their therapeutic effects is transmitted from generation to generation by some insider handles [1]. According to Kerharo and Adam [12], they are particularly used in traditional medicine because of their growth on other woody plants. Ethnobotanical research work has been undertaken in Côte d’Ivoire to document and sustain the traditional medical knowledge of Loranthaceae [9, 13, 14, 15, 16, and 17]. However, the therapeutic knowledge held by some insiders in Côte d’Ivoire, particularly in Aboisso and Maferé, in the South-East of Côte d’Ivoire is unknown and remains very fewest studied. The objective of this study is to document the endogenous knowledge of the local populations of Maferé and Aboisso on the Loranthaceae in traditional medicine for its valuation. Specifically, this will involve: (1) inventorying the Loranthaceae species used in the care of populations and (2) knowing the therapeutic potential of these plants through associated remedies.

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2. Material and methods

2.1. Study area

The studies were conducted in Aboisso and Maferé, southeast of the Côte d’Ivoire (Figure 1). Located 116 km from Abidjan and 21 km from Maferé, Aboisso with geographical coordinates 5°29’4.2’’ north Latitude and 3°15’54.8’’ west Longitude, is limited to the south by Adiaké, Tiapoum, and the Atlantic Ocean, to the north by Bettié, to the west by Alépé, to the east by Takoradi (Ghana). Its area is 7,189 km². As for Maferé (5°24’42’’ north Latitude and 3°01’58’’ west Longitude), it is located 109 km from Abidjan.

2.2. Material

For our ethnobotanical survey, two types of materials were used. Biological material consisting of Loranthaceae and technical equipment consisting of a survey questionnaire, a digital camera, a global position system (GPS) and a note pad.

2.3. Methods

2.3.1. Ethnobotanical surveys

Ethnobotanical surveys using semi-structured interviewing from a pre-elaborated survey were conducted jointly with Maferé and Aboisso, in the South-East of Côte d’Ivoire. The herbalists and traditional healers interviewed all had at least 25 years of experience in the use of traditional medicine plants. They knew all the Loranthaceae. Fifty (50) herbalists and 17 traditional healers were interviewed using a survey. The sections of this survey focused on the socio-demographic characteristics (age, sex, educational level and ethnicity) of the respondents, the species of Loranthaceae.
that they use in the preparations of remedies to treat diseases, the organs of the species recipes, the therapeutic properties and the method of administration. The interviews were conducted in local languages agni sanwi and agni andor, sometimes in french with the help of interpreters. Samples of the Loranthaceae mentioned have been identified thanks to the Herbarium of the National Floristic Center (CNF) of Abidjan, Côte d’Ivoire.

2.3.2. Data processing and analysis

The data collected on the survey cards were processed, entered using the Excel software and analyzed. The Frequency of Citations (FC) of Loranthaceae species used by herbalists and traditional healers to treat diseases in Aboisso and Maféré was calculated using the formula:

\[
FC = \frac{\text{Number of quotes}}{\text{Number of respondents}} \times 100
\]

The Frequency of Citations (FC) does not reflect the consensus of the respondents so much, the Medicinal Informant Agreement Ratio (Med.IARs) was calculated according to the formula used by Phillips [6]:

\[
\text{Med.IARs} = \frac{n_t - n_s}{n_t - 1}
\]

where \( n_r \) - total number of citations recorded for species \( s \) and \( n_s \) - number of diseases treated with this species. The Med.IARs of a species varies from 0 to 1. The Med.IARs equals 0 when the number of treated diseases equals the number of citations and equals 1 when all respondents agree on the exclusive use of the species for a given disease. A low Med.IARs value indicates that respondents disagree about the use of the species in treating the disease.

3. Results and discussion

3.1. Results

3.1.1. Socio-demographic characteristics of interviewers

Fifty (50) herbalists and 17 traditional healers were interviewed about the medicinal potential of Loranthaceae in the care of populations in Aboisso and Maféré, two localities located in South-Eastern Côte d’Ivoire (Table 1). The respondents are made up of 25 men (37.31%) and 42 women (62.69%). Their ages ranged from 35 to 45 years with a majority at age 40 (50.5%). The majority ethnicities are those of Agni Sanwi (38.81%) and Agni Andor (23.88%). 88.06% admit having acquired their knowledge of medicinal plants their ascendants against 11.94% empirically. 67.16% are illiterate compared to 13.44% for the secondary level (Table 1).

3.1.2. Species of Loranthaceae, therapeutic indications and uses

In total, three species of Loranthaceae divided into three genera were identified in the two study areas and identified. They are: Globimetula braunii (Engl.) Van Tiegh. (Figure 2), Phragmanthera capitata (Spreng.) Ballé and Tapinanthus bangwensis (Engl. and K. Krause) Danser. The identified species are used in the preparation of several recipes.

Table 1 Socio-demographic characteristics of the respondents (n = 67)

| Parameters | Number of respondents | Frequencies |
|------------|-----------------------|-------------|
| Gender     |                       |             |
| male       | 25                    | 37.31       |
| Female     | 42                    | 62.69       |
| Age        |                       |             |
| > 35 age   | 12                    | 17.91       |
| 35-45 age  | 34                    | 50.75       |
| > 45 age   | 21                    | 31.34       |
Various parts: leaves, stem bark, whole leafy twigs (Figure 3) and Loranthaceae species flowers. The leaves (100% frequency of quotations) are mainly used (Figure 4). Most of the Loranthaceae species cited are variously used in the treatment of diseases. The citation of the three species by the respondents in Aboisso and Maferé indicated Frequency of Citations (FC) between 19.40 and 95.52%. T. bangwensis (95.52%) is the most used in the preparations of remedies against is 35 diseases cited Med.IARs calculated range from 0.67 to 0.73 (Table 2). The highest value recorded at T. bangwensis. It also appears that infectious diseases are mainly mentioned herbalists and traditional healers. The search for the degree of consensus reveals that the citations of these three species in the treatment of the aforementioned pathologies have reached high values (Table 2). They are grouped into 13 categories (Figure 5). Among these 13 categories of diseases, that of infectious diseases is the majority (9 citations). It is followed by gyneco-obstetric and urological diseases (4 citations).
In interviews with traditional healers and herbalists, 2 forms of use of Loranthaceae in the treatment of diseases were discussed. A total of 65 medical effect citations of these plants, 97.01% and 18 medico-magical citations (26.87%) were recorded. According to the respondents:

- Angina or sore throat: application on the sore of an ointment made from powdered *Tapinanthus bangwensis* leaves powdered mixed with shea butter;
- Rheumatism, pain in the joints and feet, back pain: rub the painful parts with *Carapa procera* seed oil and seven (7) chilli (*Capsicum annum*) seeds mixed with a black powder of *T. bangwensis* carbonized;
- Fontanelle in newborns: use of dry stem bark of Loranthaceae, crushes with dried fruit of *Xylopia aethiopica* or two seeds of chilli (*Capsicum annum*);
- Measles: make an antiseptic bath of decoction of the leafy twigs of *T. bangwensis* or *Phragmanthera capitata* associated with the fruit of the lemon tree (*Citrus limon*) to the child, three times a day;
- Malaria: take infusion of flowers or young dried leaves of Loranthaceae. Of the 67 people interviewed 8 (11.94% of respondents) say that before any harvest of Loranthaceae and recipe preparation, they invoke the manes. To treat:
- Curses: take a total bath, a decoction of the leafy branches of Loranthaceae collected on the mango (*Mangifera indica*) or baobab (*Adansonia digitaria*) or on the cola tree (*Cola nitida*).
Table 2 Loranthaceae species and therapeutic indications

| Species & Genres | Ethnic(s) | Local names | Dis men | Nb cits | Parts used | Md prep | Md adm | FC (%) | Med.IAR |
|------------------|-----------|-------------|---------|---------|------------|---------|--------|--------|---------|
| *Globimetula. braunii* (Engl.) Van Tiegh. | agni sanwi agni nor sénoufo | gnangon djoulé lador gniriladon | mal | 13 | le | dec | abt, bvr | 19.40 | 0.67 |
|                   |           |             | dan ca |        | le tw | dec | bvr bcl |
|                   |           |             | col |       | le | kne + Lem | fric |
|                   |           |             | asth |       | le tw | inf | bvr |
|                   |           |             | mig |       | le | plg + water | instil |
| *Phragmanthera capitata* (Spreng.) Balle | baoulé | adjrêh | ftnle | flr | kne | lig frict |
| togoles | wowalé | mig | le | plg + eau | instil nsl |
| agni sanwi | gnangon djoulé | zn | le tw | pwr +ail+col | pmd, fric |
| agni nor | lador | anm | st, le | mac | bvr |
| abouré | gnamienotchouchouatchou | drhe | le | plg + chili | pge |
|           |           | ulc | le | plg + ail, inf | pge, bvr |
|           |           | Mal | le | dec | abt, bvr |
|           |           | ftnle | le | kne | lig frict |
|           |           | hypt | le tw | inf + citr | bvr |
|           |           | sex weak | st bk | dec + pcola | bvr |
|           |           | ste | st bk | pwr + Sm co | pge |
|           |           | pfl rls | st bk | pwr + citr | bvr |
|           |           | dbte | le tw | dec | bvr |
|           |           | typ fv | le | Plg + ail | pge |
|           |           | mx vtr | le | plg + chili | |

Meaning of abbreviations: Dis men - Diseases mentioned; Nb cit - Number of citations; Prts ut - Parts used; Md - Mode; adm - Administration; bdg - Brushing; st bk - Stem bark; Le - Leaf; inf - Infusion; instil - Instillations; dec - Decoction; kne - Kneading; le tw- Leafy twigs; pwr - Powder; Plg - Piling; Kne - Kneading; hypt - Hypertension; cgh - Cough; pfl rls - Painful rules; abt - Ablution; Sm co - Small cola; Dan ca - Dental caries; gm ftg - General fatigue; sex weak - Sexual weakness; var - Varicelle; mal - Malaria; ha pal - Heart palpitations; drhe - Diarrhea; asth - Asthma; dbte - Diabetes; angina - Angina; infl - Inflammation of the feet; anm - Anemia; ste - Sterile; typ fv - Typhoid fever; ftnle - Fontanelle; zn - Zona; mig - Migraine; col - colds; frc - Furuncle; Lem - Lemon; mac - Maceration; pge - Purge; bvr - Beverage; fric - Friction; bn bcl - Oral bath; Lig frict - Light friction.
### Table 2 (continued)

| Species & Genres | Ethnics | Local Names | Dis men Nb cits | Parts used | Md prep | Md adm | FC (%) | Med.IARs |
|------------------|---------|-------------|-----------------|------------|---------|--------|--------|----------|
| **Tapinanthus bangwensis** (Engl. and K. Krause) Danser | agni sanwi | gnangon djoulé | frcl | le tw | pwr + citr | frict |
| | | | anm | le tw, le | mac | bvr |
| | | | ulc | le | plg + ail | pge |
| | | | ha pal | le tw | inf | bvr |
| | | | mal | le | inf + citr | bvr |
| | | | typ fv | le tw | dec, pdr+ail | bvr, pge |
| | | | ste | le tw | pwr + sm co | pge |
| | baoulé | adjrêh | 64 | | | | 95.52 | 0.73 |
| | | | dan ca | st bk | dec | or bh |
| | | | fat gnl | st bk | mac | bvr |
| | | | ang | le | inf + lem | bvr |
| | | | asth | st bk | inf | bvr |
| | | | cgh, | le | inf + honey | bvr |
| | | | drhe | le | plg + pipili | pge |
| | | | infl feet | le | ptg+sm co | fric |
| | | | dbte | st bk | dec | bvr |
| | | | var | le | pwr + vin | paint, frict |
| | | | pfl rls | le tw | pwr + lem | bvr |
| | | | hypt | st bk | inf + lem | bvr |
| | | | frcl | st bk | dec | bvr |
| | | | anm | le | dec | bvr |

Meaning of abbreviations: Dis men - Diseases mentioned; Nb cit - Number of citations; Prts ut - Parts used; Md - Mode; adm - Administration; bdg - Brushing; st bk - Stem bark; Le - Leaf; inf - Infusion; instil - Instillations; dec - Decoction; kne - Kneading; le tw - Leafy twigs; pwr - Powder; Plg - Piling; Kne - Kneading; hypt - Hypertension; cgh - Cough; pfl rls - Painful rules; abt - Ablution; Sm.co - Small cola; Dan ca - Dental caries; gnl ftg - General fatigue; sex weak - Sexual weakness; var - Varicelle; mal - Malaria; ha pal - Heart palpitations; drhe - Diarrhoea; asth - Asthma; dbte - Diabetes; angina - Angina; infl - Inflammation of the feet; anm - Anemia; ste - Sterile; typ fv - Typhoid fever; ftrde - Fontanelle; zn - Zona; mig - Migraine; col - Colds; frcl - Furuncle; Lem - Lemon; mac - Maceration; pge - Purge; bvr - Beverage; fric - Friction; bn bel - Oral bath; Lig frict - Light friction
Meaning of abbreviations: asthenic diseases - msth; cardiovascular diseases - mcardv; dermatological diseases - mderm; digestive and stomach diseases - mdig & stom; endocrino-metabolic diseases - endo-met; poison - psn; gynecological and obstetric and urological diseases - mgyn-obst & uro; hematologic diseases - mhém; infantile diseases - minfte; respiratory diseases - mresp; infectious diseases - minf; rheumatism - rhe; diseases of mystical origin – momyst.

- Stimulation of the intelligence of the children: use in soup twice a day, young fresh leaves of Loranthaceae collected on cassava (Manihot esculenta).
- Remove mystically (sorcery) the fish stop in the throat: use drink, three times a day, fresh leaves of Loranthaceae crushed with white clay, mixed with

3.1.3. Famous host species of Loranthaceae

Twenty-seven (27) known host species for which Loranthaceae species are actively sought were cited by traditional healers and herbalists in Aboisso and Maféré (Table 3). The Frequency of Citations (FC) of the plants cited by the respondents ranged from 0.29 to 0.70 (Table 3). The specific host species with the highest FC value is Mangifera indica (56.72%) Fig. 6a. It is followed by: Adansonia digitaria (46.27%), Manihot esculenta (46.27%) (Fig. 6), Ceiba pentandra (44.78%), Bombax buonopozense (43.28%) and Alstonia boonei (43.28%).

Also, the reputed host species that showed high Med.IARs are Mangifera indica (0.70), Manihot esculenta (0.67) (Fig. 6b), Adansonia digitaria (0.63) (Fig 7a), Bombax buonopozense (0.57), Ceiba pentandra (0.55), Gossypium barbadense (0.53), Citrus sinensis (0.53) (Fig. 7b), Hevea brasiliensis (0.53) (Fig. 7c), Carica papaya (0.48), Cola nitida (0.47) (Fig. 7d), Cassia sieberiana (0.47) Anacardium occidentale (0.45).
Table 3: Famous host species of Loranthaceae and associated therapeutic values

| Species & Genres                              | Families       | Nb cits | Nb mal. cites | FC (%) | Med.IARs |
|----------------------------------------------|----------------|---------|---------------|--------|----------|
| *Adansonia digitaria L.*                     | Bombacaceae    | 31      | 12            | 46.27  | 0.63     |
| *Alstonia boonei De Wild.*                   | Apocynaceae    | 29      | 11            | 43.28  | 0.64     |
| *Anacardium occidentale L.*                  | Apocynaceae    | 25      | 14            | 37.31  | 0.45     |
| *Bombax buonopozense*                        | Bombacaceae    | 29      | 13            | 43.28  | 0.57     |
| *Bombax costatum Pellegr. & Vuillet*         | Malvaceae      | 26      | 15            | 38.81  | 0.50     |
| *Calotropis procera (Atit) R.Br*             | Lamiaceae      | 18      | 13            | 26.87  | 0.29     |
| *Capsicum annum L.*                          | Solanaceae     | 11      | 6             | 16.42  | 0.50     |
| *Carapa procera DC.*                         | Meliaceae      | 23      | 15            | 34.33  | 0.36     |
| *Carica papaya L.*                           | Caricaceae     | 28      | 15            | 41.79  | 0.48     |
| *Cassia sieberiana DC.*                      | Fabaceae       | 16      | 9             | 23.88  | 0.47     |
| *Ceiba pentandra (L.) Gaertn.*               | Bombacaceae    | 30      | 14            | 44.78  | 0.55     |
| *Citrus limon (L.) Burm. F.*                  | Rutaceae       | 10      | 6             | 14.93  | 0.44     |
| *Citrus sinensis L.*                         | Rutaceae       | 27      | 13            | 40.30  | 0.53     |
| *Cola nitida (Vent) Schott Endl*             | Euphorbiaceae  | 20      | 11            | 29.85  | 0.47     |
| *Garcinia cola* Heckel                       | Clusiaceae     | 15      | 9             | 22.39  | 0.43     |
| *Gossypium barbadense* L.*                   | Malvaceae      | 14      | 7             | 20.90  | 0.53     |
| *Hevea brasiliensis* (Wild. ex A. Juss.) Müll. Arg. | Euphorbiaceae | 18      | 9             | 26.87  | 0.53     |
| *Jatropha curcas L.*                         | Euphorbiaceae  | 17      | 10            | 25.37  | 0.44     |
| *Mangifera indica*                           | Anacardiaceae  | 38      | 12            | 56.72  | 0.70     |
| *Manihot esculenta* Crantz*                  | Euphorbiaceae  | 31      | 11            | 46.27  | 0.67     |
| *Morinda lucida* Benth.*                     | Rubiaceae      | 19      | 12            | 28.36  | 0.39     |
| *Moringa oleifera* Lam.*                     | Moringaceae    | 13      | 9             | 19.40  | 0.22     |
| *Parkia biglobosa* (Jacq.) R. Br ex G. Don*   | Mimosaceae     | 7       | 4             | 10.45  | 0.50     |
| *Psidium guajava* L.*                        | Myrtaceae      | 11      | 7             | 16.42  | 0.40     |
| *Solanum melongena* L.*                      | Solanaceae     | 7       | 4             | 10.45  | 0.50     |
| *Spondias mombin* L.*                        | Anacardiaceae  | 9       | 5             | 13.43  | 0.50     |
| *Tamarindus indica* L.*                      | Caesalpiniaceae| 14      | 7             | 20.90  | 0.53     |

Nb - Number, cits - Citations, mal. - diseases, cited – cited
4. Discussion

The study revealed three (3) species of Loranthaceae used by traditional healers and herbalists surveyed in Aboisso and Maféré, compared to 7 cited by Amon et al. [16] in the treatment of diseases throughout the Sud-Comoé region. This study is undertaken in the same region, but only in two different localities. Nevertheless, they share in common these three species of Loranthaceae cited and identified.

Thirty five (35) diseases cited by the respondents are treated with Loranthaceae in the study areas. Of all these diseases, malaria, typhoid fever, high blood pressure, diarrhea, tooth decay, fontanelle and asthma are the most cited pathologies by traditional healers and herbalists interviewed. These same diseases have been reported by several authors in Africa [10, 18, and 15]. The existence of this wide spectrum of diseases treated with Loranthaceae in this study is a proof of the medicinal potential that these plants possess. These results corroborate those of Kalis [7] who had already reported that the name of Loranthaceae was given by the Gauls to any plant that cured all diseases.

It is also clear from this survey that the parts of the Loranthaceae most used in the preparations of the remedies are leaves and leafy twigs. These results confirm the work of Jiofack et al. [10] and Amon et al. [16, 17].

The study also revealed two types of uses of Loranthaceae (medicinal and medico-magical). Results confirmed by those of Adjohoun and Aké-Assi [9], Kouyaté [19], Ladoh-Yemeda et al. [11], Ahamide et al. [18] and Amon et al. [16].
Regarding Loranthaceae harvested from hosts, a finding emerges. The species of Loranthaceae living on these specific host plants are actively sought by the traditional healers and herbalists interviewed and are distinguished by very high FC values, between 10.45 and 56.72% and their very strong Med.IARs values range from 0.22 to 0.64. Kouyaté [19] and Amon et al. [16, 17] explain this situation by the fact that these host plants would transmit potential medical potential to the species of Loranthaceae developing on them. This is the case of the Loranthaceae developing on *Mangifera indica* that would serve to combat the works of witchcraft, as well as *Manihot esculenta* and *Citrus sinensis* used against the miscarriage interruption of pregnancy in pregnant women [1].

5. Conclusion

The hemiparasitic, chlorophyllian vascular plants of the family Loranthaceae are used in traditional medicine to cure several diseases. Three (3) species have identified with the herbalists and traditional healers of Aboisso and Maféré identified as *Globimetula braunii*, *Phragmanthera capitata* and *Tapinanthus bangwensis*. They have many medicinal potential and are used to treat 35 diseases in traditional pharmacopoeia agni sanwi. Although these plants are used as remedies, additional pharmacological studies are still needed to isolate the active ingredients, and especially to evaluate their toxicity, thus opening the way to research prospects that may lead to the discovery of new molecules able to fight various diseases who assail humanity today.

Compliance with ethical standards

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Disclosure of conflict of interest

Authors declare that they have no conflict of interest.

Statement of informed consent

Each actor interviewed gave their consent deliberately and was willing to answer the different questions.

Author’s contribution

AADE and AAS ensured the development of the research protocol, the collection, the data processing and the wording of the manuscript. They were supported by AJAAB, SFD, SD, NK and TD in proofreading the different versions to improve the scientific quality of the manuscript.

References

[1] Adjanohoun EJ. La médecine traditionnelle au Benin: recensement des savoir-faire traditionnel. Extrait du rapport Centrebat. Cbbd. Revue de Médecine et pharmacopées Africains. 2001; 15: 103-111.
[2] P Zerbo, J Millogo-Raslodimby, OG Nacolma-Ouedraogo. 2007. Van Dame. Contribution à la connaissance des plantes médicinales utilisées dans les soins infantiles en pays San, au Burkina Faso. Int. J. Biol. Chem. Sci. 2007; 1(3): 262-274.
[3] N’guessan K, Soro D, Amon ADE. Plantes utilisées en médecine traditionnelle dans le traitement des maladies cardiovasculaires, en pays Abbey et Krobo, dans le Sud de la Côte d’Ivoire. Phytothérapie. 2011; 9: 199-208.
[4] Konan A. Place de la médecine traditionnelle dans les soins de santé primaires à Abidjan (Côte d’Ivoire). Doctorat d’Etat, Médecine générale, Université Toulouse - Paul Sabatier, Faculté de medicine. 2012; 118.
[5] OMS: Organisation Mondiale de la Santé. Stratégie de l’OMS pour la médecine traditionnelle pour 2002-2005. WHO/EDM/TRM/2002, Genève, 65. 2002.
[6] Phillips OL. Some quantitative methods for analyzing ethnobotanical knowledge. In: Alexiades M. N. (ed.). Selected guidelines for ethnobotanical research. New York, USA, The New York Botanical Garden.1996; 171-197.
[7] Kalis S. Médecine traditionnelle, religion et divination chez les Seereer Siin du Sénégal. La connaissance de la nuit. Harmattan. 1997; 335.
[8] Traoré D. Medicine and African magic. Presence Africaine Edition, Dakar. 1983; 569.

[9] Adjahounou E, Aké-Assi L. Contribution au recensement des plantes médicinales de Côte d’Ivoire. Université d’Abidjan, Centre National de floristique. 1979; 357.

[10] Jiofack T, Dondjang JP, Nkongmeneck BA, Smith, Kemeuze V. Diversité et gestion durable des Loranthaceae dans les hautes terres de l'Ouest du Cameroun. Bois et Forêts des Tropiques. 2010; 303 (1): 41-52.

[11] Ladoh-Yemeda Christelle Flora, Ndongo Din, Tomedi Eyango Minette. Medicinal Potentials of Phragmanthera capitata (Sprengel) S. balle (Loranthaceae) Used in the City of Douala (Cameroon). Life Sci. 2019; 4(1): 1-14.

[12] Kerharo J, Adam JG. La pharmacopée sénégalaise traditionnelle. Plantes médicinales et toxiques. Édition Vigot Frères. Paris. 1974; 10-11.

[13] Dotia YP. Esquisse de la flore ligneuse y compris les parasites épiphytoïdes (Loranthaceae) de la région de Kouto, dans le Nord de la Côte d’Ivoire. Mémoire de DEA de Botanique, Université de Cocody, UFR Biosciences Abidjan, Côte d’Ivoire. 1999; 151.

[14] Amon ADE. Les plantes vasculaires parasites de la famille des Loranthaceae rencontrées dans le Département de Grand-Bassam, au Sud de la Côte d’Ivoire. Mémoire de DEA de Botanique, Université de Cocody, UFR Biosciences Abidjan, Côte d’Ivoire. 2006; 57.

[15] Amon ADE. Les Loranthaceae (guis), hémiparasites vasculaires des arbres et des arbustes des agroécosystèmes de la région du Sud-Comoé, en zone de forêt dense sempervirente de la Côte d’Ivoire. Thèse de l’Université Félix Houphouët-Boigny. 2014. 123.

[16] AMON Anoh Denis-Edras, SEGUENA Fofana, SORO Kafana, SORO Dodiomon and NGUESSAN Koffi. Ethnobotany study of Loranthaceae, hemiparasitic plants used in traditional medicine by population, in the Sud-Comoé region Côte d’Ivoire. Journal of Medicinal Plants Studies. 2017; 5(5): 217-224.

[17] Amon Anoh Denis-Edras, Boyé Mambé Auguste-Denise, Groga Noël, Soro Kafana, Soro Dodiomon, N’gussan Koffi and Sebe Fiba Doriane. Contribution to the identification of Loranthaceae commercialized in the markets by Bete and Niaboua of Daloa, Côte d’Ivoire. World Journal of Pharmaceutical and Life Sciences. 2019; 4: 56-60.

[18] Innocent DY, Ahamide Monique G, Tossou Aristide C, Adomou Janvier G, Houenon, Hounankpon Yedomonhan, Akpovi Akoegninou. Diversité, impact et usage des Loranthaceae parasites de Cola nitida (Vent) Schott. & Endl. Au Sud-Bénin. International Journal of Biological and Chemical Sciences. 2015; 9(6): 2859-2870.

[19] Kouyaté. Aspects ethnobotaniques, étude de la variabilité morphologique, biochimique et phénologique de Detarium microcarpum guill. & perr. au Mali. 2005; 188.

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