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 few 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.

Figure 1 Presentation of the study areas

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]:

$$Med.IARs = \frac{n_t - n_s}{n_t - 1}$$

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

School level	illiterate	45	67.16
	primary	13	19.40
	secondary	9	13.44
Ethnic groups	agni sanwi	26	38.81
	sénoufo	3	4.48
	togolese	6	8.96
	agni andor	16	23.88
	baoulé	7	10.45
	abouré	9	13.43
Dividing of respondents by site	Aboisso	42	62.69
	Maferé	25	37.31
Respondents groups	herbalists	50	74.63
	traditional healers	17	25.37
Acquirement of knowledge	hereditary knowledge	59	88.06
	empiric	8	11.94

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 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).

Figure 2 Twigs of *G. braunii*

Figure 3 Bunch of twigs with leaves of Loranthaceae

Figure 4 Parts used according to the frequency of citations by group of interviewee

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	Ethnics	Local names	Dis men	Nb cites	Parts used	Md prep	Md adm	FC (%)	Med.IARs
<i>Globimetula. braunii</i> (Engl.) Van Tiegh.	agni sanwi agni anor sénoufo	<i>gnangon djoulé</i> <i>lador</i> <i>gniriladon</i>	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		
<i>Phragmanthera capitata</i> (Spreng.) Balle	baoulé	<i>adjrêh</i>	ftnle	49	flr	kne	lig frict	73.13	0.71
			mig		le	plg+ eau	instil nsl		
			zn		le tw	pwr +ail+col	pmd, fric		
			anm		st, le	mac	bvr		
			drhe		le	plg + chili	pge		
	togolese	<i>wowalé</i>	ulc		le	plg+ail, inf	pge, bvr		
			Mal		le	dec	abt, bvr		
			ftnle		le	kne	lig frict		
	agni sanwi	<i>gnangon djoulé</i>	hypt		le tw	inf + citr	bvr		
			sex weak		st bk	dec + pcola	bvr		
	agni anor	<i>lador</i>	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			
	abouté	<i>gnamien</i> <i>tchoutchouatchou</i>							

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 - 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; frcl - 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
<i>Tapinanthus bangwensis</i> (Engl. and K. Krause) Danser	agni sanwi	<i>gnangon djoulé</i>	frcl	64	le tw	pwr + citr	frict	95.52	0.73
			anm		le tw, le	mac	bvr		
			ulc		le	plge + 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		
			dan ca		st bk	dec	or bh		
			fat gnl		st bk	mac	bvr		
			ang		le	inf + lem	bvr		
	baoulé	<i>adjrêh</i>	asth		st bk	Inf	bvr		
			cgh,		le	inf + honey	bvr		
			drhe		le	plge + pipili	pge		
			infl feet		le	ptge+sm co	fric		
			dbte		st bk	dec	bvr		
			var		le	pwr + vin	paint, frict		
	abouré	<i>gnamien tchoutchouatchou</i>	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 - 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; frcl - Furuncle; Lem - Lemon; mac - Maceration; pge - Purge; bvr - Beverage; fric- Friction; bn bcl - Oral bath; Lig frict - light friction

Figure 5 Disease categories according to respondents'

Meaning of abbreviations: asthenic diseases - masth; cardiovascular diseases - mcardv; dermatological diseases - mderm; digestive and stomach diseases - mdig & stom; endocrino-metabolic diseases - endo-mét; 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 Lorantheaceae collected on cassava (*Manihot esculenta*).
- Remove mystically (sorcery) the fish stop in the throat: use drink, three times a day, fresh leaves of Lorantheaceae crushed with white clay, mixed with

3.1.3. Famous host species of Lorantheaceae

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

Nb - Number, cites - Citations, mal. - diseases, cited – cited

Figure 6 Loranthaceae species of: *Mangifera indica* (a), *Manihot esculenta* (b), highly sought after

Figure 7 Some bunches of Loranthaceae species harvested from specific hosts:

Baoba : *Adansonia digitaria* (a), hevea : *Hevea brasiliensis* (b), orange tree : *Citrus sinensis* (c), cola : *Cola nitida* (d)

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 Adjanohoun 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 Bénin: recensement des savoir-faire traditionnel. Extrait du rapport Centreat. Cbdd. Revue de Médecine et pharmacopées Africains. 2001; 15: 103-111.
- [2] P Zerbo, J Millogo-Rasolodimby, OG Nacoulma-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 Krobou, 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 médecine. 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] Adjanohoun 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 Lorantheae 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; 213.
- [16] AMON Anoh Denis-Esdras, SEGUENA Fofana, SORO Kafana, SORO Dodiomon and N'GUESSAN 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-Esdras, Boyé Mambé Auguste-Denise, Grogé Noël, Soro Kafana, Soro Dodiomon, N'guessan 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, Hounnankpon Yedomonhan, Akpovi Akoegninou. Diversité, impact et usage des Loranthaceae parasites de Cola nitida (Vent.) Schott. & Endl. Au Sud-Benin. 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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