



Ethnobotanical Survey of Medicinal Plants in Atakpamé, City of Plateau Region in Togo

Abdel-Akim Ezzo-Tsar¹, Batomayena Bakoma^{1*}, Emmanuel Adangou²,
Komlan Batawila², Wala Kpérkouma², Dourma Marra², Pereki Hodabalo²
and Akpagana Koffi²

¹Faculty of Health Sciences, University of Lomé, B.P. 1515, Lomé, Togo.

²Laboratory of Botany and Plant Ecology, Faculty of Sciences, University of Lomé, 1515, Lomé, Togo.

Authors' contributions

This work was carried out in collaboration among all authors. Author AAET designed the study, performed the statistical analysis. Author BB wrote the protocol and wrote the first draft of the manuscript. Author EA managed the analyses of the study and managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Aim: Plants are a great source of active substances and are used to cure a lot of diseases. In order to know and list medicinal plants used by traditional therapists and herbalists from the town of Atakpamé, an ethnobotanical investigation has been conducted.

Methodology: It is a transversal and descriptive study that has been carried out from 22th December 2018 to 16th March 2019.

Results: It has been conducted nearby 10 traditional therapists and 20 herbalists by direct interviews using a structured questionnaire. The traditional therapists were all men and the herbalists all women. This study has enabled to list 61 species belonging to 30 families grouped into 56 genera, used in the treatment of 30 affections and symptoms. The botanical families more represented were Euphorbiaceae with 8 species, Caesalpiniaceae and Apocynaceae with 5

*Corresponding author: E-mail: bbakoma@univ-lome.tg;

species each. The most used organs in the recipes are leaves (44,26%). The decoction (47,54%) is the most used mode of preparation. The oral route (76,47%) is the most frequently way of administration. The most healed affections were malaria, infections and anemia with the same percentage of 16,76%. The majority of medicinal recipes are monospecifics.

Conclusion: The results of this study can be a source of information for scientific researches in phytochemistry and pharmacology.

Keywords: *Ethnobotany; medicinal plants; traditional therapists; herbalists; Atakpamé.*

1. INTRODUCTION

For centuries, people have used plants to treat diseases. The study of the sociocultural interaction between humans and plants is called ethnobotany. In developing countries, medicinal plants and traditional medicine play a very important role in the health of populations [1]. Traditional medical practices vary greatly from country to country and region to region. They are influenced by known factors: culture, history and personal philosophies. According to the WHO, nearly 80% of people in developing countries in Africa use traditional medicine for their health care [2]. Thus, many ethnobotanical surveys have been conducted in many African countries [3,4,5,6] and particularly in Togo[7]. These surveys are aimed at one or more diseases or consist of an inventory of medicinal plants used by the target populations.

Ethnobotanical surveys on specific diseases have also been carried out in different administrative regions of Togo, focusing on diabetes in the maritime region [8] and malaria in the plateau region [9]. Other work [10] consisted in identifying medicinal plants without targeting a specific pathology. It is with this in mind that we conducted an ethnobotanical survey in the city of Atakpamé, the capital of the Plateaux region, which is a region with a very diversified flora.

The main objective of our study is to contribute to the valorisation of endogenous knowledge in traditional medicine in the Plateaux region, and more precisely in the city of Atakpamé. The specific objectives of this study are to identify the medicinal plants used by local populations, specify the parts used, the method of preparation and/or use; study the socio-demographic profile of traditional therapists and herbalists working in Atakpamé.

2. MATERIALS AND METHODS

2.1 Study Area

This study took place in the town of Atakpamé, the capital of the Plateaux region, at the two

major markets and in the workshops of traditional therapists. The two markets visited are those of "Assiganmé" (Grand marché) and Agbonou.

The city of Atakpamé is the capital of the Plateaux region and also that of the prefecture of Ogou (Fig. 1). It is located 161 km from the city of Lomé and its geographical coordinates are: 7°31'44" north latitude and 1°07'37" east longitude (Wikipedia Encyclopedia, 2019) [11]. It is bordered to the south by the canton of Datcha, to the north by the city of Anié, to the east by the canton of Akparé and to the west by the prefecture of Amou. Its surface area is 88.10 km² for a population estimated at approximately 7728 habitants in 2017. There is a small and a large dry season, as well as a small and a large rainy season.

2.2 Data Collection

This is an ethnobotanical survey conducted to identify medicinal plants used by traditional therapists and herbalists. It is a cross-sectional study with a descriptive aim. Data collection took place from December 22, 2018 to March 16, 2019.

We used survey sheets and a recorder to collect information; a pruning shear, newspaper and press to collect plant samples; and a camera to take plant photographs.

These are individual interviews with the respondents, followed by the acquisition of the medicinal plants concerned by purchase and/or harvesting. Two target groups were surveyed: Traditional therapists and market herbalists. To this end, questionnaires adapted to each target group were established.

The interviews were conducted mainly in Mina, the second most spoken dialect in the city. Some interviews were conducted in French. The information was collected using a recorder and concerned the profile of the respondents (surname, first names, age, sex, education level,

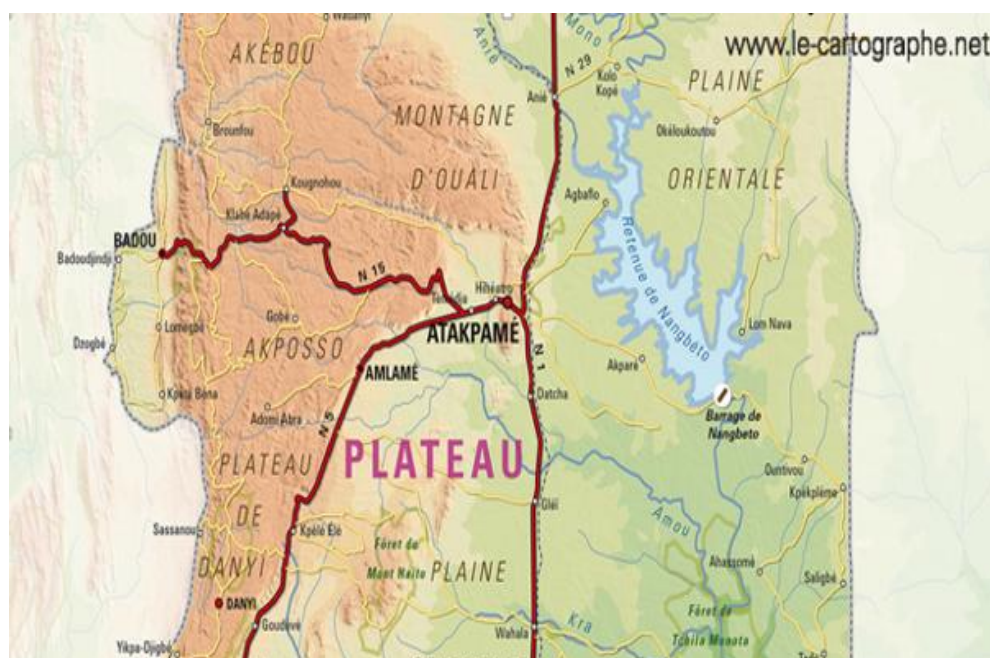


Fig. 1. Location of the city of Atakpamé

ethnicity, professional experience, etc.) and medicinal plants (vernacular names, therapeutic virtues, organs used, methods of preparation, methods of administration, dosage, etc.).

The survey sheets were completed and the ethnobotanical data collected were entered on a computer using Microsoft Excel and Word 2013 software to process the data and illustrate them with graphs.

2.3 Identification

Samples of species parts (leaves, stems, trunk bark, roots, seeds, flowers) and whole plants were identified with the help of a botanist. Photographs of different species were also taken. Unidentified species were brought back to the Laboratory of Botany and Plant Ecology of the University of Lomé for identification or confirmation. Specimens were deposited at the national herbarium of the University of Lomé. The nomenclature used is that of Hutchinson and Dalziel (1963) [12] and Akoegninou et al. [13].

3. RESULTS

3.1 Socio-demographic Profile of Respondents

A total of 30 traditional medicine stakeholders were surveyed, including 10 traditional therapists

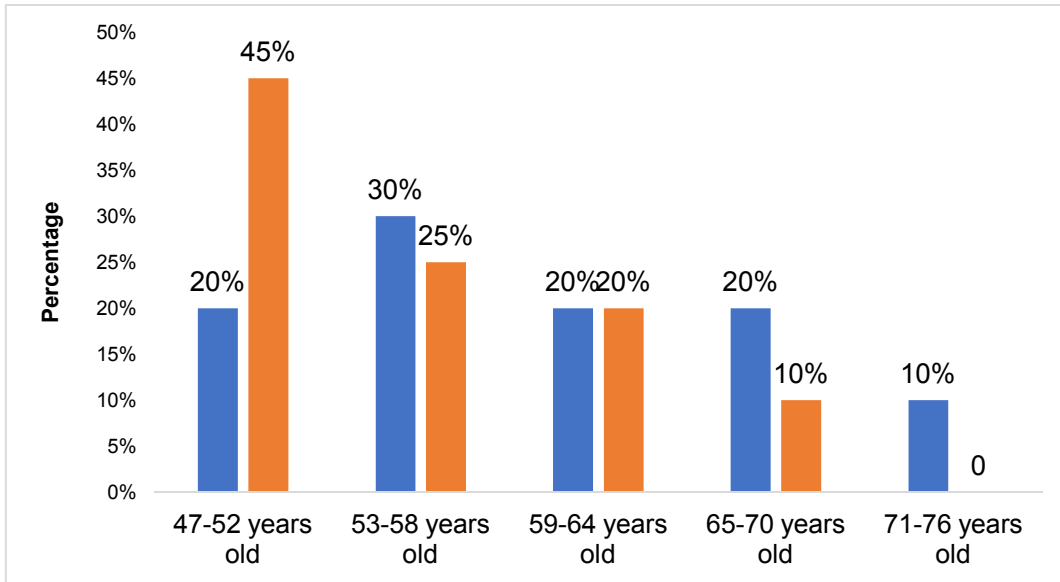
and 20 market herbalists. Market herbalists are only represented by women with a percentage corresponding to 66.67% of all respondents. Traditional therapists, on the other hand, are represented only by men with a percentage equal to 33.33% of all respondents.

The extremes of age are 49 and 72 years for traditional therapists, and 47 and 65 years for herbalists. The majority of traditional therapists belong to the 52-58 age group while herbalists belong to the 47-52 age group (Fig. 2). At the level of traditional therapists, those who have not received a school education are represented with a percentage of 30%. As for those who have reached the primary and secondary levels, they each represent 30% of the number of traditional therapists. Only 10% have reached high school level. The majority of herbalists have not attended school (55%). Only 35% of herbalists have reached the primary level, and 10% the secondary level. None of the herbalists surveyed have reached high school level (Fig. 3).

Depending on the source of knowledge about medicinal plants, the knowledge held by traditional therapists and herbalists is acquired either through initiation within the family or through apprenticeship outside the family environment, from someone who already practises the profession. Among traditional therapists, those who have acquired their

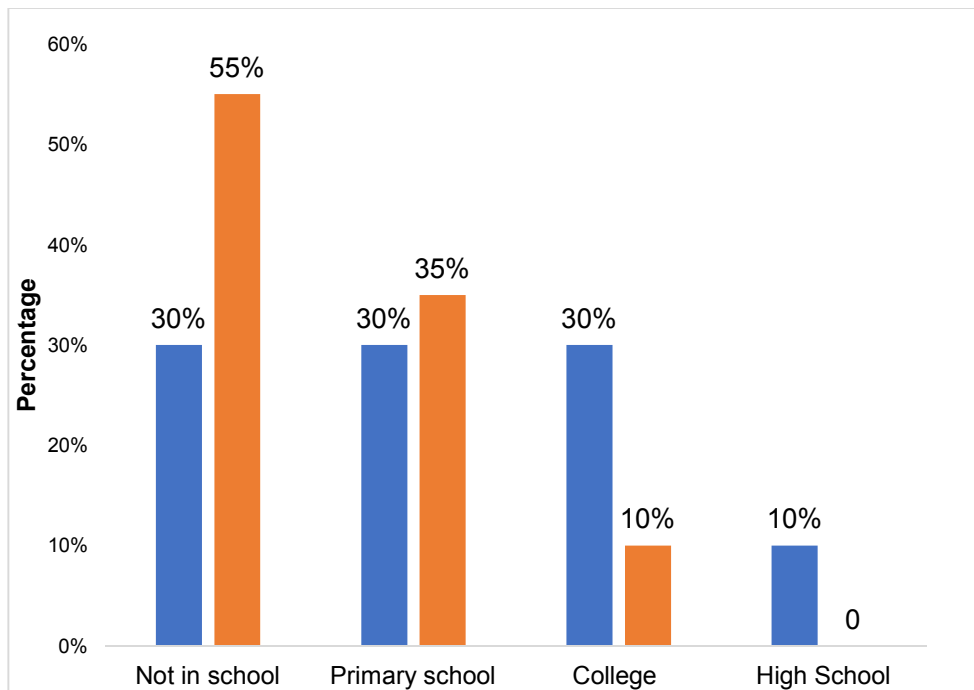
knowledge within the family are in the majority with a percentage of 70%, while those who have acquired their knowledge following an apprenticeship or training represent only 20%.

85% of herbalists have been initiated within the family and only 15% have acquired their knowledge after having completed an apprenticeship (Fig. 4).



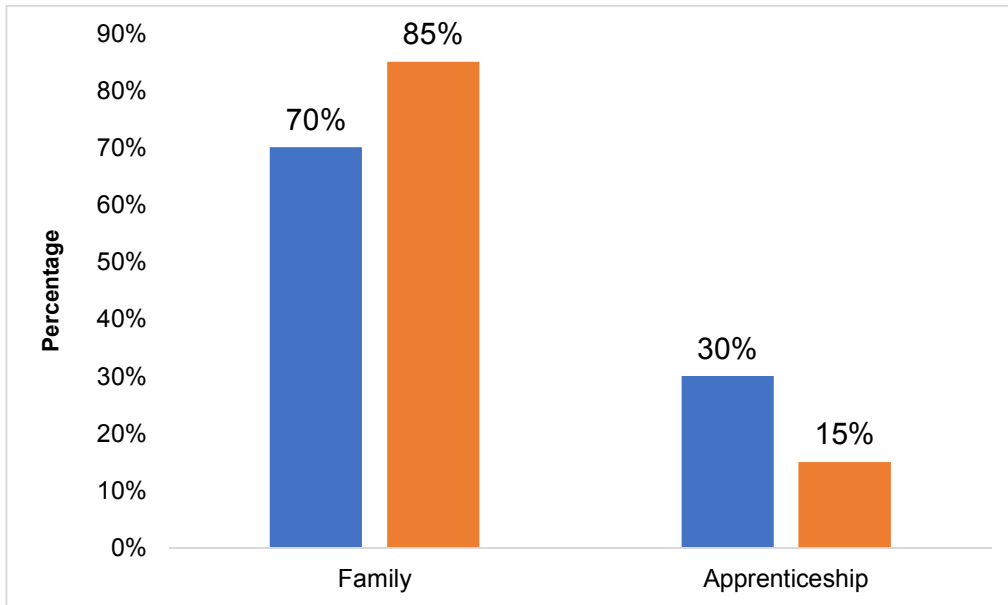
• Traditional therapists • Herbalists

Fig. 2. Distribution of respondents by age group



• Traditional therapists • Herbalists

Fig. 3. Distribution of respondents by level of education

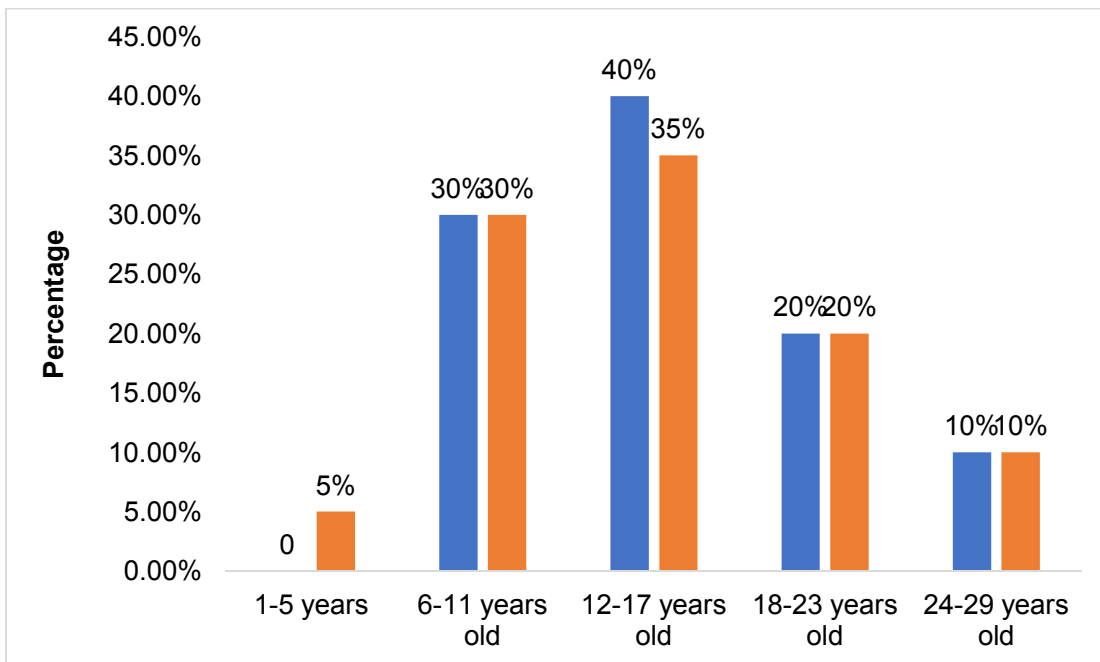


• Traditional therapists • Herbalists

Fig. 4. Distribution of respondents by source of knowledge on medicinal plants

In our study, years of professional experience ranged from 9 to 25 years for traditional therapists and 6 to 27 years for herbalists. The

majority of respondents had 12 to 17 years of experience, both among traditional therapists and herbalists (Fig. 5).



• Traditional therapists • Herbalists

Fig. 5. Distribution of respondents by number of years of experience

Table 1. Summary table of the different medicinal recipes with dosages

Species	Organs used	PM	TI	RA	Dosage
<i>Abrus precatorius</i> Linn.	Leaves + Roots	Maceration	Rheumatism	Oral	1 small glass ⁽¹⁾ morning, evening
	Leaves	Decoction (+ shea butter)	Coughing	Oral	1 small glass morning, evening
<i>Acanthospermum hispidum</i> DC.	Leaves	Decoction	Typhoid fever, malaria	Oral	1 large glass ⁽²⁾ morning and evening
<i>Allium sativum</i> Linn.	Bulb	Maceration Honey mix	HBP, Diabetes	Oral	1 small glass morning and evening
<i>Alstonia boonei</i> De Wild.	Trunk bark	Maceration	Dermatoses Infections ⁽³⁾	Dermal Oral	Morning and evening bath 1 large glass morning and evening
<i>Anthocleista djalonensis</i> A. Chev.	Leaves + Roots	Decoction	Constipation	Oral	1 large glass (if necessary)
			Diabetes, Genital infections	Oral	1 small glass morning and evening
<i>Aspilia bussei</i> O. Hoff. & Muschl.	Whole plant	Crushing	Shingles lesions	Dermal	Local application morning and evening
<i>Azadirachta indica</i> A. Juss.	Sheets/Bark of trunk	Decoction	Malaria	Oral	1 large glass morning and evening
<i>Bridelia ferruginia</i> Benth.	Leaves/Barks of trunk Roots	Decoction/Maceration	Anemia, Infections, Diabetes	Oral	1 large glass morning and evening
<i>Caesalpinia bonduc</i> (Linn.)Roxb.	Roots	Decoction	Anemia, Abdominal pain	Oral	1 large glass morning and evening
	Leaves	Alcoholation Decoction (+ water of fermented grains of <i>Zea mays</i>)	Erectil Dysfunction Genital infections	Oral Oral	1 small glass in the evening 1 small glass morning and evening
<i>Calotropis procera</i> (Ait) Ait.f.	Leaves	Decoction	Infections	Oral	1 large glass morning and evening
		Decoction (+ shea butter)	Coughing	Oral	1 small glass morning and evening
		Powder (+ <i>P. amarus</i> leaves)	Diabetes, Hepatic disorders	Oral	1 large glass morning and evening
<i>Calyptrochilum christyanum</i> (Rchb.f.) Summerh.	Leaves	Maceration	No closing of the fontanel	Dermal	Local application morning and evening
<i>Chenopodium ambrosioides</i> Linn.	Leaves	Decoction (+ leaves of <i>Zea mays</i> and <i>O. gratissimum</i> + <i>M. charantia</i>)	Measles	Oral	1 small glass morning and evening
<i>Coffea Togoensis</i> A.Chev.	Leaves	Decoction (+ <i>P. rubra</i> leaves + <i>M. excelsa</i> bark)	Skin ulcers	Dermal	Wound cleaning morning and evening
<i>Conyza aegyptiaca</i> (Linn.) Ait.	Whole plant	Decoction (+ leaves of <i>C. citratus</i> and <i>M. lucida</i> + <i>M. charantia</i>)	Diabetes	Oral	1 small glass morning and evening
<i>Cymbopogon citratus</i> (DC.) Stapf	Leaves	Decoction (+ leaves of <i>J. gossipifolia</i>)	Malaria	Oral	1 large glass morning and evening
		Decoction (+ <i>O. canum</i> , <i>A. indica</i> and <i>O. basilicum</i> leaves)	HBP	Oral	1 small glass morning and evening
<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	Leaves	Decoction (+ leaves of <i>Z. mays</i> , <i>C. limon</i> and <i>P. guajava</i>)	Varicella	Oral	1 small glass morning and evening
	Roots	Decoction	Skin abscesses	Dermal	Local application
		Decoction/Infusion	Malaria, Hepatic disorders	Oral	1 small glass morning and evening
<i>Ficus exasperata</i> Vahl	Leaves	Maceration / Crushing	Ringworm	Dermal	Local application morning and evening

Species	Organs used	PM	TI	RA	Dosage
<i>Gmelina arborea</i> Roxb.	Leaves	Decoction (+ leaves of <i>C. citratus</i> and <i>C. limon</i>)	Malaria	Oral	1 large glass morning and evening
<i>Heliotropium indicum</i> Linn.	Whole plant	Maceration	Newborn agitation (during sleep)	Dermal	Bath before falling asleep
<i>Jatropha curcas</i> Linn.	Leaves	Decoction	Diabetes	Oral	1 small glass morning and evening
	Roots	Crushing	Ringworm	Dermal	Local application morning and evening
		Decoction (+ <i>S. siamea</i> Roots)	Asthma	Oral	1 small glass morning and evening
<i>Jatropha gossypifolia</i> Linn.	Leaves	Infusion	Anemia	Oral	1 large glass morning and evening
		Decoction (+ <i>S. bicolor</i> leaves)	Anemia	Oral	1 large glass morning and evening
		Decoction (+ leaves <i>C. citratus</i>)	Malaria	Oral	1 large glass morning and evening
<i>Jatropha multifida</i> Linn.	Leaves + Flowers	Crushing	Skin ulcers	Dermal	Local application morning and evening
<i>Justicia secunda</i> Vahl	Leaves	Decoction	Anemia	Oral	1 large glass morning and evening
<i>Kalanchoe crenata</i> (Andr.) Haw.	Roots	Decoction	Diabetes	Oral	1 small glass morning and evening
<i>Khaya senegalensis</i> (Desr.) A.Juss.	Leaves+Trunk bark	Decoction	Malaria, Diabetes	Oral	1 small glass morning and evening
	Trunk bark	Decoction/Maceration	Anemia	Oral	1 large glass morning and evening
<i>Kigelia Africana</i> (Lam.) Benth.	Trunk bark	Decoction	Anemia	Oral	1 small glass morning and evening
<i>Lannea kerstingii</i> Engl. & K.Krause	Trunk bark	Decoction	Anemia	Oral	1 small glass morning and evening
<i>Launaea taraxacifolia</i> (Willd.) Amin ex C.Jeffrey	Leaves	Decoction	HBP	Oral	1 small glass morning and evening
<i>Lippia multiflora</i> Moldenke	Leaves	Decoction	HBP, Dysentery	Oral	1 small glass morning and evening
<i>Lonchocarpus sericeus</i> (Poir.) H.B. &K.	Leaves	Decoction	Hepatic disorders	Oral	1 large glass morning and evening
		Crushing (+ fruit of <i>X. aethiopica</i> + distilled palm wine)	Constipation	Oral	1 small glass morning and evening
			Hemorrhoidal disease	Oral	1 small glass morning and evening
<i>Margaritaria discoidea</i> (Baill.) G.L.Webster	Leaves	Decoction	DGU	Oral	1 small glass morning and evening
	Roots	Decoction	Infections	Oral	1 small glass morning and evening
<i>Momordica charantia</i> Linn.	Whole plant	Crushing	Erectil Dysfunction	Rectal	Enema once a day
		Crushing	Varicella	Oral	1 small glass morning and evening
		Decoction	Anemia, Diabetes	Dermal	Morning and evening bath
				Oral	1 small glass morning and evening
<i>Mondia whitei</i> (Hook.f.) Skeels	Roots	Alcoholation	Erectil Dysfunction	Oral	1 small glass in the evening
		Chewing (with a little salt)	Erectil Dysfunction	Oral	1 root in the evening
<i>Morinda lucida</i> Benth.	Leaves	Decoction	Anemia, Rheumatism	Oral	1 small glass morning and evening
<i>Newbouldia laevis</i> (P.Beauv) Seeman.ex Bureau	Leaves	Decoction/Maceration	Malaria	Oral	1 small glass morning and evening
	Trunk bark	Decoction/Maceration	Fever	Dermal	Bath (if necessary)
		Decoction	Coughing	Oral	1 small glass morning and evening
<i>Ocimum basilicum</i> Linn.	Leaves	Decoction	Fever, Abdominal pain	Oral	1 small glass morning and evening
		Decoction (+ leaves of <i>O. canum</i> , <i>C. citratus</i> and <i>A. indica</i>)	HBP	Oral	1 small glass morning and evening

Species	Organs used	PM	TI	RA	Dosage
<i>Ocimum canum</i> Sims	Leaves	Decoction Decoction (+ leaves of <i>O. basilicum</i> , <i>C. citratus</i> + <i>A.indica</i>)	Malaria HBP	Oral Oral	1 small glass morning and evening 1 small glass morning and evening
<i>Ocimum gratissimum</i> Linn.	Leaves	Decoction Crushing	HBP, Diabetes, Abdominal pain, Dysentery Hemorrhoidal disease	Oral Rectal	1 small glass morning and evening Enema once a day
<i>Paullinia pinnata</i> Linn.	Leaves + Roots	Decoction	Malaria, Anemia	Oral	1 small glass morning and evening
<i>Phyllanthus amarus</i> Schum. & Thonn.	Leaves	Powder (+ leaves of <i>C. procera</i>)	Diabetes, Hepatic disorders	Oral	1 tbsp in the spray mixture morning and evening
<i>Physalis angulata</i> Linn.	Leaves	Decoction	No closing of the fontanel	Dermal	Local application morning and evening
<i>Picralima nitida</i> (Stapf) Th. & H.Dur.	Seeds	Powder	Diabetes, Infections	Oral	1 tbsp in the spray mixture morning and evening
<i>Piliostigma thoningii</i> (Schum.) Milne.Redh.	Leaves Trunk bark	Decoction Decoction Chewing	Malaria Coughing Coughing	Oral Oral Oral	1 small glass morning and evening 1 small glass morning and evening 1 tbsp in the spray mixture morning and evening
<i>Piper guineense</i> Schum. & Thonn.	Roots	Alcohol content (+ <i>M. whitei</i> roots)	Erectil Dysfunction	Oral	1 small glass in the evening
<i>Plumeria rubra</i> Linn.	Leaves	Crushing(+indigenous "Akoto" soap	Dermatoses	Dermal	Morning and evening bath
<i>Pseudocedrela kotschy</i> (Schweinf) Harms	Leaves	Decoction	Rheumatism	Oral	1 small glass morning and evening
<i>Rauwolfia vomitoria</i> Afzel.	Roots	Decoction	Mental disorders	Oral	1 large glass morning and evening
<i>Ricinus communis</i> Linn.	Leaves	Crushing (+ <i>C. limon</i> juice)	Snake bite	Dermal	Local application
<i>Rytigynia canthioides</i> (Benth.) Robyns	Trunk bark	Decoction	Constipation, Infections	Oral	1 small glass morning and evening
<i>Sarcocephalus latifolius</i> (Sm.) E.A.Bruce	Roots	Decoction Maceration (in coconut milk)	Malaria Malaria	Oral Oral	1 small glass morning and evening 1 small glass morning and evening
<i>Securidaca longepedunculata</i> Fres.	Roots	Decoction Trituration	Sickle cell disease Inflammations	Oral Dermal	1 large glass (if necessary) Local application morning and evening
<i>Securinega virosa</i> (Roxb. Ex Willd.) Baill.	Leaves	Decoction	Malaria	Oral	1 small glass morning and evening
<i>Senna occidentalis</i> Linn.	Leaves	Decoction	Malaria, Constipation	Oral	1 small glass morning and evening
<i>Senna siamea</i> Lam.	Leaves Roots	Decoction Infusion Decoction (+ <i>J. curcas</i> roots)	Malaria Diabetes Asthma	Oral Oral Oral	1 small glass morning and evening 1 small glass morning and evening 1 small glass morning and evening
<i>Senna sieberiana</i> DC.	Leaves	Decoction	Diabetes, Abdominal pain	Oral	1 small glass morning and evening

Species	Organs used	PM	TI	RA	Dosage
<i>Sorghum bicolor</i> (Linn.) Moench.	Leaves	Decoction	Anemia	Oral	1 large glass morning and evening
<i>Tectona grandis</i> Linn.f.	Leaves	Infusion/Crushing	Anemia	Oral	1 small glass morning and evening
<i>Theobroma cacao</i> Linn.	Seeds	Decoction	Diabetes	Oral	1 small glass morning and evening
<i>Vitex doniana</i> Sweet	Leaves	Decoction	Fever, Infections	Oral	1 small glass morning and evening
	Trunk bark	Decoction	Measles, Infections	Oral	1 small glass morning and evening
<i>Xylopi aethiopia</i> (Dun.) A.Rich.	Fruit	Decoction	Diabetes	Oral	1 small glass morning and evening
		Powder	Diabetes	Oral	1 tbsp in the spray mixture morning and evening

PM : Preparation mode, TI : Therapeutic indications, RA : Route of administration, HBP : High Blood Pressure, GDU : Gastro Duodenal ulcer

3.2 Listed Medicinal Plants and Therapeutic Indications

During our study, we identified a total of 61 plant species, belonging to 56 genera divided into 30 botanical families. The medicinal plants we have identified are indicated in the treatment of a total of 30 symptoms and conditions. Traditional therapists and herbalists frequently manage the following 8 conditions: malaria (16.76%), infections (parasitosis, mycoses and

digestive bacterial infections) (16.76%), anemia (16.76%), diabetes (12.85%), high blood pressure (11.73%), rheumatism/inflammation (8.94%), genital infections (8.38%) and erectile dysfunction (7.82%) (Table 1). Of the plant species recorded, the most represented families are Euphorbiaceae (13.11%), Caesalpinaceae (8.20%) and Apocynaceae (8.20%). Next come Verbenaceae, Rubiaceae and Asteraceae and with an identical frequency of 6.55% (Fig. 6).

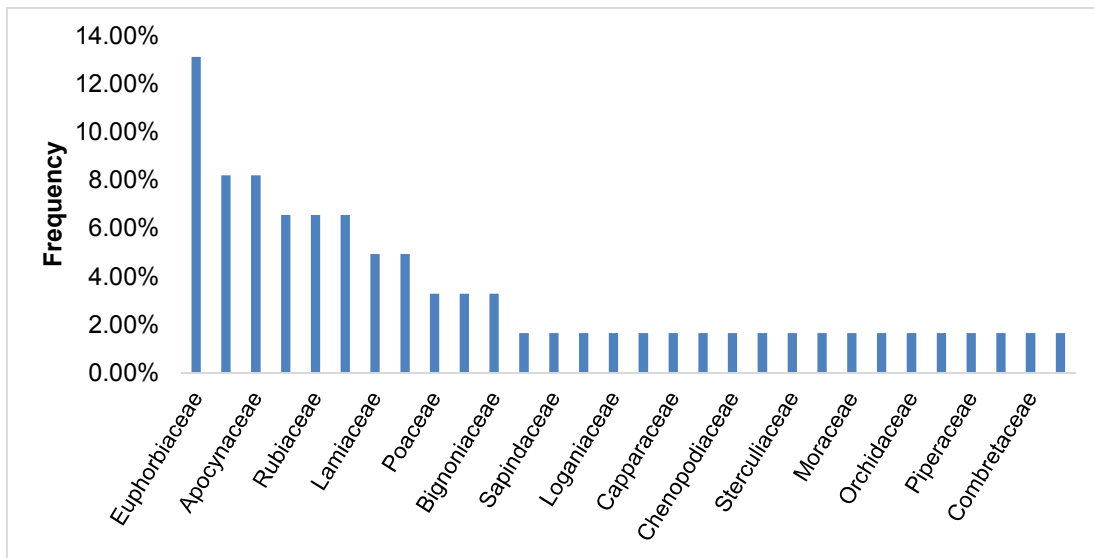


Fig. 6. Frequency of identified botanical families

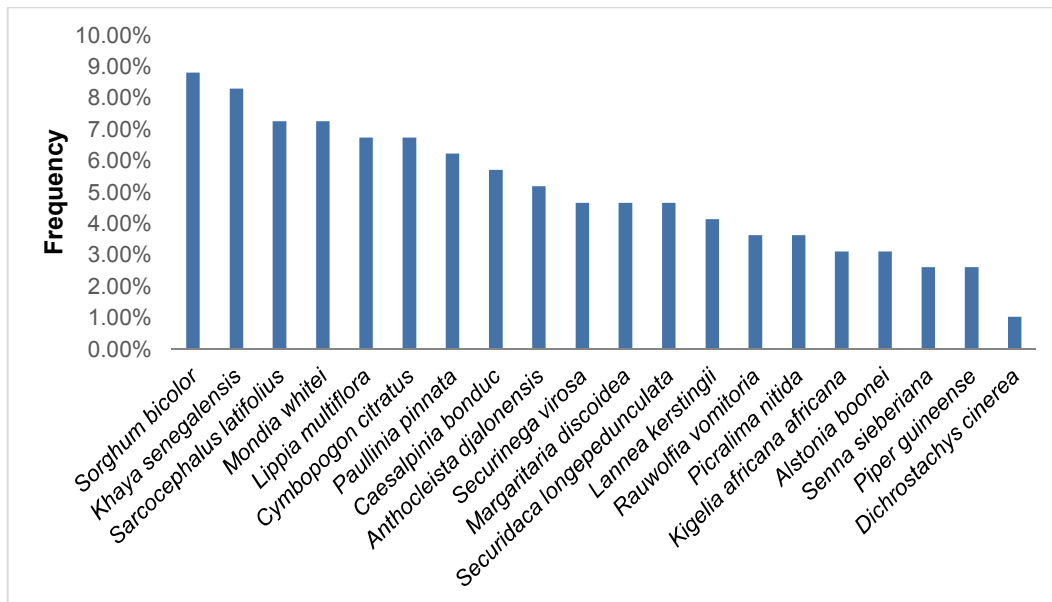


Fig. 7. Frequency of use of medicinal plants by herbalists

3.3 Frequency of Use of Identified Medicinal Plant Species

Among the different species of plants inventoried, some were much more widely used than others. Thus, some species are more cited than others. The citation frequency (Fc) of the species surveyed is determined by dividing the number of citations for the species by the total number of respondents.

The plants most frequently cited by market herbalists are *Sorghum bicolor* (8.80%), *Khaya senegalensis* (8.29%), *Sarcocephalus latifolius* and *Mondia whiteii* with an identical frequency of 7.25% (Fig. 7). At the level of traditional therapists, 58 species of medicinal plants have been identified. The most used are: *Khaya senegalensis*, *Securinega virosa*, *Phyllanthus amarus*, *Allium sativum* with a frequency of 3% for each species. And then *Sarcocephalus latifolius* and *Newbouldia laevis* with an identical frequency of 2.70% (Fig. 8).

3.4 Most Commonly Used Plant Organs

Several bodies are involved in the preparation of medicinal recipes. The leaves (44.26%) are the most used organs. Next come roots (9.84%), whole plants and leaves/roots with an identical frequency of 8.19% (Fig. 9).

3.5 Preparation Methods and Routes of Administration

Decoction is the most commonly used method of preparation (47.54%). It is followed by decoction/maceration (9.84%), then crushing and decoction/infusion with a frequency of 8.19% each (Fig. 10). Herbal recipes are mainly administered orally (76.47%). There is also dermal administration (20.59%) as a bath or local application. The bath represents 64.29% of the dermal route and the dermal application 35.71%. Rectal administration is rarely used (2.94%) (Fig. 11).

4. DISCUSSION

Our study, which was conducted with 20 herbalists and 10 traditional therapists in the city of Atakpamé, identified a total of 61 medicinal plants. Our results show that the sale of medicinal plants in the markets is made by women (66.67%), while men (33.33%) work as traditional therapists. Indeed, traditional therapists generally consult at home. This could

be explained by the fact that it is often women who are responsible for the sale of various products and items in markets. Our finding with respect to a higher proportion of women than men in traditional medicine practice is similar to that of some previous works [5,8,14,15]. But our results differ from those of Gbekley et al. [7] and Gnagne et al. [16] who found a higher proportion of men than women. Their results could come from the fact that in their studies, the respondents were only traditional therapists.

Most traditional therapists are between 53 and 58 years old with an average age of 60 years, while most herbalists are between 47 and 52 years old with an average age of 55 years. These results are similar to those reported by Koudokpon et al. [15] and Gnagne et al. [16] and Alfa et al. [17] in their work. This shows that the traditional medicine sector is the preserve of middle-aged people who therefore hold the ancestral knowledge transmitted from generation to generation. It also shows a certain lack of interest on the part of young people in traditional medicine.

The knowledge held by the majority of traditional therapists (70%) and herbalists (85%) is family knowledge. These results are similar to those obtained by Kpodar et al. [8]. This could be explained by the fact that this traditional medical art, which is ancestral, is transmitted from generation to generation and therefore preserved within families.

Our survey identified a total of 61 species from 30 families, grouped into 56 genera, and used to treat 30 conditions. Previous work on the identification of medicinal plants in the maritime region has identified 106 species grouped into 61 families and 97 genera, which are used to treat 63 diseases [10]. The results of our survey are significantly lower than those of Agody et al. [10]. The difference between our results and those obtained by Agody et al. [10] could be justified by the larger number of cities visited (Lomé, Noépé, Tsévié, Vogan) and markets visited (9) by her during her study.

The botanical families most represented during our study are Euphorbiaceae (13.11%) with 8 species, Caesalpiniaceae (8.20%). This result is consistent with those obtained by Agody et al. [10] where Euphorbiaceae and Caesalpiniaceae are the dominant families with 6 species each. The results of Béné et al. [5] also revealed that Euphorbiaceae are in the majority (8.51%) with 8 species. However, our results differ from those of

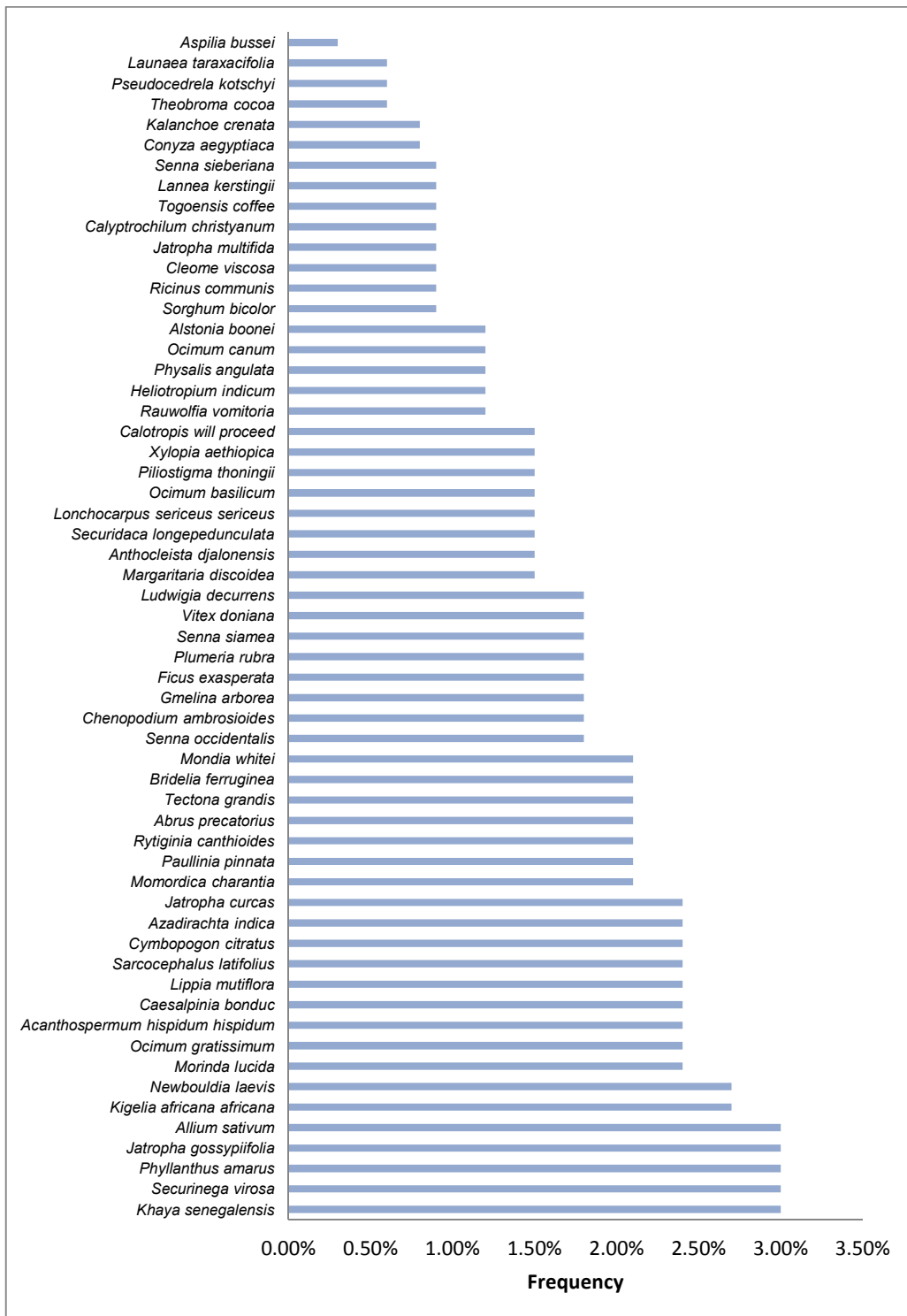


Fig. 8. Frequency of use of medicinal plants by traditional therapists

Simbo et al. [18] who found that the most represented families are Asteraceae (12.1%), Lamiaceae (5.6%) and Poaceae (5.6%). In their study, Kose et al. [4] found that the most

represented family is the Asteraceae family with 16 species. For Koudokpon et al. [15], the most dominant families among herbalists are Lamiaceae (22.7%), Rutaceae (7.70%) and Capparaceae (6.80%). Among the species

recorded during our study, we find 23 species out of 106 recorded by Agody et al. [10], 23 species out of 94 recorded by Béné et al. [5] and 19 species out of 61 recorded by Agbodeka et al. [9].

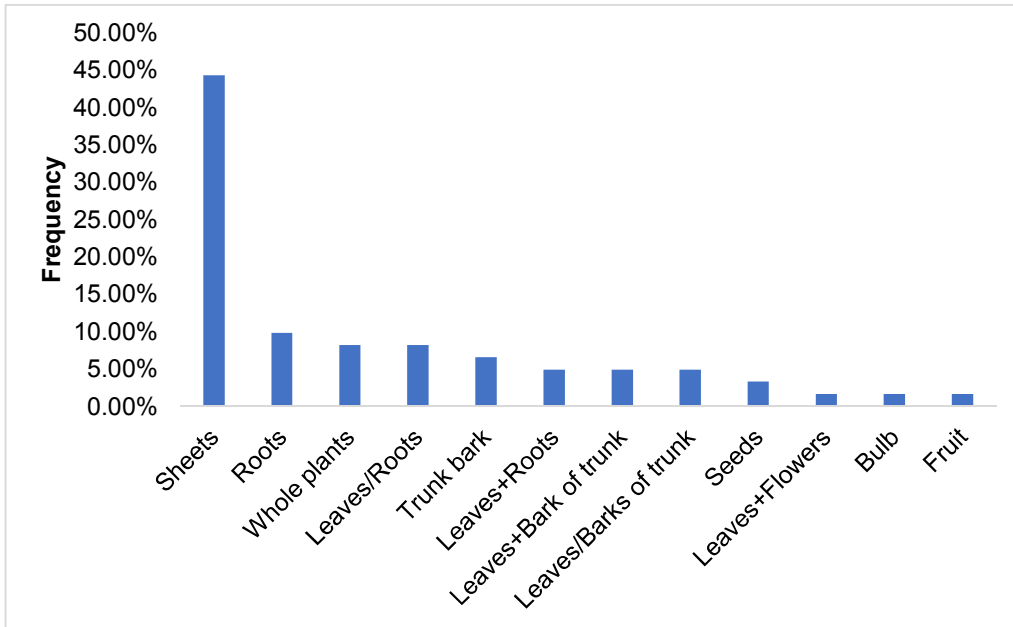


Fig. 9. Frequency of use of plant organs

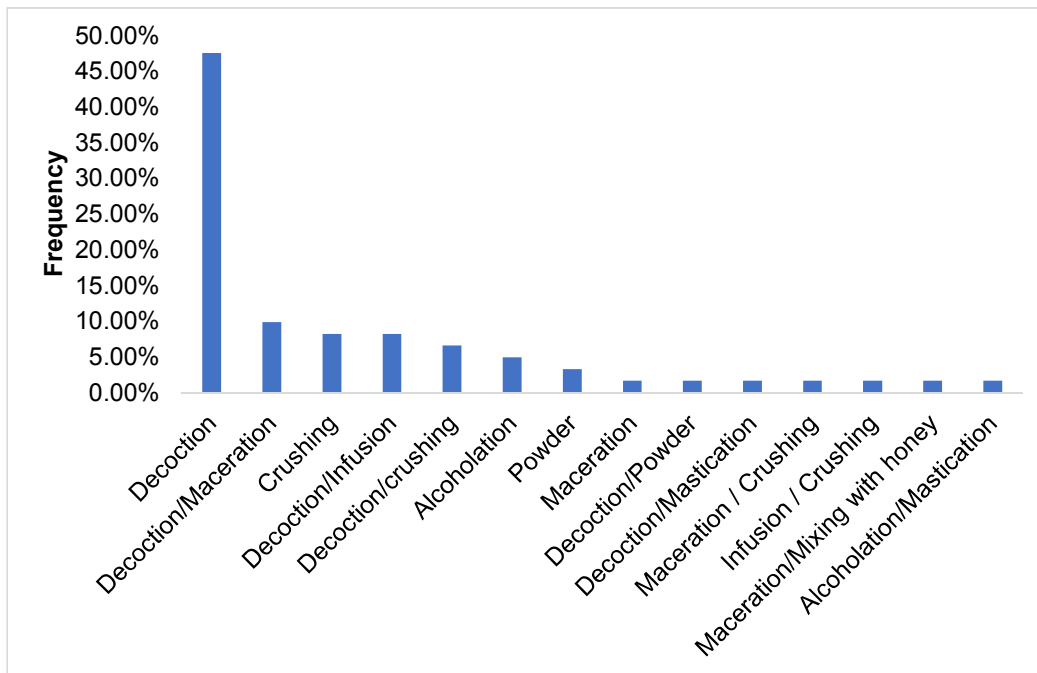


Fig. 10. Frequency of preparation modes used

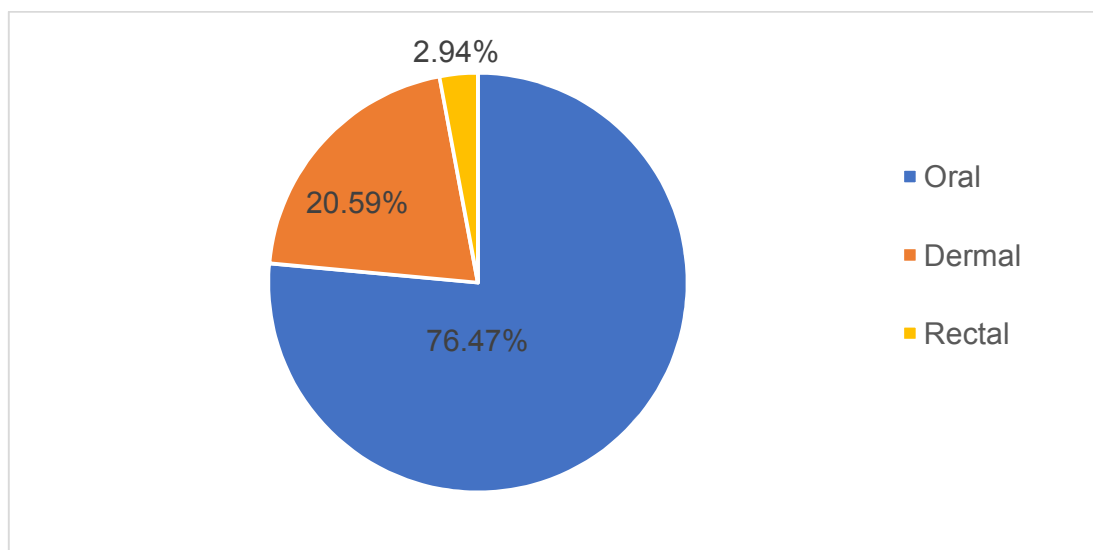


Fig. 11. Different routes of administration

5. CONCLUSION

The purpose of this study was to contribute to the promotion of traditional medical knowledge. This study shows that the profession of market herbalist is much more practiced by women and that of traditional therapist much more practiced by men. This study also identified 61 species divided into 56 genera and belonging to 30 botanical families. The plants identified are used in the treatment of 30 conditions. Euphorbiaceae, Caesalpinaceae and Apocynaceae are the most represented families. The most commonly used plant organs are leaves, which is not a threat to the sustainability of species. Decoction is the most commonly used method of preparation in the production of medicinal recipes and the oral route is the most widely used. The most treated conditions are malaria, infections and anaemia. Most of the recipes used are monospecific.

Through this study, we were able to identify therapeutic indications for certain plants that were not mentioned in previous studies. We also found that traditional medicine knowledge passed down from generation to generation was gradually being lost; adverse effects of treatments were almost not mentioned by traditional therapists and herbalists.

The results obtained from our study can be a source of information for research in the fields of phytochemistry and pharmacology in order to confirm or refute the therapeutic indications of these plants. This would also make it possible to

know if the associations of certain plants in the treatments are beneficial (synergy of action, potentiation) or rather toxic. And finally, this could lead to the manufacture of Traditional Enhanced Medicines. Ethnobotanical surveys are also an excellent way to preserve traditional medical knowledge.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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