***Original Research Article***

**Ethnobotanical survey of medicinal plants used by traditional healers from the Yamoussoukro health district**

**Yamoussoukro (Ivory Coast)**

**Abstract:**

**Background :** Knowledge of plants used by traditional health practitioners is essential for safeguarding and promoting the traditional medicine. The study aimed to identify the medicinal plants used by traditional practitioners in the Yamoussoukro health district for treating common illnesses.

**Material and methods :** An ethnobotanical survey was carried out with the traditional healers of the Yamoussoukro Traditional Healers Association. It is the association of traditional healers officially recognized by the Yamoussoukro health district authorities, with whom collaboration has already begun. The survey was conducted using the semi-structured interview method, followed by a nature outing during which plant specimens were collected. A questionnaire covering the respondent's profile and the plants used was completed. The interview was used to gather information on the diseases treated and the plants (vernacular names, morphological types, parts used, process of preparation, mode and route of administration) used to treat those diseases.

**Results :** The survey enabled us to interview 06 traditional practitioners and to list 54 species divided into 28 botanical families. The most represented families were Apocynaceae 9.26%, Fabaceae 9.26% and Euphorbiaceae 7.41%. About half (48%) of the species cited were shrubs. Leaves were the most commonly used plants parts (56.7%). The majority of plants were used in decoction form (45%), and were mainly administered orally. The therapeutic indications cited were mainly infectious diseases (44%), primarily represented by malaria. The most frequently used plant species were *Kalanchoe crenata*, *Nauclea latifolia*, *Phyllantus amarus*, and *Ageratum conyzoides.*

**Conclusion :** This study reveals the diversity of medicinal plants used by traditional practitioners and their role in healthcare in Yamoussoukro. Additionally, these results help safeguard the knowledge of traditional medicine. These data could be used for future phytochemical and pharmacological studies to develop improved traditional medicines.

Keywords : ethnobotanical survey, medicinal plants, Yamoussoukro.

1. **INTRODUCTION**

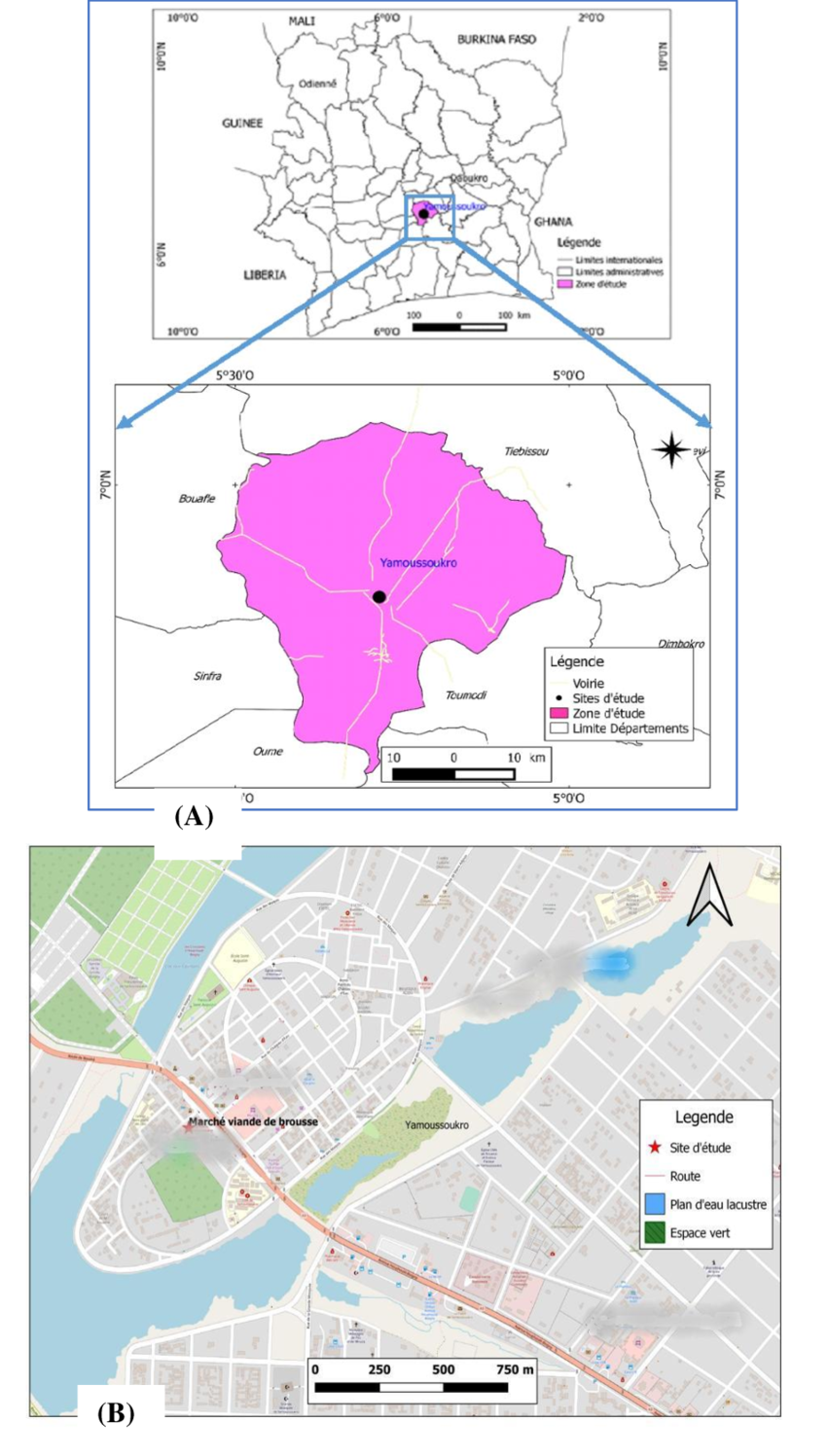
The World Health Organization (WHO) defines traditional medicine as "the body of knowledge and practices used by practitioners to diagnose, prevent, or cure physical, mental, or social imbalances based on experience and observation handed down from generation to generation, whether orally or in writing" (WHO, 2000). The WHO reports that the use of traditional medicine remains high in developing countries, estimated at 65-80% for primary healthcare, due to poverty and the unaffordability of modern medicine (WHO, 2002).

The WHO's strategies for traditional medicine recommend actions to ensure the quality, safety, and efficiency of traditional medicine by regulating products, practices, and practitioners.

In Yamoussoukro, there is an association of traditional health practitioners (THP). This collaboration has enabled TPS to organize their activities and raise public awareness of health issues. THPs are particularly knowledgeable about the medicinal use of plants, making them an alternative for populations seeking effective, affordable solutions. The present study is an ethnobotanical survey of TPS from the Association of Traditional Healers in the Yamoussoukro health district. The goal is to identify the medicinal plants used in their practice and describe their characteristics and traditional therapeutic uses.

1. **MATERIALS AND METHODS**
   1. **Study context :**

The study was carried out from February to March 2022 in the Autonomous District of Yamoussoukro, the political capital of Côte d'Ivoire located in the center of the country (Figure 1). This district is located in zone 30 N between 725,000 m and 785,000 m north latitude and 220,000 m and 285,000 m west longitude, 248 km north of Abidjan, the economic capital. The town of Yamoussoukro, capital of the department, covers an area of around 3,500 km² and is bordered by the departments of Tiébissou to the north, Sinfra to the south, Toumodi to the east and Bouaflé to the west. The flora is dominated by pre-forest savannah dotted more or less densely with small trees. There are also copses, forest islands and gallery forests in the lowlands, along marshes and rivers. Numerous forage species belonging to the Panicum, Stylosanthes, Andropogon and other genera also colonize the Yamoussoukro district. The equatorial climate is characterized by four seasons. Average rainfall is between 900 and 1100 mm per year, with a spatial distribution that varies considerably from one year to the next. The region's average temperature is around 26°C (Koutouan et al., 2017).



**Figure 1 :** Map of the city of Yamoussoukro

* 1. **Plant material**

The plant material included all of the species of plants listed and collected in the Yamoussoukro district.

* 1. **Ethnobotanical survey**

An ethnobotanical preliminary investigation was conducted with the city of Yamoussoukro's health authorities to obtain authorization for the study. During a meeting between the Department of Health and the association of traditional medicine practitioners affiliated with the health district, an initial meeting was held to present the study.

The association's practitioners are recognized by the health authorities and have a framework for their activities. This meeting helped establish trust and explain how the survey would be carried out. After the pre-survey, initial contact visits and interviews were conducted to enable the completion of the questionnaires.

* + 1. **Collecting information**

The survey form collected information on the sex, age and academic level of the respondents. Information on the plants cited included the vernacular name in the local language (Baoulé), the part used, the process of preparation of the plants, the method of administration, the area where the drug is harvested and the diseases treated by these plants.

* + 1. **Collecting plants and making herbariums**

The plants were harvested with the help of a traditional healer. Using vernacular names (in the local language), samples of medicinal plants were taken from the area surrounding the city of Yamoussoukro and from certain sub-prefectures, with a view to compiling a herbarium of each species.

* + 1. **Botanical identification of the species**

The botanical identification of the plants was carried out at the National Floristic Center of the Félix Houphouët-Boigny University (Abidjan-Cocody).

APG IV (2016) nomenclature was used to standardize the scientific names of the recorded species.

* + 1. **Data processing**

The data analysis yielded information that was used to create a database in Excel and analyzed using Excel 2010. The citation frequency (Fc) for each item was determined using the following formula :

Fc = (Number of quotations for the plant considered/Total number of quotations for all plants) x 100

1. **RESULTS AND DISCUSSION**
   1. **Social profile of traditional healers surveyed**

At the end of the survey, six traditional healers who were members of the Traditional Healers Association (PMT) in the Yamoussoukro district were interviewed. There were both men and women among them, but the majority were men (66.67%) (Table 1). Sylla et al., (2018) explain the preponderance of men among traditional health practitioners by noting that, in Côte d'Ivoire, women generally engage in the herbalist profession, which involves selling plants in markets.

Bla et al., (2015), on the other hand, interviewed 9 exclusively male traditional healers in Toumodi. All of the healers interviewed were over 40 years of age (Table 1). These results suggest that traditional healers are advanced in age and have acquired knowledge of plant use through many years of experience. This underscores the importance of passing on knowledge to younger generations to ensure the continuation of traditional medicine practices and knowledge. Similar results were obtained by Anderson (2015) and Soumahoro (2021). Figure 3 shows that more than half of the traditional healers (66.7%) had a secondary education. These results differ from those of Gnagne et al., (2017) and Guinin et al., (2015), who reported 64% and 90% of practitioners, respectively, had no schooling.

**Table 1 : Socio-demographic characteristics of registered traditional practitioners**

|  |  |
| --- | --- |
| **Parameters**  **Headcount** | 6 |
| **Gender (%)**  Masculin  Féminin | 67  33 |
| **Age range (%)**  [40-50[  > 50 | 33,33  66,67 |
| **Educational level (%)**  Out of school  Primairy  Secondairy | 16,67  16,67  66,66 |

* 1. **Characteristics of medicinal plants used by traditional practitioners.**

The survey identified 54 plant species from 53 genera and 28 botanical families, used in the treatment of various pathologies. Table 2 shows the plants listed, their scientific names, vernacular names (local names), drugs used, preparation methods, administration methods and therapeutic indications.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Plant Species** | **Family** | **local name (Baoulé)** | **Growth habit** | **Part used** | **Method of preparation** | **Administration route** | **Medicinal uses** | **Fréquency**  **(%)** |
| 1 | *Abrus precatorius* L. | Fabaceae | Labô labô | Liana | Leaves | Decoction | Oral route | Dysentery,  Cholera,  Dry cough | 2,5 |
| 2 | *Ageratum conyzoides* L. | Asteraceae | Kou n'dre | Tree | Leaves | Decoction, Grinding, Maceration | Oral route | Internal hemorrhoids,  Migraine,  Sexual weakness | 3,75 |
| 3 | *Alchornea cordifolia*  (Schumach. & Thonn.) Müll. Arg | Euphorbiaceae | Djeka | Herb | leafy stem | Decoction | Oral route | Rheumatism,  Lumbago,  Herniated disc | 1,25 |
| 4 | *Alstoni aboonei*  De Wild. | Apocynaceae | Mien | Shrub | Leaves | Decoction | Oral route | Insomnia,  Asthenia | 1,25 |
| 5 | *Alstonia congensis* Engl. | Apocynaceae | Amien | Tree | Bark | Powder | Oral route | Anemia,  Malaria | 2,5 |
| 6 | *Anthocleista djalonensis*  A.chev | Gentianaceae | Wowolouwo | Liana | Leaves | Grinding | Rectal route  (enema) | Typhoid fever | 2,5 |
| 7 | *Bambusa vulgaris* Schrad. Ex J.C.  Wendp. | Poaceae | Blofoue n'vle | Shrub | Leaves | Decoction | Oral route,  Cutaneous route  (a bath) | Typhoid fever | 2,5 |
| 8 | *Bombax buonopozense*  P.Beauv | Malvaceae | Kpouka | Tree | Bark | Grinding | Voie cutanée  (skin basting) | Mental disorders | 1,25 |
| 9 | *Caesalpinia bonduc* (L.)  Roxb | Fabaceae | Ale | Shrub | Leaves | petrissage | Vaginal route  (intimate hygiene) | painful periods | 1,25 |
| 10 | *Cardiospermum grandiflorum* Sw. | Sapindaceae | Akô | Liana | Leaves | Decoction | Oral route | Difficult delivery | 1,25 |

**Table 2 :** List of plants used by traditional healers to treat pathologies

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | *Carica papaya* L. | Caricaceae | Oflê yassoua | Tree | Bark | Decoction | Oral route | Asthma,  Cough | 1,25 |
| 12 | *Citrus limon* (L.) Burn | Rutaceae | Wawle lomi | Tree | Fruit | Decoction | Oral route | Slimming, Hypercholesterolemia, Hyperglycemia | 1,25 |
| 13 | *Cnestis ferruginea* DC. | Connaraceae | Kplêkêssou kplêkêssê | Liana | Leaf | Decoction | Oral route,  Vaginal route  (vaporization) | Dental infections,  Gynaecological infections | 2,5 |
| 14 | *Cochlospermum planchonii* Hook. f. ex  Planch. | Cochlospermaceae | Kale n'dja | Shrub | Root | Grinding | Rectal route | Severe malaria | 2,5 |
| 15 | *Cola cordifolia* (Cav.) R. Br. | Malvaceae | Walê | Tree | Leaf | Grinding | Cutaneous route | Scabies | 1,25 |
| 16 | *Coleus monostachyus*  (P.Beauv) A.J. Paton | Lamiaceae | Lolowlê | Shrub | Leaf | Grinding | Cutaneous route (skin basting) | Convulsions | 1,25 |
| 17 | Combretum molle R. Br. ex G. Don | Combretaceae | Yassoua waka | Small shrub | Root | Decoction | Cutaneous route  (a bath) | Mental disorders | 1,25 |
| 18 | *Crossopteryx febrifuga*  (Afzel.ex G.Don) Benth | Rubiaceae | Krokro | Shrub | Leaf | Decoction | Oral route | Malaria | 3,75 |
| 19 | *Cryptolepis nigrescens*  (Wennberg) L. Joubert & Bruyns | Apocynaceae | Djamla | Liana | Leaf | Petrissage | Oral route | Angina,  Otorhinolaryngology infections | 1,25 |
| 20 | *Dichrostachys cinerea* (L.) Wight & Am. | Fabaceae |  | Shrub | Root | Grinding | Rectal route | Viral infections,  Shingles | 1,25 |
| 21 | *Elaeis guineensis* Jacq. | Arecaceae | M'me | Tree | Root | Decoction | Cutaneous route  (a bath) | humpback disease | 1,25 |
| 22 | *Euphorbia hirta* L. | Euphorbiaceae | Akô lolo | Herb | Leaf | Petrissage, Grinding | Oral route, rectal route | Urinary tract infections,  Gonorrhea,  Abdominal pain | 2,5 |
| *23* | *Ficus exasperata* Vahl | Moraceae | Ye n'gle | Shrub | Leaf | Petrissage, Grinding | Ocular route,  Nasal route,  Rectal route (enema) | Blurred vision,  Difficult delivery,  Envenomation | 3,75 |
| 24 | *Gymnanthemum coloratum* (Willd.) H. Rob. & B. Kahn | Asteraceae | Abôwi | Shrub | Leaf | Grinding | Rectale route | Internal hemorrhoid,  Hemorrhage,  Lack of appetite | 1,25 |
| 25 | *Harrisonia abyssinica* Oliv. | Rutaceae | Pebou'n | Shrub | Root | Grinding | Rectale route | Hemorrhoids | 1,25 |
| *26* | *Heliotropium indicum* L. | Boraginaceae | Lolowlê loa | Herb | Leaf | Grinding, Decoction | Cutaneous route (massage), Oral route | Vascular accident,  Asthma,  Breathing difficulties,  Cough | 2,5 |
| *27* | *Jatropha curcas* L. | Euphorbiaceae | Plôplô oufoue | Shrub | Root | Grinding | Rectale route (enema) | Haemorrhage,  Menstrual disorders | 1,25 |
| *28* | *Justicia secunda* Vahl | Acanthaceae |  | Shrub | Leaf | Decoction | Oral route | Anemia | 1,25 |
| *29* | *Kalanchoe crenata*  (Andrews) Haw | Crassulaceae | Kpole n'gbli | Shrub | Root | Petrissage | Voie nasale | Colds,  Cough,  Bronchitis | 5 |
| *30* | *Kigelia africana* (Lam.)  Benth. | Bignoniaceae | Meme doun | Shrub | Bark | Decoction | Cutaneous route (a bath) | Epilepsy | 1,25 |
| 31 | *Lonchocarpus sericeus*  (Poir) Kunth ex DC. | Fabaceae | Akpê | Shrub | Leaf | Grinding | Cutaneous route (skin basting), Rectale route | viral infections | 1,25 |
| 32 | *Lophira lanceolata* Tiegh. ex Keay | Ochnaceae | N'gouin | Tree | Bark | Decoction | Cutaneous route (a bath) | Mental disorders | 1,25 |
| 33 | *Manihot esculenta* Crantz | Euphorbiaceae | Agba | Shrub | Leaf | Petrissage | Oral route | Angina | 1,25 |
| 34 | *Margaritaria discoidea* (Baill.) G.L. Webster | Phyllanthaceae | Kpê kpê sia | Shrub | Leaf | Maceration | Oral route | Menstrual troubles | 1,25 |
| 35 | *Milicia excelsa* (Welw.) C.C. Berg | Moraceae | Ala | Tree | Bark | Decoction | Cutaneous route (a bath) | Malaria,  Ulcer | 1,25 |
| 36 | *Morinda lucida* Benth | Rubiaceae | Kouia | Shrub | Root | Decoction | Oral route | Typhoid fever | 2,5 |
| 37 | *Moringa oleifera* Lam. | Moringaceae | Morenga | Shrub | Leaf | Decoction, Maceration | Oral route | Malaria,  Diabetes,  Constipation,  Sexual weakness | 1,25 |
| 38 | *Nauclea latifolia* Sm. | Rubiaceae | Dolê | Sarmentous | Leaf | Decoction,  Grinding | Oral route, Rectale route (enema) | Severe malaria,  Typhoid fever | 3,75 |
| 39 | *Newbouldia laevis* (P.Beauv) Seem | Bignoniaceae | Tou n'zue | Shrub | Leaf | Petrissage | Nasal route | Sinusitis | 2,5 |
| 40 | *Nicotiana tabacum* L. | Solanaceae | Gbo sou n'gna | Herb | Leaf | Petrissage | Ocular route | Mental disorders | 1,25 |
| 41 | *Ocimum gratissimum* L. | Lamiaceae | Aromangnrin | Shrub | Leaf | Decoction | Oral route, Nasal route | Rhinitis,  Bronchitis,  Epistaxis | 1,25 |
| 42 | *Olax subscorpioidea* Oliv. | Olacaceae | Aklindje | Shrub | Leaf | Decoction | Oral route | Malaria | 3,75 |
| 43 | *Cenchrus purpureus* (Schumach.) Morrone | Poaceae | N'de | Herb | Leaf | Decoction | Ocular route | Blurred vision | 1,25 |
| 44 | Phragmanthrera capitata (Spreng) Balle | Loranthaceae | Adjroua | Shrub | Leaf | Grinding | Cutaneous route (skin basting) | humpback disease | 1,25 |
| 45 | *Phyllanthus amarus* Schumach & Thonn. | Phyllanthaceae | Sou n'gna sin | Shrub | Leaf | Petrissage, Decoction, Maceration | Oral route | Diarrhea,  Lung infection,  Cough,  Malaria, | 3,75 |
| 46 | *Saccharum officinarum* L. | Poaceae | Anglanan | Herb | Leaf | Decoction | Oral route | difficulty urinating | 1,25 |
| 47 | *Secamone afzelii* (Roem. & Schult) K. Schum. | Apocynaceae | Golifle | Liana | Leaf | Decoction | Cutaneous route (a bath) | Fever | 1,25 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 48 | *Senna occidentalis* (L.) Link | Fabaceae | Mantouankan n'gna | Small shrub | Leaf | Petrissage | Auricular route,  Oral route | Infections and pain  pain,  Dental pain | 1,25 |
| 49 | *Solanum torvum* Sw. | Solanaceae | Koffi kan n'droi | Shrub | Leaf | Decoction | Cutaneous route | Panariasis | 1,25 |
| 50 | *Spathodea campanulata* P. Beauv. | Bignoniaceae | Bie bie siri | Shrub | Bark | Decoction | Cutaneous route (a bath) | Malaria,  Ulcer | 1,25 |
| 51 | *Spondias mombin* L. | Anacardiaceae | Tronman | Shrub | Leaf | Powder | Oral route,  Cutaneous route | Hemorrhoids,  Itchy skin | 1,25 |
| 52 | *Strophantus hispidus* DC. | Apocynaceae |  | Liana | Leaf | Grinding, Decoction | Oral route, Cutaneous route (poultice) | Ulcers,  Wound healing | 1,25 |
| 53 | *Terminalia schimperiana* Hochst. | Combretaceae | Kpandji | Tree | Bark | Grinding | Oral route | Sexual weakness | 1,25 |
| 54 | *Zanthoxylum zanthoxyloides* (Lam) Zepern. & Timler | Rutaceae | Tche n'dje | Tree | Bark | Powder Maceration | Oral route | Gonococcal infections, Sickle cell disease,  Premature ejaculation | 2,5 |

* + 1. **Morphological types of species**

As for the morphological types of species recorded, 48% were shrubs (Figure 2). The abundance of shrubs can be explained by the town of Yamoussoukro's geographical location, where the survey was conducted. The town is located in the central region of Côte d'Ivoire, within a transition zone of forest and savannah vegetation. Additionally, the abundance of shrubs in the practitioners' environment and the simplicity of harvesting organs from these plants could explain this preference. These results are similar to those of Bene et al., (2016), who reveals in his study that shrubs were the most represented with 51%. During the surveys by Desalegn et al., (2022) in the Gechi district of Ethiopia, the majority of the recorded plants were also shrubs (32.9%).

However, N'guessan et al., (2010) and Diatta et al., (2013) obtained a predominance of trees during their surveys in Cote d'Ivoire and Benin respectively. A study in Nigeria showed that herbs were the most important morphological type of medicinal plants (34.4%), often due to their wide distribution and ease of harvesting.

**Figure 2 :** Morphological type of plants used

* + 1. **Families of species recorded**

Apocynaceae (9.26%), Fabaceae (9.26%) and Euphorbiaceae (7.41%) were the families most frequently encountered (figure 3). This predominance of families such as Fabaceae and Euphorbiaceae is justified by the fact that they are among the most numerous plant families in the Ivorian flora (Aké-Assi, 2001). Also, the presence of the Fabaceae among the main families can be explained by the use of APG IV nomenclature, which now groups the Mimosaceae and Caesalpiniaceae families in the Fabaceae family belonging to the Fabales order (APG, 2016).

These results apart from a few differences are similar to those of many authors who have carried out surveys in other regions of Ivory Coast. Indeed, Béné et al., (2016) have indicated that Euphorbiaceae and Apocynacea are the most represented families. A studty conducted in Morocco determined that the Asteraceae, Fabaceae and Poaceae families, which are the three most prevalent in Moroccan vascular flora, comprise over a third of the country's species (Fennane & Ibn Tatou, 2012). Similarly, Azonbakin et al., (2021) identified the Euphorbiaceae, Apocynaceae, and Fabaceae as some of the most commonly used plant families in Benin.

**Figure 3 :** Botanical family of plants used

* + 1. **Plant parts used**

More types of organ were used as drugs. Leaves were the most popular plant parts (56.7%) (Figure 4). Ngbolua et al., (2013) suggest that the ease and speed with which leaves can be harvested may explain the preference for this plant part. Surveys by Bla et al., (2015) and Ouattara et al., (2021) arrived at similar results.

Excessive use of plant leaves could be a cause for concern, but Poffenberger et al., (1992) have shown that removing 50% of a tree's leaves does not significantly affect its survival.

Leaves aside, the most widely used plant parts were roots and bark, at 20% and 16%, respectively. Azonbakin et al., (2021) also found that roots and trunk bark were used minimally in Bénin.

However, removing roots, the second most commonly used organ group in this study (20%), hinders the plant's nutrient processes because the plant draws its nutrients from the roots, unlike leaves (Yapi, 2013). Similarly, overuse of bark leaves the plant vulnerable to attack by fungi, birds, and infective caterpillars due to the large scars left by its removal. Uprooting and debarking are dangerous harvesting methods and are responsible for species disappearance (Yao et al., 2024).

**Figure 4 :** The different plant parts used

**3.2.4 Methods of preparing remedies**

Various techniques were used to prepare the remedies. Decoction (45%) was the most frequently cited method (Figure 5). The water used for decoction is the most accessible and least expensive solvent. In addition, decoction may constitute a form of sterilization of the preparation, since the heat source used can prevent possible microbial contamination. This result is in line with those of Ambé et al., (2015). Similar results were obtained by Guinnin et al., (2015) and Kpabi et al., (2020) in Benin and Togo, respectively, when the decoction was used at proportions of 39.5% and 40.9%.

**Figure 5 :** Method of preparation of remedies

* + 1. **Route of administration**

The oral route was the most frequently cited (44.1%) (Figure 6). The preferential use of this route is due to its suitability for treating pathologies localized in internal organs, notably bacterial, fungal and/or parasitic infections (Tra Bi et al., 2008). Several studies concur with this finding, including that of Saraka et al., (2018), who showed that the oral route (44%) was the most widely used for the administration of medicinal Euphorbiaceae in Yamoussoukro. Sylla et al., (2018) also indicate the oral route as the most cited by healers. In contrast, Diatta et al., (2013) revealed the predominance of the percutaneous route.

**Figure 6** **:** Classification of differents routes of administration

**3.2.7 Groups of pathologies treated**

A breakdown by pathology group revealed the predominance of infectious diseases (44%) (Figure 7). Malaria was the most frequently cited disease (13.84%). These results correspond to the health profile of the Yamoussoukro district, which is dominated by malaria, the main reason for consultation in basic health centers, but also to that of Côte d'Ivoire, which is essentially dominated by infectious and parasitic diseases (PNLP, 2005). Collaboration between modern and traditional medicine needs to be stepped up and better organized, in order to capitalize on the knowledge that can help eradicate these diseases. A study of ornamental plants in Mali showed that malaria was the most commonly treated ailment (Samaké et al., 2020). In contrast, digestive and skin disorders were the main ailments treated with plants from the Talassemtane Park in Morocco (Rhattas et al., 2016).

**Figure 7 :** Distribution of pathology groups treated by traditional healers

**3.2.2 Most frequently used plant species.**

Of the plant species listed, *Kalanchoe crenata* was the most frequently cited (66.67%) (Table 2). Extracts from the roots and leaves of this plant were cited by traditional practitioners for the treatment of coughs, colds and bronchitis. Its antimicrobial activity and anti-inflammatory effects justify its use in the treatment of coughs (Kablan, 2008).

*Nauclea latifolia*, *Phyllantus amarus* and *Ageratum conyzoides* were the other most commonly used species.

The aqueous extract of *Nauclea latifolia* is said to be rich in chemical groups that may explain the use of this plant in the treatment of malaria (Anowi et al., 2015).

The decoction, macerate or extract after pressing of *Phyllantus amarus* leaves can be used to treat malaria, typhoid fever, pulmonary infections and coughs, according to the traditional practitioners surveyed. Coulibaly et al., (2011) have shown that this plant contains substances that could also justify its traditional use in tuberculosis.

*Ageratum conizoydes* was cited in the treatment of sexual weakness and internal hemorrhoids. This traditional use for the treatment of hemorrhoids has already been mentioned in a survey (Sidio et al., 2020).

**3.2.8 Plant sourcing location**

All the traditional healers we met harvested medicinal plants from the nature for the preparation of their remedies. These results reveal the great accessibility of traditional healers to plant drugs. This availability of plants in the immediate natural environment of traditional health practitioners represents an enormous advantage for the practice of traditional medicine. Soumahoro obtained a similar result in his study, in which 84.5% of plants came from nature (Soumahoro, 2021).

Also in Senegal's Ziguinchor region, 100% of the traditional health practitioners we met turned to nature for their plant supplies (Diedhiou, 2017). However, overexploitation of forests and urbanization of cities are at the root of deforestation and species extinction. As a result, practitioners face enormous difficulties in obtaining plant supplies, which are becoming increasingly difficult, sometimes necessitating relocation to other parts of the country. Given the above-mentioned problems, the current challenge is to find solutions that will enable the survival of these species for therapeutic use. An effective solution to this issue is to encourage the cultivation of medicinal species. This enables sustainable harvesting that respects quality standards, promotes the preservation of medicinal plants, and ensures the availability of plant raw materials (WHO, 2003).

**CONCLUSION**

This study identified 54 species belonging to 53 genera. Shrubs were the most abundant, accounting for 48% of the species. Leaves were the most commonly used organ (56.7%), and decoction (45%) was the most common method of preparation. The oral route (44.1%) was the most popular method of administration for remedies. The most commonly treated illnesses were malaria and other infectious diseases (41%).These data could serve as a source of information for phytochemical and pharmacological research. Identifying active metabolites and evaluating their activities will help us define the scientific basis for the traditional use of these plants. The goal is to add value to the traditional pharmacopoeia by developing improved traditional medicines that are safe, effective, and affordable.

**DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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