



Ethnobotanical study of medicinal plants used in the treatment of infantile gastrointestinal infections in Mbouda (West Cameroon)

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ABSTRACT

Introduction: Plants are a major source of active ingredients that can be used in the management of childhood gastrointestinal infections. The aim of this study was to identify plants used in traditional medicine for the treatment of childhood gastrointestinal infections in Mbouda.

Methods: From November 20023 to January 2024, an ethnobotanical survey was conducted among 145 parents with children under the age of 05 and 05 traditional practitioners in the town of Mbouda by means of direct interviews using a semi-structured questionnaire.

Results: The data collected identified 35 plant species belonging to 24 families. The most represented families were Asteraceae with 09 species, followed by Lamiaceae, Acanthaceae, Curcubitaceae and Malvaceae with 02 species each. The most frequently cited species were *Ocimum gratissimum*, *Ageratum conizoides*, *Lantana camara* and *Coffea arabica*. The most commonly used plant parts were leaves, followed by whole plants. The main method of preparation is trituration.

Conclusion: Mbouda has a high biodiversity of medicinal plants. The plants listed constitute a panel that can be used as a starting point for biological screening and pharmacological tests in the laboratory, especially the most frequently cited species with a good medicinal value.

Key words: Ethnobotany, medicinal plant, gastrointestinal infections, Mbouda.

RESUME

Introduction: Les plantes constituent une grande source de principes actifs qui peuvent être utilisés dans la prise en charge des infections gastro-intestinales infantiles. L'objectif de cette étude était de recenser les plantes utilisées en médecine traditionnelle pour la prise en charge des infections gastro-intestinales infantiles à Mbouda.

Méthodes: De novembre 20023 à janvier 2024, une enquête ethnobotanique a été réalisée auprès de 145 parents ayant des enfants de moins de 05 ans et 05 tradipraticiens dans la ville de Mbouda par des interviews directes à l'aide d'un questionnaire semi structuré.

Résultats: Les données recueillies ont permis d'identifier 35 espèces végétales appartenant à 24 familles. Les familles les plus représentées ont été les des Asteraceae avec 09 espèces, suivie des Lamiaceae, Acanthaceae, Curcubitaceae et Malvaceae avec 02 espèces chacune. Les espèces les plus citées ont été *Ocimum gratissimum*, *Ageratum conizoides*, *Lantana camara*, *Coffea arabica*. Les parties de plantes les plus utilisées ont été les feuilles suivies par les plantes entières. La principale méthode de préparation reste la trituration.

Conclusion: Mbouda dispose d'une biodiversité floristique importante en matière de plantes médicinales. Les plantes ainsi répertoriées constituent un panel qui peut servir de point de départ pour les criblages biologiques et des tests pharmacologiques au laboratoire surtout les espèces les plus citées et ayant une bonne valeur usuelle.

Mots-clés: Ethnobotanique, plante médicinale, infections gastro-intestinales, Mbouda

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I. INTRODUCTION

A gastrointestinal infection is an inflammation of the lining of the stomach, small intestine and large intestine causing diarrhoea, vomiting and abdominal pain [1]. Worldwide, approximately 3 to 5 billion children suffer from gastrointestinal infection [2]. However, according to the World Health Organisation in 2006, the prevalence of gastrointestinal infections in Africa was 39.1% [3]. In Cameroon, more specifically in the city of Douala, 60.4% of the population suffer from gastrointestinal infections [4]. These infections can be caused by bacteria (*Salmonella*, *Escherichia coli*, *Staphylococcus*, *Shigella*), viruses (rotavirus), parasitic organisms or fungi of the *Candida* [5-6]. Treatment of these infections is based on the use of cephalosporins (ceftriaxone), fluoroquinolones (Ciprofloxacin), polyenes (nystatin) and azoles (fluconazoles). However, resistance to these treatments is increasingly being recorded [7-8]. Bacteria such as *Staphylococcus aureus*, *Streptococcus pneumoniae* and *Escherichia coli* are known to be resistant to antibiotics [9]. These resistances contribute to therapeutic failures using official medicines. Faced with this situation, medicinal plants could provide an alternative. The scientific exploration of these medicinal plants with a view to finding molecules that can be active against microorganisms represents a serious research opportunity, as plants have always been used for food or healthcare purposes, due to their richness in primary and secondary metabolites (alkaloids, flavonoids, phenols, tannins) [10]. Medicinal plants are a valuable resource for the vast majority of rural populations in Africa, where over 80% of the population use them for healthcare [11]. This is the case in Cameroon, where people in both urban and rural areas are increasingly turning to the use of medicinal plants to solve their health problems [11]. The use of plants also reflects the cultural diversity of ethnic groups in the country and consequently in the West Cameroon region [11]. This traditional medicine, essentially based on the massive and priority use of plant resources, plays a very important role. Most of these important plant resources are little known and it is important to exploit them by adopting an ethnopharmacological approach to selecting potentially active plants and verifying their efficacy. The aim of the study being carried out in Mbouda is to contribute to our knowledge of the plants and to gather as much information as possible about their therapeutic use by the local population. Indeed, it is important to translate this traditional knowledge into scientific knowledge, with a view to enhancing its value, conserving it and using it rationally.

II. METHODOLOGY

2.1 Presentation of the study area

The Bamboutos department is located in the West region. It is located on the western edge of the West region. Mbouda, its capital, is on the Route Nationale 6, 28 km north-west of the regional capital, Bafoussam. It covers an area of 437 km², with a population of around 330,423 in 2005, with a density of 282 inhabitants per km². It comprises 4 arrondissements: Mbouda, Batcham, Galim and Babadjou. Mbouda is a Cameroonian municipality and the capital of the Bamboutos department in the West region. It lies at the foot of Mount Bamboutos [12].

The landscape is mountainous, with rugged relief, but it is also made up of plains and valleys. Mbouda's fertile volcanic soils make it one of Cameroon's main food sources. The presence of *Imperata cylindrica* on hilltop soils is evidence of their infertility, caused by run-off water. Some of these soils are therefore prone to leaching and need to be fertilised to give good crop yields. According to Köppen's classification, the municipality has an Aw-type tropical climate, with an average annual temperature of 20.4°C and around 1,964 mm of rainfall per year, less in winter than in summer (Figure 1) [12].

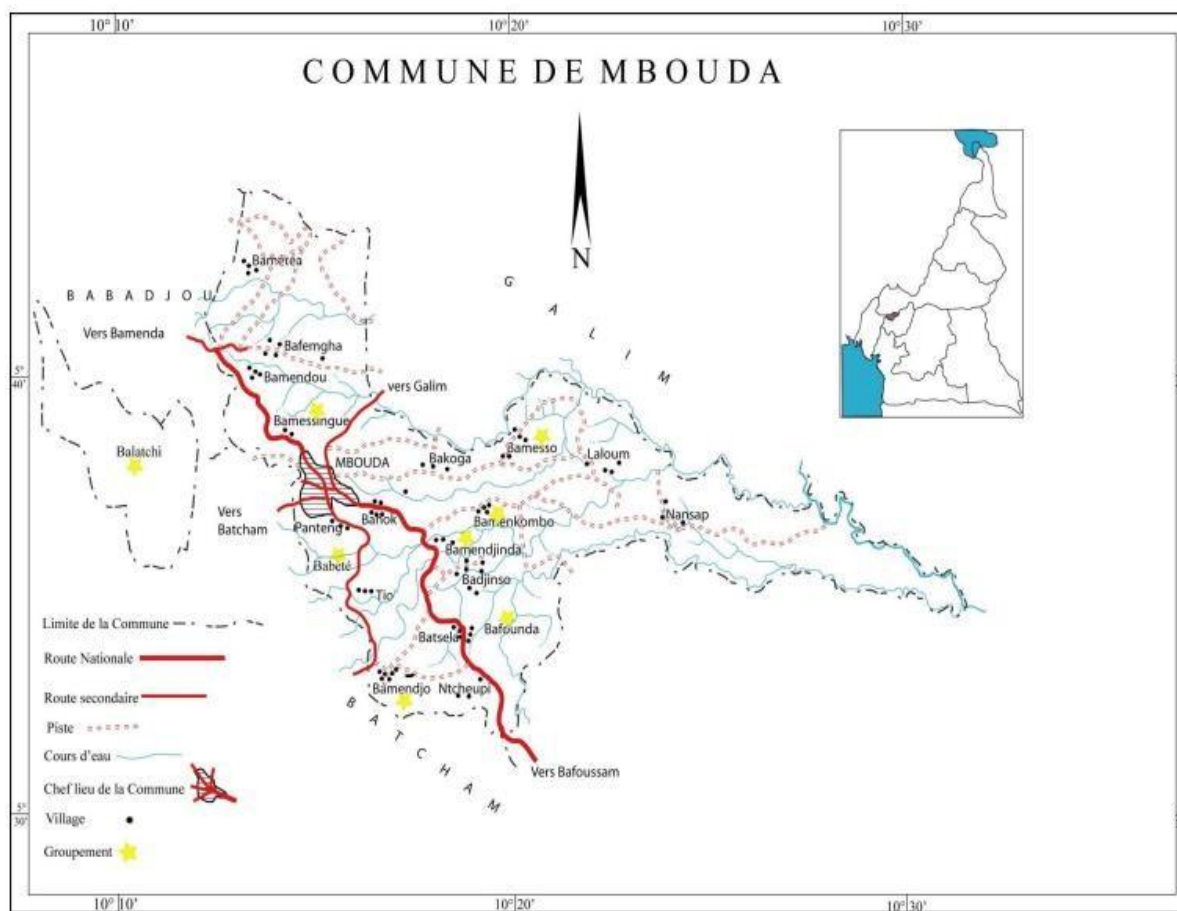


Figure 1: Location of the study area [12]

2.2 Data collection

Data was collected using an ethnobotanical survey approach. Using survey forms containing a structured questionnaire and a direct interview, a series of interviews was conducted with traditional healers and parents. The parents interviewed had to have children under the age of 5. The information collected related to data on knowledge and causes of childhood gastrointestinal infections, and the different therapeutic practices for the management of these infections.

2.3 Identification of the medicinal plants collected

With the help of a botanist, the samples were identified at the National Herbarium of Cameroon. The samples to be identified were either compared with illustrations in a taxonomic botany manual or compared with other samples of the same type already fully identified and stored at the herbarium.

2.4 Data analysis

The forms obtained at the end of the survey were analysed. The various plants and recipes were counted. This phase was followed by encoding the information relating to each herbarium sample in an Excel database. The data was then analysed using Excel 2013 and the diagrams were drawn.

III. RESULTS

3.1 Socio-demographic data of participants

The survey was carried out in the town of Mbouda among traditional healers and parents with children under 5 years of age. A total of 150 people aged between 20 and 85 were surveyed. Of these, 97% (145) were parents and 3% (5) were traditional healers.

3.1.1 Characteristics of parents of children under 5 years of age

145 parents were interviewed, 95% of whom were women and 5% men. 67% attended school and 33% did not. 70% of parents are farmers and all use medicinal plants to treat themselves.

3.1.2 Characteristics of the traditional healers

The 5 traditional healers include one woman and four men aged between 30 and 60. Only one male had attended school and the other 4 had not. Only one of the 5 had acquired knowledge of medicinal plants by reading books on traditional medicine and the other four had acquired their knowledge of traditional medicine through family transmission from generation to generation. 100% of these traditional practitioners prepare their own recipes for their patients. 2 traditional practitioners use only local products, while three use both local and imported products.

3.1.3 Characteristics of the symptoms of gastrointestinal infections

The diagnosis of gastrointestinal infections by parents and traditional healers is based solely on symptoms. Several symptoms have been cited (Table I). Among these symptoms, abdominal pain, colic, diarrhoea, dysentery and flatulence are the most representative, cited respectively by 11.95%, 10.45% and 7.46% of respondents. Other symptoms such as angina, jaundice, gastro-oesophageal reflux disease and typhoid were cited less frequently (Figure 2).

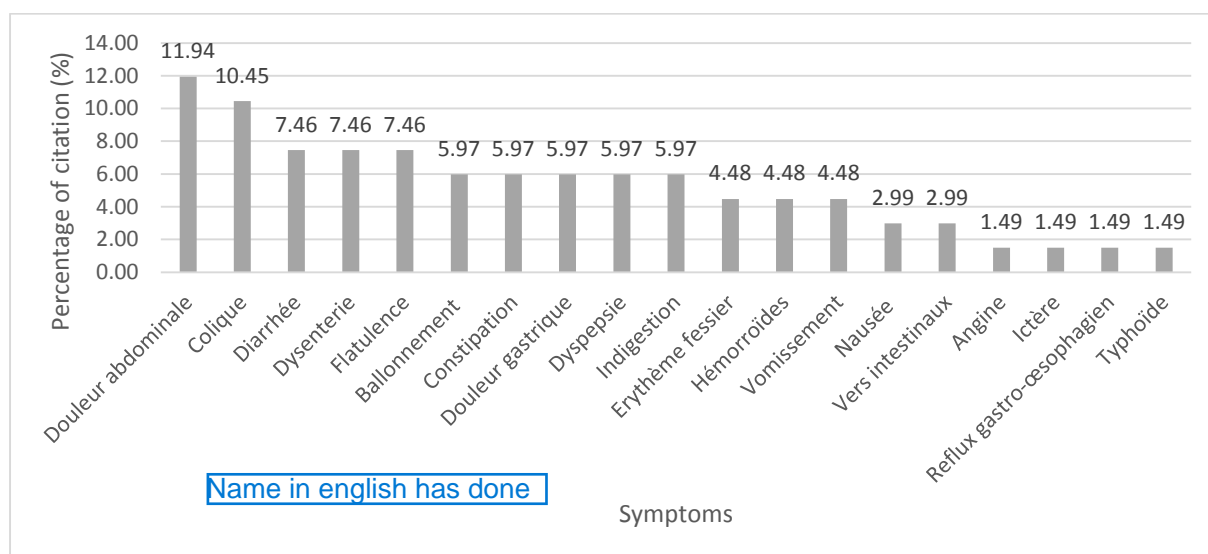


Figure 2: Different symptoms of gastrointestinal infections found in Mbouda

3.2 Botanical characteristics and plant diversity

A total of 35 plant species were identified during the course of this study. They belong to 24 families. The most represented families were Asteraceae (25%), followed by Lamiaceae, Acanthaceae, Curcubitaceae and Malvaceae (5.56%) (Figure 3).

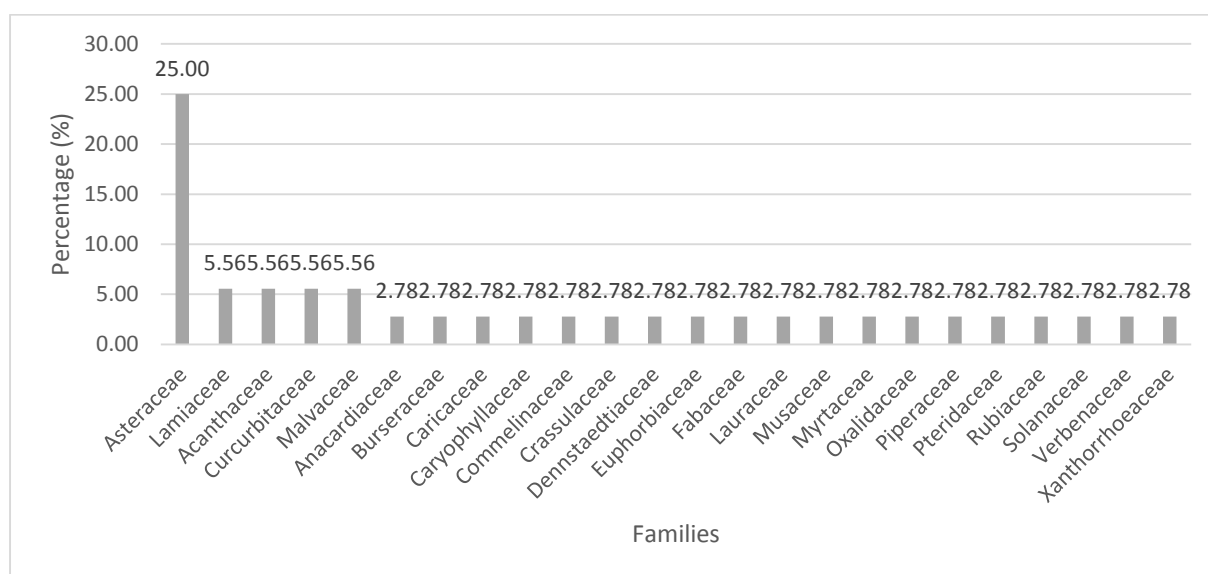


Figure 3: Families study

Of the 35 plant species, 13 have a number of citations greater than or equal to 10. These are *Ocimum gratissimum* (177), *Ageratum conyzoides* (156), *Lantana camara* (140), *Coffea arabica* (135), *Drymaria cordata* (131), *Eremomastax speciosa* (120), *Desmodium hirtum* (116), *Melisses officinales* (112), *Bidens pilosa* (110), *Musa acuminata* (110), *Pteridium aquilinum* (104), *Acmella caulirhiza* (100) and *Hibiscus surattensis* (100) (figure 4).

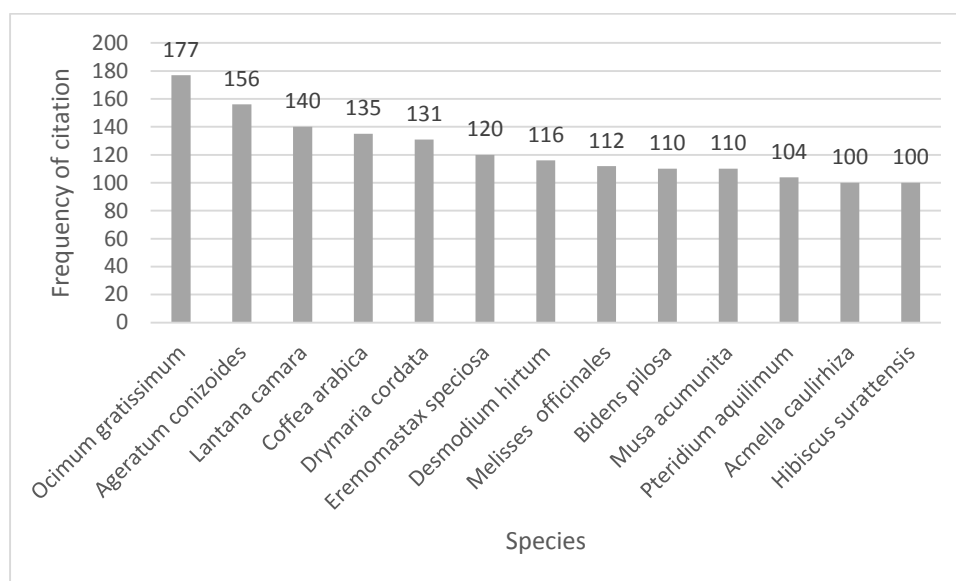


Figure 4: Most frequently cited plant species

Table I: Distribution of plant species used in the treatment of gastrointestinal infections

Families	Scientific name	Common name	Name in French	Parts used	Method of preparation	Symptoms	Method of administration	Frequency of quotation
Acanthaceae	<i>Eremomastax speciosa</i> (Hochst.) Cufod	Panzeumot	Rouge d'un cote	Leaf	Trituration, powder	Abdominal pain, nausea, vomiting, colic, diaper rash	Oral	120
Acanthaceae	<i>Dicliptera chinensis</i> (L.) Juss.	Keutkit		Leaf and stem	Infusion or eat raw	vomiting or stomach pain	Oral	19
Anacardiaceae	<i>Mangifera indica</i> L.	Margou	Manguier	Bark	Maceration	Diarrhea	Oral	17
Asteraceae	<i>Erigeron sumatrensis</i> Retz	Jume		Leaf	Eat raw or trituration	Angina, constipation	Oral	90
Asteraceae	<i>Vernonia amygdalina</i> Delile	Meluine	Ndole	Leaf	Trituration	Abdominal pain	Oral	80
Asteraceae	<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	Bokassa		Root	Decoction	Stomach pain Gastric pain	Oral	43
Asteraceae	<i>Tithonia diversifolia</i> (Hemsl.) A.Gray	Fleur jalousie	Fleur jalousie	Leaf	Maceration	Abdominal pain	Anal	90
Asteraceae	<i>Ageratum conyzoides</i> L.	Fotou	Rois de herbes	Whole plant	Eat raw or decoction trituration or Infusion	Digestive pain, Intestinal worms, bloating and flatulence	Oral	156
Asteraceae	<i>Bidens pilosa</i> L.	Yemik		Leaf and stem	Decoction	Dyspepsia	Oral	110
Asteraceae	<i>Vernonia amygdalina</i> Delile	Meluine	Ndole	Root	Decoction	Jaundice	Oral	14
Asteraceae	<i>Acmella caulirhiza</i> Delile	Pantsou		Whole plant	Trituration	Colic and diaper rash	Anal	100
Asteraceae	<i>Emilia sonchifolia</i> (L.) DC. ex Wight	mouobot		Leaf	Trituration	Stomach pain	Oral	52
Burseraceae	<i>Canarium schweinfurthii</i> Engl.	Bêlait	Fruit noire	Core	Powder	Dysentery	Oral	88

Caricaceae	<i>Carica papaya</i> L.	Poupou	Papayer	Leaf	Decoction	Constipation	Anal	38
Caryophyllaceae	<i>Drymaria cordata</i> (L.) Willd. ex Schult.	Segne		Whole plant	Trituration, powder	Colic, bloating; diaper rash	Anal	131
Commelinaceae	<i>Commelina benghalensis</i> L.	kekoneolum		Leaf and stem	Trituration	Constipation	Anal	42
Crassulaceae	<i>Kalanchoe pinnata</i> (Lam.) Pers.	Nezou		Leaf	Trituration	Colic	Oral	50
Curcubitaceae	<i>Cucumis sativus</i> L.	Kakne	Concombre	Leaf	Trituration	Constipation, colic	Oral	34
Curcubitaceae	<i>Sicyos Angulatus</i> L.	Laplap		Leaf	Trituration	Bloating and flatulence	Oral	76
Dennstaedtiaceae	<i>Pteridium aquilinum</i> (L.) Kuhn	Fouger	Fouger	Whole plant	Decoction infusion	Hemorrhoids Dysentery, digestive pain Intestinal worms	Oral	104
Euphorbiaceae	<i>Euphorbia hirta</i> L.	Nepeumo		Leaf	Powder	Dyspepsia	Oral	49
Fabaceae	<i>Desmodium hirtum</i> Guill. & Perr.	Mefemezoule		Leaf	Eat raw or trituration	Dysentery, hemorrhoids	Oral	116
Lamiaceae	<i>Melisses officinales</i> L.	Bansak		Whole plant	Trituration, infusion and maceration	diarrhea, nausea and vomiting, Abdominal pain	Oral	112
Lamiaceae	<i>Ocimum gratissimum</i> L.	Cortomano	Massep	Leaf	Trituration, powder	Dysentery, digestion pain, Colic and flatulence	Oral	177
Lauraceae	<i>Persea americana</i> Mill.	Piar	Avocatier	Core	Powder	Stomach pain, gastroesophageal reflux	Oral	17
Malvaceae	<i>Sida acuta</i> Burm.f.	Chudada		Leaf and stem	Trituration Decoction	Dyspepsia	Oral	68
Malvaceae	<i>Hibiscus surattensis</i> L.	Tsenandon		Whole plant	Decoction	Abdominal pain	Anal	100
Musaceae	<i>Musa acuminita</i> Colla	Kedie	Bananier	Root + epicarp	Maceration	Abdominal pain, bloating and Flatulence	Oral	110
Myrtaceae	<i>Psidium guajava</i> L.	Goave	Goyavier	Leaf	Decoction trituration or	Diarrhea, dysentery and flatulence	Oral	30
Oxalidaceae	<i>Oxalis incarnata</i> L.	Leuleucina		Whole plant	Eat raw	Dyspepsia	Oral	25
Piperaceae	<i>Piper umbellatum</i> L.	Bepog		Leaf	powder	Diarrhea	Oral	39
Pteridaceae	<i>Pteris fauriei</i> Hieron	Kara		Leaf and stem	Decoction	Hemorrhoids	Local	58
Rubiaceae	<i>Coffea arabica</i> L.	Cofie	Caféier	Leaf	Decoction	Diarrhea and Abdominal pain	Oral	135
Solanaceae	<i>Solanum linnaeanum</i> Hepper & P.-M.L.Jaeger	Tsapkeguet		Leaf	Infusion	Colic	Anal	22
Verbenaceae	<i>Lantana camara</i> L.	Fluar	Lantanier	Leaf	Decoction	Typhoid	Oral	140
Xanthorrhoeaceae	<i>Aloe vera</i> (L.) Burm.f.	Alovera	Alovera	Leaf	Maceration	Abdominal pain, digestion pain	Oral	63

3.2.1 Plant parts used

A total of 07 plant parts are used in the preparation of the traditional recipes listed, as shown in Figure 5, which shows that leaves (49%), followed by whole plants (22%) and leaves and stems (14%) are the most commonly used parts. Less than 10% of the other parts are used.

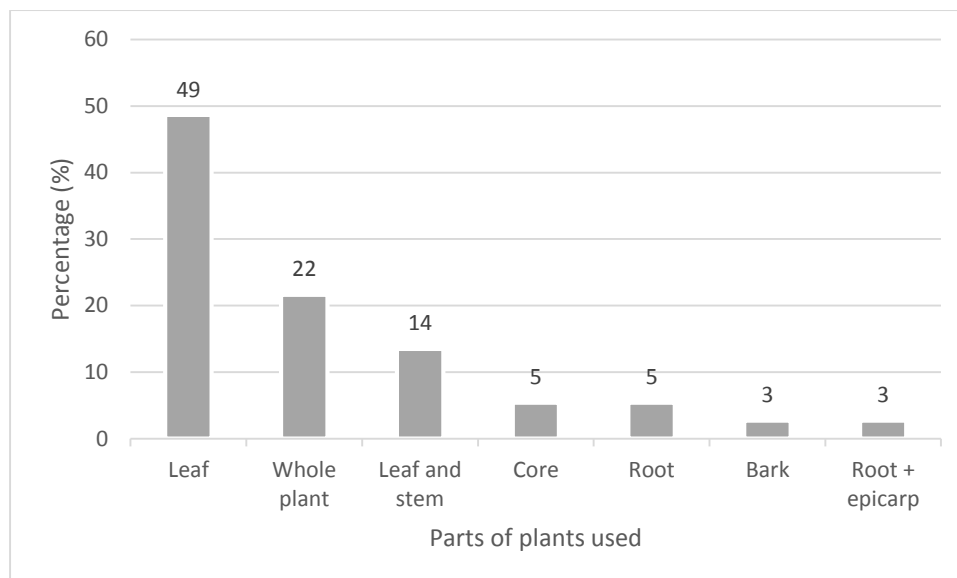


Figure 5: Parts of plants used to prepare the recipes

3.2.2 Recipe preparation methods

The informants identified 6 methods of preparation for the recipes surveyed. Trituration was the most commonly used method (34%), followed by decoction (25%). Infusion was the least used (8%) (Figure 6).

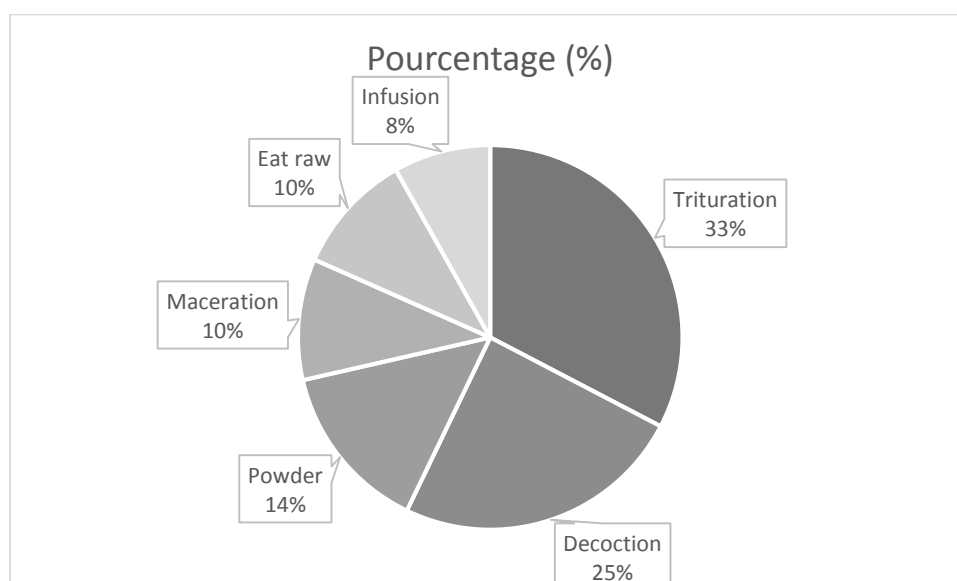


Figure 6: Recipe preparation method

3.2.3 Routes of administration

The main routes of administration are oral (91%) and anal (19%). The local route is the least used (3%) (Figure 7).

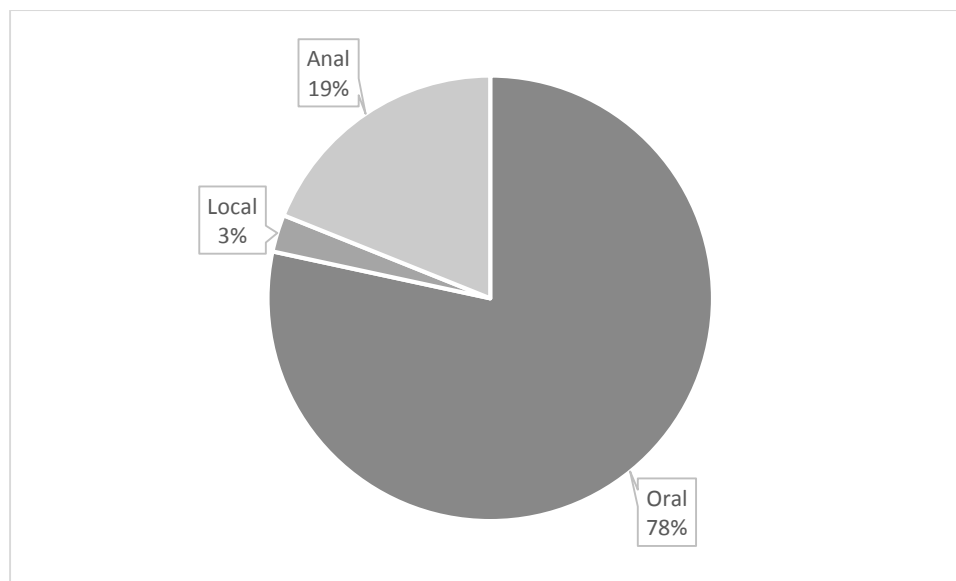


Figure 7 : Revenue administration channels

IV. DISCUSSION

The aim of this study was to identify the plants used in the treatment of childhood gastrointestinal infections in Mbouda. The ethnobotanical survey was carried out among 150 participants in the town, 145 of whom were parents with children under 5 years of age and 5 of whom were traditional healers. Of the 145 parents, 95% were women and 5% men. This can be explained by the fact that it is women who provide first aid to family members, particularly children. Among the traditional healers, 80% were male. The predominance of men could be explained by the fact that the virtues of plants are ancestral knowledge that is passed down from father to son and generally to the successor, who is very often male [13]. These results corroborate those of Tchuenguem & al., 2017 [14], where 80% of the traditional healers surveyed were male. Among the symptoms treated by the species surveyed in the town of Mbouda, abdominal pain and colic were in the majority. In children aged 0 to 6 months, colic may be due to the fact that the mother could enrich the breast milk with substances that are poorly tolerated by the baby's intestine if she consumes a large quantity of milk or dairy products. Colic may indicate an allergy to cow's milk proteins or lactose intolerance in artificially breastfed children. Abdominal pain, which is linked to food, and diarrhoea, which is due to food poisoning, are more common in children aged between 7 months and 3 years. This is justified by the fact that these children ingest everything they find, and have a weak immune system. In view of the results, oral routes of administration presented the highest percentages compared with anal routes, which would suggest that topical or oral routes would be the most suitable for treating digestive disorders. These results corroborate those of Oullai and Chamek, 2018 [15] who found that the oral route was the preferred route for the treatment of digestive diseases using plants. 35 plant species belonging to 24 families were identified. The most represented families were the Asteraceae (22%) and the leaves, the most commonly used parts. This family is among those that provide the most plants for African pharmacopoeia in general and Cameroonian pharmacopoeia in particular [(16)]. These results show some similarities with those of Tchuenguem et al., 2017 [14], who listed 47 plants from 28 families, the most represented of which was the Asteraceae. The use of these parts can be explained by their ease and speed of collection, their availability and their stability during storage. It emerged from this study that the species most commonly used in the treatment of childhood gastrointestinal infections are *Ocimum gratissimum*, *Ageratum conizoides*, *Lantana camara*, *Coffea arabica*, *Drymaria cordata*, *Eremomastax speciosa*, *Desmodium hirtum*, *Melisses officinales*, *Bidens pilosa*, *Musa acuminata*, *Pteridium aquilinum*, *Acmella caulirhiza* and *Hibiscus surattensis*. Some of these plants have been included in studies carried out by other authors. For example, in the earlier study by Makemteu et al., 2022 in Cameroon [17], these plants were used to treat a number of diseases. *Ageratum conizoides* has been reported to be used in the treatment of colic and malaria in Mbanga [17] and also in the treatment of colic by the Mpiemo people in eastern Cameroon and south-west Central Africa [18]. Several methods of preparation are used, including trituration, decoction, infusion and maceration. Users are constantly on the lookout for the easiest method of making phytomedicines. Trituration is the most widely used method, which is justified by the fact that the properties of the plant are not denatured during preparation.

V. CONCLUSION

This study shows that Mbouda has an interesting biodiversity of medicinal plants. In addition, the participants share many similarities in the use of plant species. The plants thus listed constitute a panel that can serve as a starting point for biological screening and pharmacological tests in the laboratory, especially the most frequently cited species with a good customary value.

Conflicts of interest

The authors declare no conflict of interest.

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