

## Ethnobotanical Study of Medicinal Plants Used in the Treatment of Vaginal Infections in Four Towns in Cameroon

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**Abstract:** The main objective of this study is to contribute to the knowledge of plants with antifungal and antibacterial potentials. Ethnobotanical surveys on the uses of plants cited in the traditional pharmacopoeia against vaginal infections are conducted in the markets and districts of four Cameroonian cities. The botanical data collected was recorded in the Excel 2010 version spreadsheet and processed statistically. A dendrogram showing the similarity of use of anti vaginitis plants by city and by respondents was established using the Jaccard similarity coefficient using the XIStat software. A total of 73 respondents were interviewed. The analysis of the dendrogram of similarity between the uses of plants in the four cities reveals a comparison between the knowledge of the respondents of the cities of the Center region and the dissimilarity between those of the Littoral. Thirty-four (34) plant species belonging to twenty-eight (28) plant families have been identified and the first is Asteraceae. The Guineo-Congolese phytogeographic type (12 citations) predominates. Fourteen (14) diseases and/or symptoms related to the female plant were obtained; Vaginal infections (33 citations) the first. Traditional medicines prepared are mostly preserved at room temperature (41%). Sexual intercourse comes first (37%), as a prohibition that can damage the treatment. Given the upsurge in vaginal infections in Africa, it is essential to develop a strategy to find effective means of control and especially at a lower cost to propose an alternative to conventional therapy.

**Keywords:** Antibacterial, Candidiasis, Itching, Traditional pharmacopoeia, Ethnobotany, Cameroon.

## **INTRODUCTION**

Infectious diseases are a major threat to human health. The incidence and mortality of these infections are influenced by the characteristics of the population at risk, the availability of medical care, the distribution of responsible species and the prevalence of resistance [1].

Vaginal infections can have several causes, the most common being fungal infections, of which *Candida albicans* is the most common; and those caused by bacteria, causing bacterial vaginitis. They occur in disorders such that they may affect the fragile area of the female reproductive system (mycoses, itching).

When the delicate balance of the vagina is disturbed, fungi develop disorderly, causing intense itching and burning. Candidiasis can also occur by thick, whitish or yellowish flows. This disease can be

caused by a number of phenomena that are unrelated to sexual intercourse including menstruation, pregnancy, menopause, antibiotics, diabetes, obesity, excessive use of salts of bath or soap strippers. Too tight panties, vaginal deodorants, vaginal douches, herbs or other substances inserted into the vagina are also factors of spread of genital candidiasis [2-4].

Surveys have shown that vaginal infections are frequent in Cameroon (etiologically and 51,745 cases of sexually transmitted infections notified and treated at national level in 2009), gonorrhea remains the first (sexually transmitted infection (STI) With 32.5%, followed by syphilis (29.7%), Trichomonas disease (25.7%), Chlamydia (8%) and chancroid (4.1%) [5]. Studies of their herbal treatment remain embryonic and scattered. However, in view of the upsurge in vaginal infections in Africa (more precisely in Cameroon), it is essential, even imperative, to set up a strategy to find

effective means of control at a lower cost and above all to propose an alternative to conventional therapeutics.

Results of the previous studies as well as the bibliographic and ethnobotanical data show that several plant extracts and their compounds have antibacterial and antifungal activities [6]. Among bacteria and fungi (yeasts) sensitive to plant extracts, several are responsible for vaginal infections.

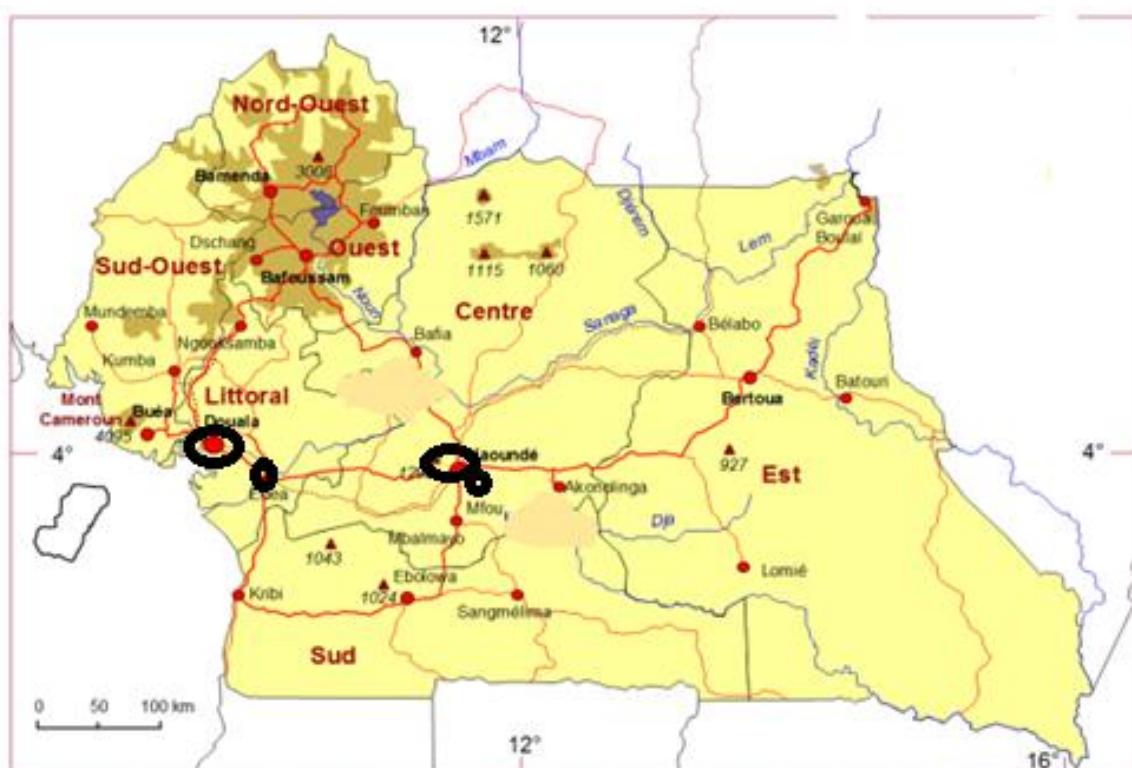
The main objective of this study is to contribute to the knowledge of plants with antifungal and antibacterial potentials. Specific objectives are to: (1) identify respondents, (2) characterize the medicinal florule and (3) identify medicinal recipes.

## MATERIALS AND METHODS

### Study sites

Located between latitudes  $1^{\circ} 40N$  and  $13^{\circ} 05N$  and longitudes  $8^{\circ} 30E$  and  $16^{\circ} 10E$ , Cameroon covers an area of 475 475 km<sup>2</sup>. It has a shape close to that of a triangle and shares 4700 km of borders with Nigeria, Chad, Central African Republic, Congo (Brazzaville), Gabon and Equatorial Guinea. It opens onto the Atlantic Ocean on a 400-km coastline.

Douala, Edéa, Yaoundé and Mfou, respectively the economic, industrial, political capitals of Cameroon and a small community in the Center region, were selected because of their representativeness and cultural diversity (Figure-1).



**Fig-1: Location map of the surveyed sites (Douala, Edéa, Mfou, Yaoundé) in the southern half of Cameroon.**

Source: Geographical Division of the Ministry of Foreign Affairs. Study sites

### Ethnobotanical survey methodology

Ethnobotanical surveys on the uses of plants cited in the traditional pharmacopoeia against vaginal infections were conducted in markets of four Cameroonian cities (a major city and a neighboring small town in the center region, Yaoundé and Mfou) and the Littoral (Douala and Edéa). The choice of small towns was made based on the proximity with the major cities and the presence of tangled relics existing forest. The choice of markets is justified by the fact that the Mokolo Market and the Goat Market are the largest of the two major cities in terms of the sales of medicinal plants [7-9].

The respondents' approach (sellers of medicinal plants in major cities or inhabitants of small towns, holders of knowledge in traditional medicine), whose age ranged between 20 and 75 years, was based on dialogue in French and local languages with the aim of obtaining a sample of at least 30 respondents. People surveyed gave all the information on medicinal plants used in the treatment of infectious diseases and only, vaginal infections and other diseases of the urinary system were registered. In addition, the gender and age of each respondent were also recorded. Respondents were considered young when their age ranged between 20 and 40 years, as adults if they were between 41 and 60, and elderly if they were older than 60 years.

Botanical descriptions of medicinal plants encountered were supplemented by information provided by authors such as [10]. Those from plant identification sites such as Prota 4U and those collected at the National Herbarium of Cameroon.

Florula was characterized by phytogeographical distribution types, morphological types, types of biotopes, and types and means of distribution of diaspores [11].

#### Statistical analysis of data

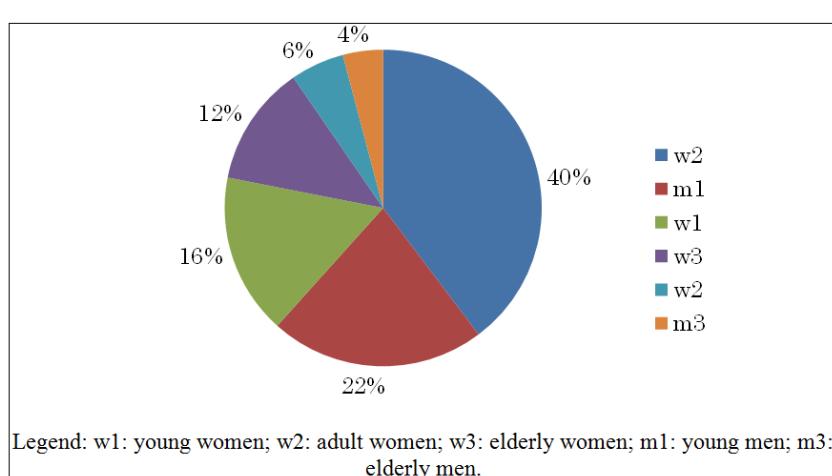
Data collected was saved in the Excel 2010 Version spreadsheet and processed. A dendrogram showing the similarity of use of anti vaginitis plants by city and by respondent was established using the

Jaccard similarity coefficient using XIStat software. Calculation of this coefficient is based on the mere presence or absence of a species in a recipe cited by a respondent of a given site. It measures the degree of association of species and the level of similarity between recipes taking into account the plants that are used there [12-13].

#### RESULTS AND DISCUSSIONS

##### Information on respondents

A total of 29 adult women out of 73 respondents (40%) were able to give traditional recipes for the treatment of vaginal infections, followed by young men with 16%, 12 young women (16%), 9 (6%) and 3 elderly men (4%) (Figure-2).

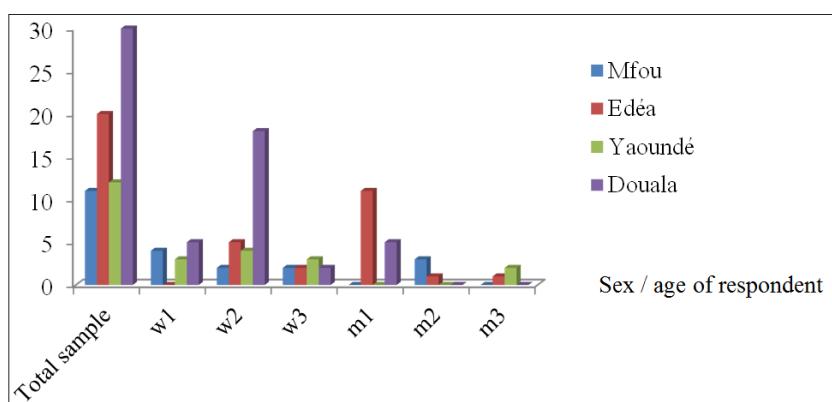


**Fig-2: Percentage of respondents by sex and age group as a percentage**

Out of a total of 73 respondents, Douala counts 30, Edéa 20, Yaoundé 12 and Mfou 11. Women outnumber men with a total of 50 women including 29 adults, 12 young people and 9 senior women against 23

men Including 16 young people, 4 adults and 3 senior men (Figure-3).

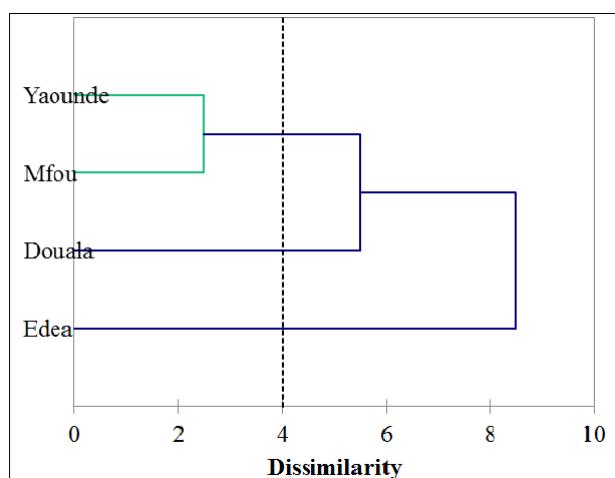
#### Effective



**Fig-4: Weighted spectrum of respondents by sex and age group.**

The dendrogram determines whether the respondents' knowledge converges. Analysis of this dendrogram reveals a comparison between the knowledge of respondents of the towns of the Center region (Yaoundé and Mfou), the dissimilarity between

Douala and Edéa; Douala and Yaoundé as well as Edea and Yaoundé (Figure-3).

**Similarity of respondents' knowledge****Towns****Fig-4: Dendrogram of respondent's knowledge****Plant characterization**

A total of thirty-four (34) plant species belonging to twenty-eight (28) plant families were listed: *Cylcodiscus gabunensis* Harms (10 citations), *Aloe vera* Linn. (8), *Alchornea cordifolia* (Sch. & Thonn.) Müll. Arg. (5), *Mammea africana* (Sabine) (5), *Ageratum conyzoides* Linn. (5), *Antrocaryon klaineanum* Stone (4), *Myrianthus arboreus* P. Beauvois (3), *Monodora myristica* (Dunal) (2), *Commelina benghalensis* Linn., *Piptadeniastrum africanum* (Hook.f.) Brenan *Ricinodendron heudelotii* Müll.Arg. (2), *Dissotis rotundifolia* (Sm.) Triana (2), *Guibourtia tessmannii* (Harms) J.Léonard (2), *Sida rhombifolia* Hochr. (1), *Alstonia boonei* De Wild. (1), *Vernonia amygdalina* Del (1), *Emilia coccinea* (Sims) G.Don (1), *Annickia chlorantha* (Oliv.) Setten & P. J. Maas (1), *Entandrophragma cylindricum* (Sprague) (1), *Nicotiana tabacum* (1), *Baillonella toxisperma* Pierre (1), *Allium* sp. (1), *Irvingia gabonensis* (Aubry-Le comte ex O'rourke) Baill. (1), *Portulaca oleacera* Linn. (1), *Lantana camara* Linn. (1), *Sida cordifolia* Linn. (1), *Camellia sinensis* (L.) Kuntze (1), *Solanum melongena* Linn. (1), *Carica papaya* Linn (1), *Triumfetta pentandra* A.Rich.(1), *Citrus limon* Linn. (1), *Zingiber officinale* Linn. (1), *Ocimum basilicum* Linn. (1), *Passiflora foetida* Linn. (1).

Six families are mostly represented, including Asteraceae with three (3) species, Eupobiaceae, Fabaceae, Annonaceae, Solanaceae and Malvaceae (2 species each). The least represented are Portulacaceae, Theaceae, Sapotaceae, Caricaceae, Verbenaceae, Apocynaceae, Rutaceae, Meliaceae, Lamiaceae, Irvingiaceae, Tiliaceae, Moraceae, Zingiberaceae, Passifloraceae and Liliaceae families(1 species each).

**Phytogeographical Distribution**

Amongst the twelve types of phytogeographical distributions represented, Guineo-

Congolese type (12 quotations) is the major, followed closely by Pantropical (9), Afro-tropical (6) types. Other types: African American, Asian, Central Guineo-Congolese, Cosmopolitan, Guinean, Guineo-Sudano-Zambezian, Paleo Tropical, Sudanese-Zambezian and Western Guinean, each have a single citation.

**Types of Biotope**

Eight types of biotope were recorded: crops (10 quotes), primary forests (9), secondary forests (5), ruderal environment (4), savanna and fallow (2), hydromorphous forest and Forest edge (1).

**Morphological types**

Seven morphological types were recorded: trees (47%), annual herbaceous plants (22%), perennial herbaceous plants (15%), shrubs (11%), bushes (3%) and stipes (1%). And lianas (1%).

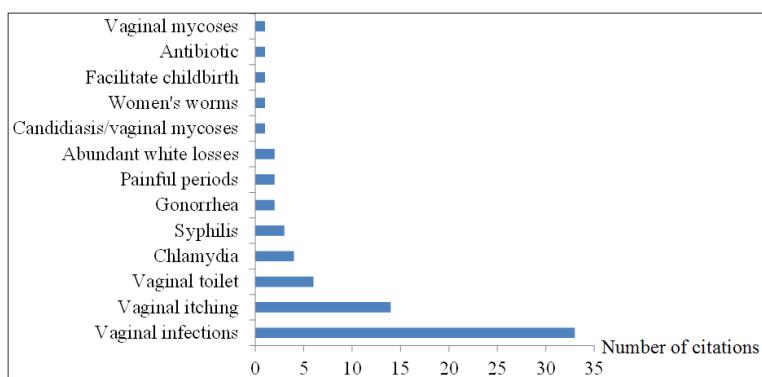
**Types of diaspores and means of diaspore distribution**

The types of diaspores recorded are sarcochorus (16 quotes), ballochore (6), sclerochore and pogonochore (2 quotes each), desmochore and barochore (1 citation each).

An overall of three modes of diaspore distribution were obtained: zoothochory (44%), anemochory (33%) and autochory (23%).

**Characterization of revenue****Diseases treated**

Fourteen (14) diseases and / or symptoms related to the female plant were recorded; Vaginal itching (6), chlamydia (4), syphilis and gonorrhea (3), painful periods and abundant white discharge (2), vaginal candidiasis, Antibiotics, vaginal mycoses, gonorrhea (1) (Figure-5).

**Itchings****Fig-5: Weighted spectrum of diseases by number of citations.****Used Parts**

Plant parts and / or organs used for the treatment of vaginal infections are barks (35 citations), leaves (20), whole plant (4), leaves / stems and roots (3), bulb, Bark / leaf, leaf / root, leaf / sap, leaf / stem / seed and fruit (1).

**Modes of preparation**

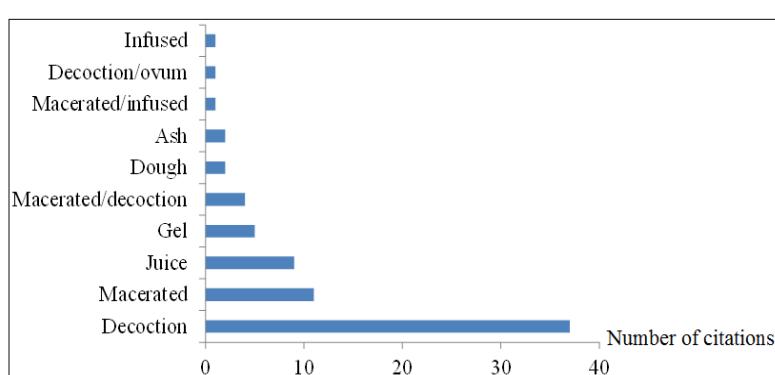
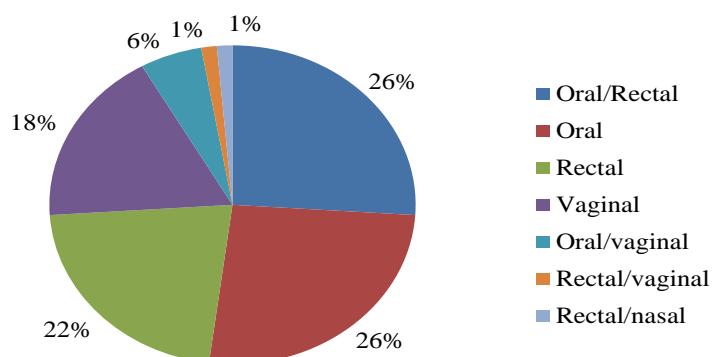
The most frequently used preparation is decoction followed by trituration (13), maceration (12), grinding and maceration / decoction (4), pressing, infusion and maceration / infusion (1).

**Forms of use**

The decocted form remains the first form of use (38 citations), followed by macerated (12) (Figure-6).

**Routes of administration**

Seven routes of administration were obtained: oral (26%), rectal (22%), vaginal (18%), oral / vaginal (6%), rectal / vaginal and rectal / nasal (1%) (Figure-7).

**Use patterns****Fig-6: Weighted spectrum of use patterns by number of citations.****Fig-7: Diagram of Pathways as a Percentage.**

#### Modes of conservation

Traditionally prepared medicines are predominantly stored at room temperatures (41%) not exceeding 25 °C, wet (26%) and cool (19%). A large proportion of the drug cannot be preserved (14%), followed immediately by the preparation.

#### What to avoid during treatment

Amongst the two types of bans reported, sexual intercourse was first (37%) followed by alcohol (8%). The majority of revenue (55%) has no ban.

### DISCUSSION

#### Information on respondents

The study shows that the treatment of infectious diseases, especially vaginal infections is controlled by adult women and to a lesser extent by young men certainly concerned about their intimate well-being. Plant treatment of vaginal infections is of little interest to young women and may be due to their preference for modern medicine and their lack of interest in herbal therapist or traditional health practitioner. Moreover, very few young people (28 out of a total of 73 respondents) who are probably supporters of rural exodus, practice this activity [14].

Douala is the most densely populated city in Cameroon and there are all the cultures of the country, this probably explains why this major city has a greater number of sellers of medicinal plants than all the other cities [9]. Small towns near major cities have reduced numbers, as sellers of medicinal plants are becoming scarce and people with traditional know-how refuse to pass it on to foreigners; Those who agree to do so ask for a compensation in justifying it by tradition. It would therefore be essential to carry out a thorough pharmacological study of the different plants, in order to make their use efficient and effective, for the curative treatment of the aforementioned pathologies.

The dendrogram shows that populations of the Center use virtually the same plants to treat vaginal infections while those in the Littoral do not. The explanation would be the cultural diversity observed in the city of Douala as also think [12] who have inventoried the anti hemorrhoidal plants in Congo. But this dissimilarity would also testify to the cultural and even plant diversity between the populations and their respective living environments. It would then be necessary to identify and study in depth the plants and the recipes of these two regions, in order to improve them by a possible synthesis of knowledge.

#### Characterization of the medicinal florula

To cite only those two plants that are among the most cited in the traditional treatment of vaginal infections in the study area, namely *Alchornea cordifolia* and *Cylcodiscus gabunensis*, several studies

have justified their use in the treatment of target diseases.

*Alchornea cordifolia*, one of the most frequently cited plants, is also used in the Congo in the treatment of vaginitis and appears like all others in the treatment of various other ailments [13]. Aqueous and ethylacetate extracts of *Alchornea cordifolia* have potentials to improve infertility associated with low spermatogenesis through its chemical contents, antioxidant and antimicrobial activities [15].

*Alchornea cordifolia*'s aqueous and Ethyl Acetate extracts have bactericidal and bacteriostatic activity on some Gram + bacteria as well as other Gram - bacteria [16].

The hydroethanolic extracts have no activity on *Staphylococcus aureus* but have a bactericidal activity on two bacteria responsible for vaginal infections [17].

Leaf extracts also have inhibitory effects on *Candida albicans* [1]. Extracts with hexane also have inhibitory, bacteriostatic and bactericidal activities on certain germs responsible for vaginal infections (*Staphylococcus aureus*, *Escherichia coli* and *Proteus spp*) [18].

In regards to the Ethyl Acetate extract of the bark of *Cylcodiscus gabunensis* has been shown to have antimicrobial properties on *Staphylococcus aureus* and *Proteus vulgaris*, which are also responsible for vaginal infections [19].

For the treatment of vaginal infections, the most represented phytogeographic types are Guineo-Congolese, Pantropical and Afrotropical, revealing that populations use local plants to treat vaginal infections [6, 9].

Moreover, the most widely used plant species are respectively grown, taken from primary forest, secondary forest and taken close to homes. [14] also point out that people are much more proficient in the local pharmacopoeia and have also learned to domesticate species that are of great interest to them.

Non-timber forest products used for the treatment of vaginal infections mostly come from trees, annual herbaceous plants and perennials. It is clear that forest resources remain the most important for traditional pharmacopoeia [14]. Sarcochor species being the most widely represented [20], the most abundant modes of dissemination are zoochory and anemomorphory. Animals and wind would be essential for the conservation and perpetuation of anti-vaginitis plants [14].

**Revenue Census**

The most common diseases affecting the female reproductive system are vaginal infections and the plant parts and / or organs used for treatment remain barks and leaves. These organs are also those which contain mostly secondary metabolites, hence their use for the treatment of diseases such as syphilis [6] and hemorrhoids [9].

The decoctus form remains the first form of use (38 citations) [14, 20, 21] followed by macerated, hence the need to study these two types of extracts which would make it possible to obtain effective drugs.

The most commonly used routes of administration are the oral, rectal and vaginal routes, probably because the drug has a general but also local action. Traditional medicines are predominantly stored at room temperature (41%), but others are used directly to avoid any denaturation of the active ingredients. Of the two types of bans observed during the traditional vaginal medication, sexual intercourse was first (37%) followed by alcohol (8%). This would avoid any further contamination in terms of sexual intercourse on the one hand and cessation of treatment with regard to alcohol intake on the other.

The majority of receipts (55%) have no ban and sexual activity or drinking would have no disadvantage in the treatment.

**CONCLUSION**

The study carried out in the Goat market in Douala and Mokolo in Yaoundé on the one hand and in the cities Edéa and Mfou on the other hand allowed to count 34 species used against vaginal infections. These species are divided into 21 families. The main families recorded are Asteraceae and Euphorbiaceae. Woody trees (69%) predominate compared to grasses (31%). The most commonly used vegetative organs are barks and leaves. In the dosage proposed by the interviewees, the decoction and maceration dominate. Guineo-Congolese and pantropical species are the most represented.

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