

Full Length Research Paper

Ethnobotanical survey and phytochemical screening of some plants used against human fungal diseases in Buea, Cameroon

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Human fungal infections remain a burden worldwide, due to resistance to existing antibiotics. Developing antifungal drugs from plant secondary metabolites is good because they are cheap, highly available and have less side effects. This study sought to identify and assess the potential of plants used against human fungal diseases in Buea, Southwest Region of Cameroon. Semi-structured questionnaires were administered to participants in five villages. Identified plants were ranked and the top five most frequently cited screened for phytochemicals. Twenty-nine plant species belonging to 22 families were used to treat eight different human fungal diseases. The highest number (11) of plants was reported for the treatment of Eczema. The most represented family was Asteraceae with three species, followed by Arecaceae, Cucurbitaceae, Rutaceae and Zingiberaceae with two species each while the other families had one species each. The most used (60%) plant parts were leaves. Maceration was the most used method of preparation, while route of administration was mostly topical. The screening indicated the presence of alkaloids, steroids, tannins, cardiac glycosides, saponins and flavonoids in the different species, and in various proportions. Saponins were found in all the five plants, with *Senna alata* and *Commelina benghalensis* extracts having more than other species. Although the degree of presence varied with species and solvent, overall, *S. alata* had most of the bioactive compounds while *Allium sativum* recorded the least. The results of the study highlight the role of indigenous knowledge in the identification of plants used for primary healthcare and indicate that the documented plants have potential pharmaceutical properties that could be exploited for the manufacture of antifungal drugs, necessitating their wise exploitation and conservation.

Key words: Ethnobotanical study, phytochemical screening, plants, human fungal diseases, Buea.

INTRODUCTION

Human fungal diseases pose a significant, but often overlooked burden on public health, affecting over one billion people worldwide (Brown et al., 2012). They are significant cause of morbidity and mortality in humans

(Ravikant et al., 2015). A fungus that invades the tissue can cause a disease that is confined to the skin, spread to the tissue, the bones and organs or affects the whole body (Nazzaro et al., 2017). Approximately 625 fungal species

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have been reported to infect vertebrates, 200 of which can be human associated, either as commensals and members of our microbiome or as pathogens that cause infectious diseases (Kobayashi, 1996; Fisher et al., 2020). According to Casadevall et al. (2019), human fungal infections range from superficial infections (hair, skin, nails or mucosal surfaces, which are usually benign and other ailments including allergies) through cutaneous infections to systemic or deep infection depending on the degree of tissue involvement and the host response to the pathogen. The symptoms of fungal infection include; patches, scaling, and irritable, thickened or peeling skin. Sometimes infections are alongside with blisters and unpleasant odour (Martin and Ernst, 2004). Secondary infection include: deafness and skin lesions (Mandengue and Denning, 2018). Infection of the mouth and skin is common in tropical developing countries (Al-Fatimi, 2019). The most common type of infection is ringworm (*Tinea corporis*), which appears as circular scaly patches on areas of the skin, caused by *Trichophyton*, *Microsporum*, and *Epidermophyton* species; athlete's foot (*Tinea pedis*), which is scaling and cracking of the feet, especially around and between toes, caused by *Trichophyton rubrum*, *Trichophyton mentagrophytes*, *Trichophyton interdigitale*, *Epidermophyton floccosum* and *Tinea cruris* (Jock itch), which occurs in the genital and upper thigh area, caused by *Trichophyton* spp. (Focho et al., 2009).

Antifungal drugs, primarily topical, oral, and intravenous, are used to treat various types of fungal infections. Commonly used antifungal drugs contain different types of broad categories of components such as azole, echinocandin, and polyenes (Teixeira et al., 2022). Although a large number of these drugs are commercially available, only few of them are really effective (Pfaller et al., 2011). The increased use of antifungal agents has resulted in the development of resistance to these drugs (Kaushik and Agarwa, 2019). In recent years, medicinal plants have attracted much attention because of their uses and many benefits, such as decreased expenses and fewer side effects (Mossiavand et al., 2025). Medicinal plants are considered a rich source of antimicrobial agents and therefore can be used as antimicrobial remedies because they produce secondary metabolites (Momeni et al., 2021). Treatment of infections using plants is an ancient traditional practice which today is strongly supported by phytochemical analysis. This research work therefore aimed at identifying the different plants used in treating human fungal diseases and screening for secondary metabolites of some of the plants in Buea, with the hope that results could be exploited by the pharmaceutical and cosmetic industries.

MATERIALS AND METHODS

Description of study area

The study was carried out in Buea (Figure 1), located between

latitude 3°57' – 4°27' N and longitude 8°58' – 9°24' E. It has an equatorial climate with two seasons: the rainy and the dry season. The dry season runs from November to February and the rainy season from March to October. The annual rainfall varies between 3000 mm and 5000 mm and the mean annual temperature is about 25°C (National Community-driven Development Program, 2012). The indigenous inhabitants of Buea belong to the Bakweri tribe. An estimated total of 800,000 people live in Buea (including the villages of Bokwaongo, Muea, Bomaka, Tole, Mile 16 (Bolifamba), Mile 17, Mile 15, Mile 14 (Dibanda), Great Soppo, Molyko, Small Soppo, Bwitingi, Mile 18 (Wonyamavio), Lower farms, Bokwai, Bonduma, Sandpit, Wonyamongo, Bulu and Bokova) (Helder et al., 2013). Buea is a highly complex community caught between a blend of urban, semi urban, rural and traditional settings. There is one state university, University of Buea, and several other Private Higher Education Institutions (PHEIs). The population is made up of Christians (90%) of various denominations and Muslims (10%). Due to the volcanic origin, the surrounding soil is rich in nutrients and provides high fertility for both natural vegetation and farmland (Ghong et al., 2023).

Both subsistence and plantation agriculture are practiced in the municipality. Local inhabitants are involved in small scale (subsistence) agriculture for domestic and commercial purposes while the Cameroon Development Corporation (CDC) and the Cameroon Tea Estate (CTE) have plantations for Banana and Tea cultivation respectively. The different plantations employ people both from within and out of the municipality. Being an academic environment, many other people living there are students and associated instructors while others are involved in *petit* and large-scale businesses. Buea has one main Health District (Buea Health District), which is divided into seven smaller health areas which include: Bokwango, Buea Town, Tole, Bova, Buea Road, Molyko and Muea. According to a 2004 survey carried out by the Ministry of Public Health in Cameroon, about 40% of the population of Buea do not have access to quality health care while close to 60% have financial difficulties to afford basic healthcare services (National Community-driven Development Program, 2012).

Identification of plants used for the treatment of human fungal diseases in Buea.

Ethnobotanical survey was carried out in five villages: Molyko, Great Soppo, Bokwai, Bwitingi, and Bulu. 200 semi-structured questionnaires were administered to traditional healers and inhabitants of the different villages. This was carried out, after obtaining permission from the traditional heads of the villages and the consent of the participants. The questionnaires consisted of three parts: part A was focused on demography, part B on peoples' perception of plants used against different fungal ailments and part C, other uses of the plants. Some of the mentioned plants were identified in the field, while those that could not be identified were taken to the Limbe Botanic Garden herbarium for identification, where voucher specimens were deposited and all the plants were classified by growth form. The data collected were quantitatively analyzed for the following indices: Use Value (UV), Relative Frequency of Citation (RFC), Frequency of Citation (FC), and Fidelity Level (FL).

Phytochemical screening of some plants for metabolites against fungal infection

Following identification, the plants were ranked and the top five plants most frequently cited were qualitatively screened for alkaloids, flavonoids, cardiac glycosides, phenols, saponins, steroids and tannins (Trease and Evans, 1989; Christen, 2000; Young and Woodside, 2001; MacNee, 2005). These species were; *Senna alata* L. (FC=200), *Carica papaya* L. (FC=130), *Commelina benghalensis*

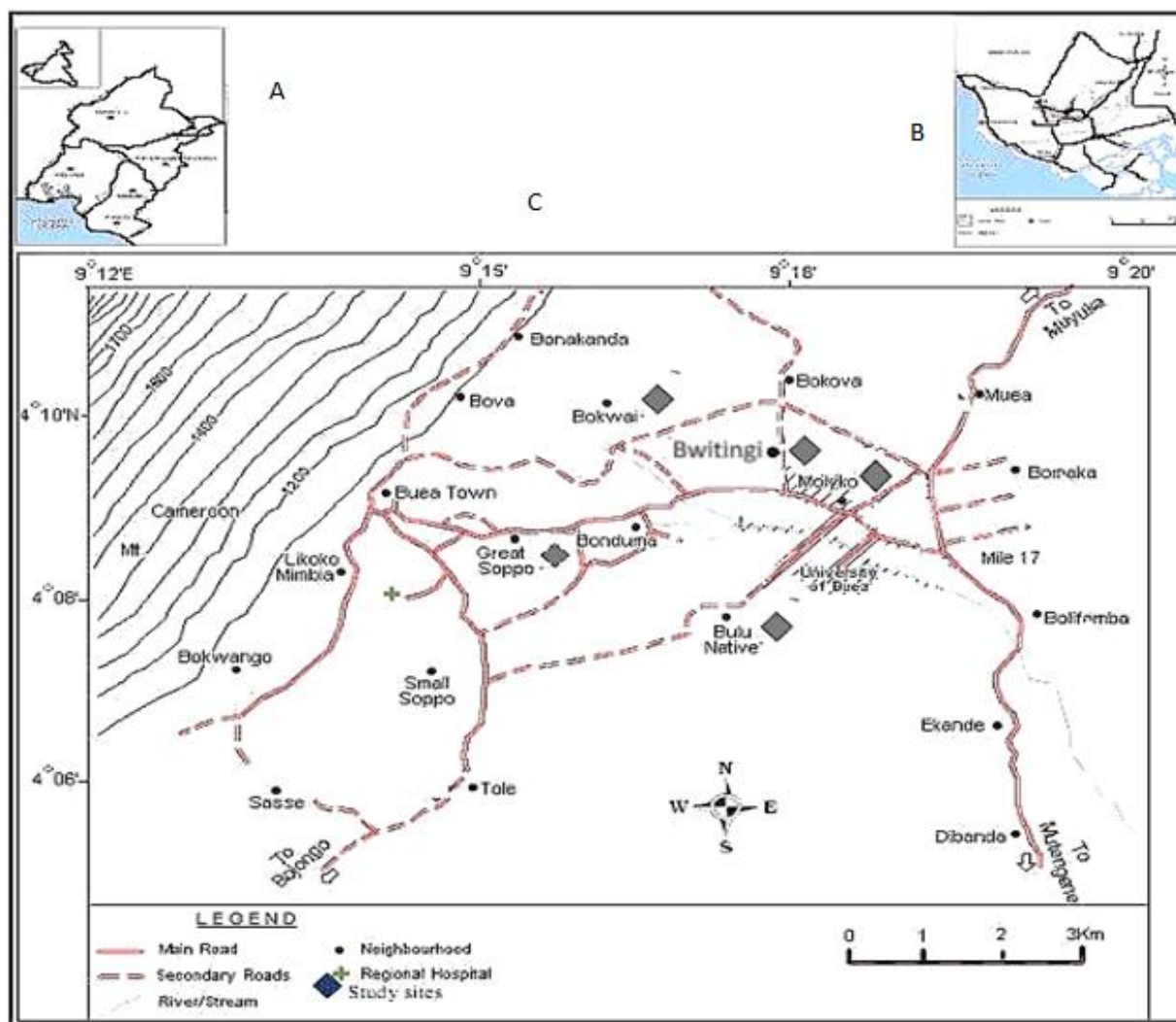


Figure 1. Spatial layout showing study sites in Buea, Southwest Region, Cameroon. A, South west region; B, Fako Division; C, Buea municipality.

Source: Ntangsi et al. (2004).

L. (FC=120), *Allium sativum* L. (FC=100), and *Vernonia amygdalina* L. (FC=100).

Each of the plants was extracted in the following solvents: methylene chloride, methanol and distilled water, following standard procedures (Saio and Syiem, 2015). Methylene chloride and methanol were recovered under reduced pressure through a rotary evaporator (BUCHI Rotavapor R-200) at 50°C, while the water extract was concentrated by drying through the oven at 40°C. Residual solvent was removed by air drying at room temperature (23-25°C). The extracts were stored at -20°C until used. An aliquot of each sample was used for phytochemical screening as reported by Afaq et al. (2024) and Ndam et al. (2014).

RESULTS

Demographic information of the studied population

The 200 questionnaires administered were recovered. Demographic characteristics of the respondents are

shown in Table 1. The majority of the respondents were female (65%) within the ages of 51-61 years while the least respondents (13%) were 62 years and above. Most of the respondents were Christians (94%), and (32%) had attained secondary level of education. The highest occupation of the population was farmers (30.5%), who had lived in these communities for more than 5 years.

Plants used in the treatment of human fungal diseases in Buea

A total of 29 plants species belonging to 22 families and 28 genera were recorded as being used in the treatment of eight fungal diseases (Table 2). The plants were used to treat ailments ranging from superficial infections to systemic infections including ringworm, eczema, dandruff,

Table 1. Demographics of the respondents.

Variable	Category	Number of respondents	%
Gender	Male	70	35
	Female	130	65
Age	18-28	31	15.5
	29-39	41	20.5
	40-50	35	17.5
	51-61	67	33.5
	>62	26	13
Religious background	Christian	188	94
	Muslim	10	5
	Herbalists	2	1
Level of education	No formal education	23	11.5
	Holder of FSLC	38	19
	GCE 'O' level	64	32
	GCE 'A' level	35	17.5
	University degree	31	15.5
Marital status	Single	68	34
	Married	119	59.5
	Widow	13	6.5
Occupation	Teacher	38	19
	Farmer	61	30.5
	Trader	55	27.5
	Student	34	17
	Traditional practitioner	12	6
Duration of stay	<5 years	42	21
	5-10 years	97	48.5
	>10 years	61	30.5

nail fungi, aphthae, acne, athlete's foot and internal fungi. Amongst the diseases observed, eczema had the highest number (11) of plants used for its treatment. The most represented family was Asteraceae with three species, followed by Arecaceae, Cucurbitaceae, Rutaceae, and Zingiberaceae with 2 species each, while the rest of the families had one species each. *S. alata* had the highest frequency of citation (FC=200) followed by *C. papaya* (FC=130) and *C. benghalensis* (FC=120). The least frequency of citation (FC=9) was recorded by *Afrostryax lepidophyllus*. The highest fidelity level (FL = 100) was recorded in *Ficus exasperata*, *Zingiber officinale* and *Ageratum conyzoides*, while the least was recorded in *Afrostryax lepidophyllus*. It was observed that maceration was the highest method of preparation (35%) while grinding was the least used method (8%) (Table 3). The highest mode of administration was topical while enema was the least. Plant part used varied with sites. However, leaves were highly used than other parts (Figure 2). The

habits of the plants included shrubs, trees, herbs and climbers. Shrubs and herbs dominated in Molyko, Great Soppo and Bulu while trees were the most reported habit for Bwitingi and Bokwai (Figure 3).

Phytochemical constituents of the screened plants

Results of the phytochemical constituents of the five screened plants are shown in Table 4. Saponins were found in all five plants, with *S. alata* and *C. benghalensis* extracts having high contents than other species. Steroids were found in high concentrations in the *V. amygdalina*, *C. papaya* and *C. benghalensis* when methylene chloride was used, while absent for the rest of the plants. The highest concentrations of tannins were found in *S. alata* while *C. papaya* had the least. *V. amygdalina* extract did not contain tannins. Cardiac glycosides were present in four of the plant extracts, with *S. alata* and *V. amygdalina*

Table 2. Checklist of plants used in the treatment of fungal diseases and their frequency of citation in the different study sites in Buea.

S/N	Family	Species	Common Names	Habits of the plants	Type of fungi diseases treated	Plant parts used	Study sites/FC					Total FC	RFC	UV	FL (%)
							M	GS	Bu	Bw	Bo				
1	Acanthaceae	<i>Eremomastax speciosa</i> (Hochst.) Cufod.	Two-sided leaf	Herb	Internal fungal (njitinjiti)	Leaves	10	10	15	5	5	45	0.23	0.23	34.35
2	Amaryllidaceae	<i>Allium sativum</i> L.	Garlic	Herb	Ringworm	Bulb	24	38	25	8	5	100	0.50	0.50	37.31
3	Araliaceae	<i>Panax ginseng</i> C.A.Mey.	Ginseng	Tree	Eczema	Leaves	13	10	0	5	2	30	0.15	0.15	5.29
4	Arecaceae	<i>Cocos nucifera</i> L.	Coconut	Tree	Dandruff	Fruits	0	0	5	2	3	10	0.05	0.05	7.14
		<i>Elaeis guineensis</i> Jacq.	Palm tree	Tree	Ringworm	Nuts	2	8	10	1	0	21	0.11	0.11	7.84
5	Asphodelaceae	<i>Aloe vera</i> (L.) Burm.f.	Aloe vera	Herb	Acne	Leaves/Juice	10	15	20	5	5	55	0.28	0.28	26.19
6	Asteraceae	<i>Ageratum conyzoides</i> L.	King grass	Herb	Athlete's foot	Leaves	0	2	8	3	2	15	0.08	0.08	100
		<i>Emilia coccinea</i> (Sims) G. Don	Rabbit grass	Herb	Ringworm	Leaves	0	3	2	5	5	15	0.08	0.08	5.60
		<i>Vernonia amygdalina</i> L.	Bitter leaf	Shrub	Dandruff	Leaves	27	40	24	12	7	100	0.50	0.50	71.43
7	Caricaceae	<i>Carica papaya</i> L.	Pawpaw	Tree	Eczema	Leaves	40	50	22	10	8	130	0.65	0.65	22.93
8	Commelinaceae	<i>Commelina benghalensis</i> L.	Johnny walker	Creeping herb	Ringworm	Whole plant	35	40	25	12	8	120	0.60	0.60	44.78
9	Convolvulaceae	<i>Ipomoea batatas</i> (L.) Lam.	Sweet potato	Creeping herb	Ringworm	Leaves	0	1	4	2	5	12	0.06	0.06	4.48
10	Cucurbitaceae	<i>Cucumis sativus</i> L.	Cucumber	Climber	Acne	Fruit	21	20	5	8	6	60	0.30	0.30	28.57
		<i>Cucumeropsis mannii</i> Naudin	"Country egusi"	Climber	Internal fungi ("njiti njiti")	Leaves	5	10	8	7	6	36	0.18	0.18	27.48
11	Euphorbiaceae	<i>Euphorbia hirta</i> L.	Hairy purge	Herb	Eczema	Leaves	0	2	4	2	2	10	0.05	0.05	1.76
12	Fabaceae	<i>Senna alata</i> L.	Ringworm brush	Shrub	Eczema	Leaves	87	60	28	15	10	200	1.00	1.00	35.27
		<i>Cajanus cajan</i> (L.) Millsp.	Pigeon pea	Tree	Eczema	Leaves	3	1	4	1	1	10	0.05	0.05	1.76
13	Huaceae	<i>Afrotyrax lepidophyllus</i> Mildbr.	Country Onion	Tree	Eczema	Seeds	2	0	5	1	1	9	0.05	0.05	1.59
14	Lamiaceae	<i>Ocimum gratissimum</i> L.	Masepo	Shrub	"Njiti njiti"	Leaves	15	10	10	10	5	50	0.25	0.25	38.17
15	Maliaceae	<i>Azadirachta indica</i> A.Juss	Neem plant	Tree	Eczema	Leaves	20	10	5	3	0	38	0.19	0.19	6.70
16	Moraceae	<i>Ficus exasperata</i> Vahl.	Sand leaf	Tree	Aphthae	Leaves	15	20	12	8	4	59	0.30	0.30	100
17	Moringaceae	<i>Moringa oleifera</i> Lam.	Moringa	Tree	Eczema	Leaves	20	15	5	0	2	42	0.21	0.21	7.41
18	Myrtaceae	<i>Psidium guajava</i> L.	Guava leaves	Tree	Eczema	Leaves	10	20	8	2	0	40	0.20	0.20	7.05
19	Rutaceae	<i>Citrus limon</i> (L.) Osbeck	Lemon	Tree	Acne	Fruits	24	12	15	0	4	55	0.28	0.28	26.19
		<i>Citrus aurantifolia</i> (Christm.) Swingle	Lime	Tree	Acne	Fruits	15	10	13	2	0	40	0.20	0.20	19.05
20	Sapotaceae	<i>Vitellaria paradoxa</i> C.F.Gaertn.	Shea butter	Tree	Dandruff	Seed	20	5	4	1	0	30	0.15	0.15	21.43
21	Talinaceae	<i>Talinum fruticosum</i> (L.) Juss.	Water leaf	Herb	Eczema	Leaves	3	5	10	5	3	26	0.13	0.13	4.59
22	Zingiberaceae	<i>Zingiber officinale</i> Roscoe	Ginger	Herb	Nail fungi	Rhizome	20	25	18	2	1	66	0.33	0.33	100
		<i>Curcuma longa</i> L.	Turmeric powder	Herb	Eczema	Rhizome	15	10	5	2	0	32	0.16	0.16	5.64

FC: Frequency of citation; M: Molyko; GS: Great Soppo; Bu: Bulu; Bw: Bwitingi; Bo: Bokwai; UV: Use Value; FL: Fidelity level; RFC: Relative frequency of citation.

Table 3. Method of preparation and mode of administration of plants used in the treatment of fungal diseases in some villages in Buea.

Family	Species	Type of fungi diseases treated	Method of preparation of different plants	Mode of administration of different plants
Acanthaceae	<i>Eremomastax speciosa</i> (Hochst.) Cufod.	Internal fungi (njitti njitti)	3 large leaves are ground and mixed with a spoon full of palm kernel oil and 3 scent leaves (concoction)	The concoction is taken orally. 1 teaspoon full, two times a day
Amaryllidaceae	<i>Allium sativum</i> L.	Ringworm	The fresh garlic is ground into a paste	3 large cloves of garlic are ground into a paste and applied 3 times daily on the affected area
Araliaceae	<i>Panax ginseng</i> C.A. Mey	Eczema	The leaves are infused	1 glass of the infused leaves are taken for one day orally
Arecaceae	<i>Cocos nucifera</i> L.	Dandruff	Ten large coconut fruit is grated and boiled to extract oil from it	The oil is applied topically on the scalp, until symptoms are reduced
	<i>Elaeis guineensis</i> Jacq.	Ringworm	Two to three large nuts are scrubbed to expose the inner layer (Mesocarp)	The nuts are scrubbed on the affected area three times a day, topically
Asphodelaceae	<i>Aloe vera</i> (L.) Burm. f.	Acne	The liquid from the leaves is been squeezed out	The liquid is applied for one day topically on the affected area.
Asteraceae	<i>Ageratum conyzoides</i> L.	Athlete's foot	6-10 leaves are macerated to obtain the liquid.	The liquid from the leaves is applied two times daily between the toes
	<i>Emilia coccinea</i> (Sims) G. Don.	Ringworm	4-5 leaves are macerated to obtain liquid	The liquid is applied three times a day topically
	<i>Vernonia amygdalina</i> L.	Dandruff	5-8 large leaves are macerated to obtain the liquid	The liquid is applied two times a day topically
Caricaceae	<i>Carica papaya</i> L.	Eczema	2-3 large leaves are infused	1 glass is taken twice a day orally
Commelinaceae	<i>Commelina benghalensis</i> L.	Ringworm	The whole plant is macerated	The product is applied topically on the affected area, three times a day
Convolvulaceae	<i>Ipomoea batatas</i> (L.) Lam.	Ringworm	One potato vine is macerated to extract the liquid	The product is applied topically on the affected area, two times a day
	<i>Cucumis sativus</i> L.	Acne	The fruits are sliced in small circular shapes	1/2 sliced of the fruit is being placed on affected area, two times a day
Cucurbitaceae	<i>Cucumeropsis mannii</i> Naudin	Internal fungi	3-4 leaves are macerated to extract the liquid mixed with palm kernel oil (Concoction)	2 teaspoon full is taken orally, two times a day
Euphorbiaceae	<i>Euphorbia hirta</i> L.	Eczema	2-3 leaves ground into paste	The paste is applied topically on the affected area
Fabaceae	<i>Senna alata</i> L.	Eczema	10 to 20 leaves are infused	The infused leaves are taken as tea, one glass in the morning and one in the evening
Sapotaceae	<i>Vitellaria paradoxa</i> C.F. Gaertn	Dandruff	Industrially produced	A handful of oil is applied topically daily on the scalp
Talinaceae	<i>Talinum fruticosum</i> (L.) Juss.	Eczema	A handful of leaves are infused	2 to 3 pump is taken through enema once, after every two weeks
	<i>Zingiber officinale</i> Roscoe	Nail fungi	The rhizome is ground into a paste	The paste is applied topically, once a day
Zingiberaceae	<i>Curcuma longa</i> L.	Eczema	The powdered turmeric is infused	One glass is taken as tea, once daily

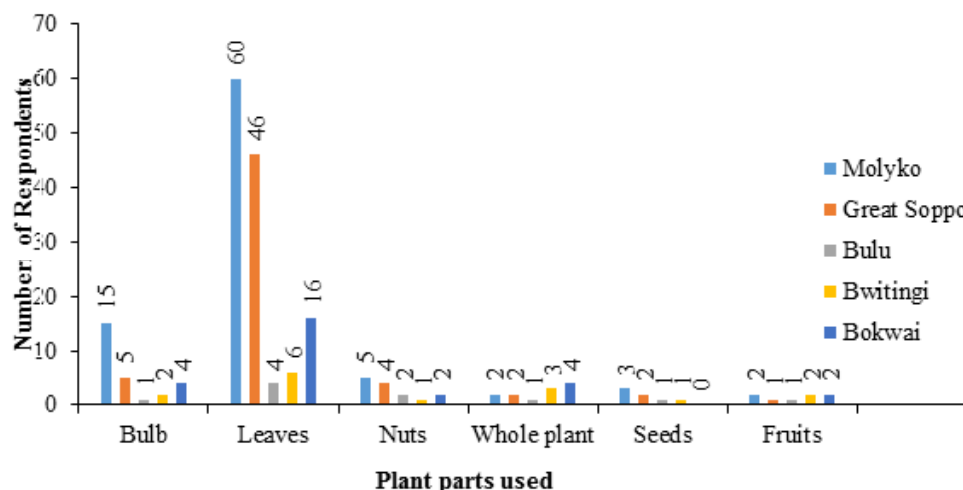


Figure 2. Plant Parts used for the treatment of human fungal infections in Buea.

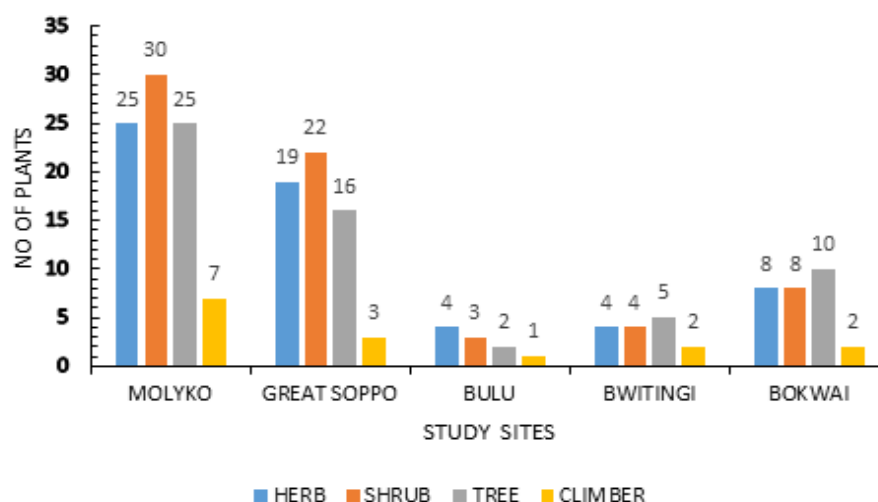


Figure 3. Habits of plants used against human fungal diseases in Buea.

having moderate concentrations while low concentrations were recorded in *C. papaya* and *C. benghalensis*. *A. sativum* did not contain this secondary metabolite. Alkaloids were present only in *V. amygdalina* and *S. alata*, in low concentrations. Similarly, flavonoids were found in only two plant extracts, *A. sativum* and *S. alata*. Overall, *S. alata* contained the highest concentrations of the bioactive compounds while *A. sativum* recorded the lowest.

DISCUSSION

The study revealed that women were more involved in the use of the plants than men probably because women are more involved in the upbringing of children, homemakers, and health which equip them with varied strategies to care

for their families (Villena-Tejada et al., 2021). Similar trend regarding the majority of females was reported in Morocco by Elharas and Ouhssine (2025); in Nigeria by Zanna et al. (2021); and in South Africa (Adhikari et al., 2024). Majority of the respondents were between 51 and 61 years, in line with Focho et al. (2009) who reported that, older people hold indigenous knowledge on the uses of medicinal plants than younger generations.

The most used plant habit were trees, shrubs and herbs while the leaves were the most used parts, corroborating the findings of Amjad et al. (2017), Al-Mekhlafi et al. (2024) and Chaachouay et al. (2022). The use of leaves is mainly due to the presence of active secondary metabolites compared to other parts and also for their regenerative ability (Jahantab et al., 2023). This is of great significance in conservation because their utilization may not severely

Table 4. Results of the phytochemical constituents of the five screened plants.

Plant extract	Solvent	Alkaloid	Steroid	Tannin	Phenolic	Cardiac glycoside	Saponin	Flavonoid
<i>A. sativum</i> L.	M.C	-	-	-	-	-	+	-
	M	-	-	++	-	-	+	+
	D.W	-	-	-	-	-	-	-
<i>S. alata</i> L.	M.C	+	-	-	-	++	+	-
	M	-	-	+++	-	++	+++	+
	D.W	-	-	+	-	-	+	-
<i>V. amygdalina</i> L.	M.C	+	+++	-	-	++	+	-
	M	-	-	-	-	-	-	-
	D.W	-	-	-	-	-	+	-
<i>C. papaya</i> L.	M.C	-	+++	-	-	+	-	-
	M	-	-	-	-	-	-	-
	D.W	-	-	+	-	-	++	-
<i>C. benghalensis</i> L.	M.C	-	+++	-	-	+	+	-
	M	-	-	-	-	-	+	-
	D.W	-	-	++	-	-	+++	-

-: Absent; +: Low concentration; ++: Moderate concentration; +++: High concentration; M.C: Methylene Chloride; M: Methanol; D.W: Distilled water.

affect the sustainability of the resource base.

The RFC of the reported plant species ranged from 0.05 to 1.00. RFC value varies from 0 (when nobody refers to a plant as a useful one), to 1 (when all the informants mention it as useful) (Tardio and Pardo-de-Santayana, 2008). *A. sativum*, *E. coccinea*, *C. papaya*, *C. benghalensis* and *S. alata* had high RFC values indicating their abundant use and widespread knowledge among the respondents. This explains why the RFC values were the same with UV for the different species. Low UV is not necessarily unimportant but indicate that traditional knowledge about them is at risk of not being transmitted and maybe gradually disappearing (Chaudhary et al., 2006).

The fidelity level of the different plant species ranged from 1.59% (*A. lepidophyllus*) to 100% (*A. conyzoides*, *F. exasperata* and *Z. officinale*). In general, high FL of a species indicates the prevalence of a specific disease in an area and the utilisation of the plant species by the inhabitants as alternative medicine. The effectiveness of *A. lepidophyllus* could be attributed to the presence of essential oils (Yirankinyuki et al., 2018). *Z. officinale* is curcuminoids and its effectiveness could be linked to antibacterial, antifungal and antiviral properties (Clement et al., 2015).

Alkaloids, steroids, tannins, phenols, cardiac glycoside, saponins and flavonoids were found in the different plants in different proportions. Alkaloids and phenolic compounds exhibit a wide range of physiological properties, such as anti-inflammatory, antimicrobial and antioxidant effects (Manach et al., 2004). Alkaloids and glycosides have significant effects on the central nervous system and are

known for their ability to increase the forces of systolic concentration (Ogundele et al., 2025). Tannins possess astringent, anti-inflammatory and antimicrobial activity properties (Ozogul et al., 2025). Saponins often have medicinal features as blood cleansers, expectorants and antibiotics (Ugboko et al., 2020; Olowe et al., 2025).

Conclusion

The results of the study highlight the role of indigenous knowledge in the identification of plants used for primary healthcare and indicate that the documented plants have potential pharmaceutical properties that could be exploited for the manufacture of antifungal drugs, necessitating their wise exploitation and conservation.

ACKNOWLEDGEMENT

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CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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