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An ethnobotanical study of plants used to treat liver diseases in the Maritime region of Togo

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ABSTRACT

Ethnopharmacological relevance: In Togo, many persons still rely on plants for healing, however very little is known about the medicinal practices of the indigenous people. The present study aimed to document the medicinal plant utilization for the management of liver diseases in the Maritime region of the country.

Methodology: This was an ethnobotanical survey conducted in the Maritime region of Togo from June to August 2015. The data were gathered from 104 traditional healers (TH) by direct interviews using a semi-structured questionnaire. The calculated use values (UV) were used to analyze the importance of the cited plants.

Results: A total of 99 plant species belonging to 88 genera and 49 families were cited by the TH as curing the hepatic diseases. The most represented families were Caesalpiniaceae with 8 species, followed by Euphorbiaceae with 7 species, Apocynaceae and Asteraceae with 6 species each. The highest UV were recorded with *Gomphrena celosioides* (0.13), *Xylopia ethiopica* (0.12), *Senna occidentalis* (0.12), *Bridelia ferruginea* (0.12), *Cymbopogon citratus* (0.12), *Kigellia Africana* (0.09), *Cassia sieberiana* (0.08) and *Sanseviera liberica* (0.08), showing their importance in the management of liver dysfunction in the surveyed region. The main used parts were the leaves, followed by the roots, the whole plant, the rhizome and the bark, accounting for more than 10% each. The herbal medicines were mostly prepared in the form of decoction and administrated by oral route.

Conclusion: This study showed that Maritime region of Togo has an important plant biodiversity that is exploited by the indigenous TH. However, some plants cited by the TH have not been studied for their possible hepatoprotective effects. These plants are therefore a starting point for biological screenings.

1. Introduction

Nowadays, there is a renewed interest in the medicinal plants research because of the health problems that remained unsolved (Briskin, 2000; Rafieian-Kopaei, 2011; Atanasov et al., 2015). The humanity is confronted with infectious diseases such as malaria for decades without really finding a definitive solution. Indeed, there is no effective vaccine against the disease, while the *Plasmodium* increasingly resists to currently available drugs (Larremore et al., 2015; Rosa et al., 2015). Concerning the bacterial infections, new antibiotics are continuously introduced on the market but each antibiotic has a limited effective lifetime after which, the majority of bacteria develop a resistance (Cohen et al., 2015; Le Doare et al., 2015; Oneko et al., 2015). There are in addition, cancers and metabolic diseases such as diabetes and arterial hypertension whose incidence is increasing. Many efforts are being made in synthetic chemistry to bring to market new drugs against these diseases, but the need for new molecules arises today with acuity. This current situation justifies the new resurgence of interest in medicinal plants, given their potential in this topic (Gali-Muhtasib et al., 2015; Lakshmi et al., 2015). A plant can synthesize thousands of secondary metabolites with pharmacological properties. Thus, the plant-derived molecules have largely contributed to the fight against various diseases (Patridge et al., 2015; Prasad and Tyagi, 2015).

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The investigation of medicinal plants has often followed a classic pattern. Firstly, the ethnobotanical surveys are conducted to gather the knowledge acquired by man and handed on from generation to generation through the oral tradition, secondly the laboratory studies are performed following these traditional usage to identify the active principles. Interestingly, the African continent has an important floristic biodiversity and a secular knowledge about the use of plants for healing (Homsy et al., 2015). In fact, in Africa it is a question of culture and tradition and it is estimated that over 80% of the population in rural areas have an exclusive use of plants for their primary health care needs (Egharevba et al., 2015). The studies related to medicinal plants are continuously conducted on the continent and some lead to the identification of active principles (Tchacondo et al., 2012; Ilboudo et al., 2013). However, considering the problem of climate change, exacerbated by the rapid degradation of the environment with the extinction of many plant species; it becomes urgent to accelerate ethnobotanical studies to establish an exhaustive list of species and their use. To date, it is estimated that less than 10% of the plants have been systematically studied for their biochemical composition (Atanasov et al., 2015).

In Togo, the medicinal plants are used by most of the people to heal various diseases. Thus ethnobotanical studies are being conducted to document the Togolese herbal medicine. Until now, the targeted diseases included malaria, diabetes and arterial hypertension (Karou et al., 2011a; Koudouvo et al., 2011; Holaly et al., 2015; Kpodar et al. 2015). The ethnobotanical data on plants used in liver diseases management are almost nonexistent. This study was therefore undertaken to document the medicinal plants used in the Maritime region to treat liver diseases.

2. Materials and methods

2.1. Study area

Togo is a western African country lying between Burkina Faso in the North, Benin in the East, Ghana in the West and the Atlantic Ocean in the South. The country is divided into five economic regions namely Savannah Region, Kara Region, Central Region, Plateaux Region, and Maritime Region. This study was conducted in Maritime Region. The study area was previously described (Kpodar et al., 2015). In brief, the Maritime Region stands between 1°20′–1°50′ east and 6°10′–6°60′ north of the equator. The region is bordered respectively to the north, West, East and the South by Plateaux Region, Republic of Ghana, Republic of Benin and the Atlantic Ocean. It surface consists of a total area of 6100 km^2, approximately 10.78% of the total land area of the country. The climate is sub-equatorial. The region is inhabited by 1.828.000 people, a density of 50–200 persons/km^2.

2.2. Data collection

Direct interviews with traditional healers (TH) were conducted between June and August 2015 using a semi-structured questionnaire, after their informed consent. Each TH gave a verbal consent certifying his/her agreement. Questions asked were about (i) the TH identity, i.e. name and surname, sex, age, level of education; (ii) the origin of their knowledge; (iii) the status of the TH, i.e. full-time professional TH or partial-time professional TH; (iv) the disease, i.e. name of the disease in the local language; (v) the causes of the disease; (vi) the diagnosis, i.e. main symptoms; (vii) the possible collaboration with the modern medicine; and (viii) the remedies, i.e. the number of plants in the remedy, the local names of the plants, the used parts, the remedy formulation, and the administration route.

2.3. Plant identification

After the interviews, a preliminary identification of the plants was done in the field by a botanist. Subsequently, herbarium specimens were prepared and photographs were taken to aid in the botanical authentication of the plants. Plant identities were confirmed by comparison with available voucher specimens in the Herbarium of the Botany Department, University of Lomé, using the taxonomic keys of the online databases of West African Plants – a photo Guide on the website: http://www.westafricanplants.senckenberg.de/root/index.php. The nomenclature of species was done using the online data base of IPNI website: http://www.ipni.org/ipni/plantnamesearchpage.do.

2.4. Data analysis

Excel spread sheet was used to make simple calculations and determine plant frequencies. Histograms were drawn with the GraphPad Prism 5 software. The use value (UV), a quantitative method indicating the relative importance of species, was calculated as follows:

$$UV=\Sigma U/n$$

where, UV is the use value of a species; ΣU the total number of citations per species; n the number of informants (Aburjai et al., 2007; Hudaib et al., 2008).

3. Results

3.1. Socio demographic profiles of the traditional healers

The socio demographic profiles of the traditional healers are displayed in the Table 1. A total of 104 TH were interviewed including 51 males and 53 females. Their age varied between 30 and 82 years, mean age of 52.55 ± 13.31. Most of them were ranged in the age groups of 50–70 years and 30–50 years, corresponding to 43.27 and 42.31% respectively. Concerning the educational level, 55.77% were illiterates; the others were at least of primary educational level. Thus, 29.81% of the TH attended the primary school and 12.50% the secondary school. Only 2 TH reached the university. Different origins of the medicinal practice or knowledge were recorded, notably the familial inheritance, the initiation from a TH and the divine revelation. Some TH mentioned several origins of their knowledge; for example, a TH could have inherited the knowledge through the oral tradition in his family in addition to the divine revelation. According to Table 1, the main origins of medicinal knowledge were the familial inheritance (95.19%), the divine revelation (27.88%) and the initiation from a senior TH (26.92%). In addition, the majority of the TH (82.69%) exerts the medicinal practice as their main activity. The others were either farmers or teachers or merchants exerting the traditional medicine as a secondary activity. Few of them (17.31%) claimed to collaborate with the modern medicine, by referring the serious cases they could not support to the hospital.

3.2. Symptoms and probable causes of liver dysfunction

Two names were recorded for the liver dysfunction in the Maritime region, "*Vevedzadaazodzi*" in *Mina* language that literally means the bile pours on the liver and "*Akla-do*" in *Ewe* language, that literally means the liver disease. Table 2 summarized the symptoms used by the TH to diagnose the hepatic damage. A total of 29 symptoms were cited. Of them, yellow urine, hard stools, asthenia, eyes yellowing, constipation, spots on the skin and