



Ethnobotanical study of medicinal plants used for the treatment of malaria in plateau of Allada, Benin (West Africa)

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ABSTRACT

Background: Malaria remains one of the most important illnesses in sub-Saharan Africa. In Benin, it constitutes a major public health preoccupation particularly for children and pregnant women. Until now, population still mostly relies on herbal medicine for malaria healing. Hence this study was carried out to document the medicinal plants used in the plateau of Allada in Benin and to assess local knowledge on traditional medicine in the management of malaria and related symptoms.

Materials and methods: Data were collected from 53 informants composed of 23 traditional healers and 30 medicinal plants sellers using a structured questionnaire.

Results: A total of 82 plants species belonging to 78 genera in 43 plant families were recorded as antimalarial in the study area. The families of Rubiaceae and Caesalpiniaceae were the most represented with seven species each. High informant consensus factor (ICF) was recorded in the treatment of malaria (ICF=0.90). High fidelity level (FL=100%) was also recorded for 45.67% of the species used as antimalarial. *Dichapetalum madagascariense* was the species of high relative frequency of citation (RFC=0.81). The dominant plant parts used in the preparation of remedies were leaves (68%). The decoction (79%) was the main mode of preparation, while oral route (92%) was the principal route of remedies administration.

Conclusion: This study provides plant species used in the plateau of Allada for malaria and related symptoms treatment. We hope that this study could be important for the conservation of traditional knowledge on the antimalarial plants and the improvement of malaria management. However, several plant species used as antimalarial by the traditional medicine practitioners in the study area need to be screened in order to identify the species having antiplasmodial activity.

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1. Introduction

Malaria is one of the most prevalent diseases and stays as an endemic illness in tropical countries. This disease is a major reason of morbidity and mortality in the world (Nguta et al., 2010; Koudouvo et al., 2011; WHO, 2011).

Although the progress accomplished in medicine, malaria management still remains an important issue for public health because of the resistance developed to pharmaceutical drugs by *Plasmodium* parasite responsible of this disease. According to WHO (2011), the resistance to antimalarial drugs was attested for *Plasmodium falciparum*, *Plasmodium malariae* and *Plasmodium vivax* in many endemic areas. As far as *Plasmodium falciparum* is concerned, the resistance was observed to almost antimalarial

drugs actually used (amodiaquine, chloroquine, mefloquine, quinine and sulfadoxine-pyrimethamine) and precisely to derivatives of artemisinin. Consequently, the recourse to the medicinal plants to fight against malaria became a therapeutic option in medicine. Moreover, the raised cost of the sanitary cares as well as the social-cultural behaviors make that more than 80% of the populations are more inclined to the traditional medicine to treat the current affections from the local pharmacopeias (WHO, 2009).

In Benin, malaria constitutes a real public health issue and be located in 2009 to the first rank of the illnesses motivating the consultation and/or the hospitalization in the sanitary center (PNLP, 2007). Malaria rages in all regions of Benin and is at the origin of serious social-economic distresses (Kindé-Gazard et al., 2003, PNL, 2007). More than 70% of Benin's population still use traditional medicine in malaria healing probably due to the raised cost of sanitary care as well as resistance to antimalarial drugs (WHO, 2002).

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In spite of numerous studies carried out in Benin to bring up a rational scientific about the use of plants by the local populations (Adjanohoun et al., 1989; Agassounon-Djikpo-Tchiboza et al., 2001; Hermans et al., 2004; Bero et al., 2009; Allabi et al., 2011), there is still a need to pursue investigation in order to have a database as complete as possible on medicinal plants used for malaria management. Hence this study aims to assess plant species used as antimalarial remedies and their recipes in the plateau of Allada in Benin. Specifically, the study sought to document: (i) plants used by the traditional healers and medicinal plants sellers for antimalarial remedies, (ii) remedies and their route of administration and, (iii) perceived abundance of the used plant species and place of collection.

2. Methodology

2.1. Study area

The plateau of Allada is situated in the south of Benin in West Africa and located between 2°00' and 2°30' of longitude east and 6°20'–6°50' of north latitude (Fig. 1). It includes five districts (Abomey-Calavi, Allada, Toffo, Tori-Bossito and Zè) and covers an area of about 2140 km² (Dissou, 1986).

The climate is sub-equatorial and characterized by two rainy seasons (mid March–mid July: large rainy season and, mid September–mid November: short rainy season) alternating with two dry seasons (mid November–mid March: large dry season and, mid July–mid September: short dry season). The annual mean rainfall varies between 1100 and 1300 mm. The mean temperature is 27 °C. During the rainy season, the region receives the maximal annual rains in the country, favoring the development and the persistence of mosquitoes, vector of *Plasmodium* parasites that cause malaria. The vegetation of the region is characterized by a mosaic of shrubby fallow; agroforestry systems, remnant semi-evergreen rainforest where many of useful plant species are withdrawn for illness treating.

Benin is malaria endemic country with epidemiologic profiles essentially based on eco-climatic data (Kindé-Gazard et al., 2003). The population of the plateau of Allada is 591,623 inhabitants with a demographic rate of 18.03% (INSAE/RGPH3, 2002). The population is multi-ethnic with the dominance of Aïzo,

Fôn and Ouémènou. The main activities of the population are agriculture and non timber forest products harvesting. The believing system is based on abroad religion (Christianity, Muslim) and traditional religions which influence the local population of the use of medicinal plant.

2.2. Ethnobotanical data collection

Before starting ethnobotanical data collection, we explained the goal of our study to informants and requested their consent for capitalizing their knowledge in a published document in order to avoid knowledge erosion on medicinal plants used for malaria treatment through the time. Ethnobotanical investigation was carried out from September 2011 to May 2012. During that period, fifty-three (53) informants who freely accepted to participate to the survey were interviewed using structured questionnaire. These informants are selected among the practitioners of the traditional medicine. The sampling is composed of 23 traditional healers and 30 sellers of medicinal plants belonging to different ethnic groups.

During the survey, questions asked are related to medicinal plants used in the treatment of malaria and related symptoms, the plants parts used, modes of preparation and administration of herbal remedies, the availability of plant species collected and the place (habitats) from which the species are harvested and, the source of the traditional knowledge on medicinal plants use among the informants.

2.3. Plants identification

Voucher specimens were collected with the aid of informants for all quoted plant species during the survey. Preliminary identification of the plants was done with the literature and the herbarium specimen were prepared and deposited at the National Botanical Garden of University of Abomey-Calavi for comparison and confirmation of the field plants identification. After, all the species was classified into each corresponding plant family.

2.4. Data analysis

The knowledge on medicinal plants used in the treatment of malaria and related symptoms between the local populations of

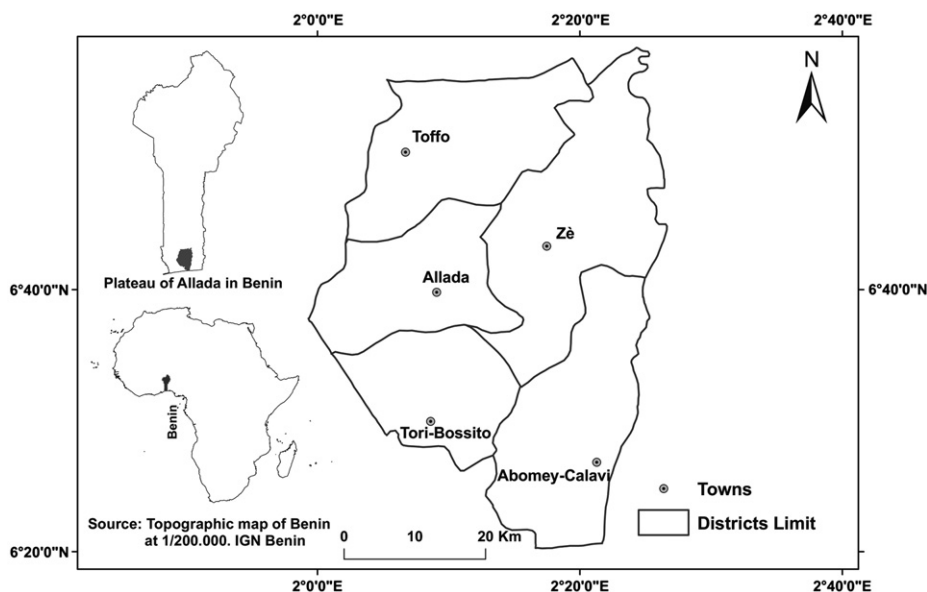


Fig. 1. Map of the plateau of Allada.

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