Journal of Ethnopharmacology 193 (2016) 179–194

Contents lists available at ScienceDirect

Journal of Ethnopharmacology

journal homepage: www.elsevier.com/locate/jep

Use of plants in oral health care by the population of Mahajanga, Madagascar

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ARTICLE INFO

Article history:
Received 18 February 2016
Received in revised form
25 July 2016
Accepted 29 July 2016
Available online 3 August 2016

Keywords:
Ethnobotanical survey
Medicinal plants
Oral care
Mahajanga

ABSTRACT

Background: The use of medicinal plants to address oral health problems is not well documented in Madagascar, yet the country is full of endemic flora. The *aim* of this study was to collect information on the use of plants in the region of Mahajanga, Madagascar, for the treatments of oral diseases mainly tooth decay.

Methods: The ethnobotanical survey with respect to the use of plants for curing dental problems was carried out in 2012. A cluster sampling at three levels was applied when choosing the study sites. The target population was made up of heads of household. The following data were collected from a semi-structured questionnaire: name of plants, part used, mode of preparation, and administration. The Informant Consensus Factor and Fidelity Level indexes were calculated for each condition treated and used plants.

The *Results* revealed that 93 per cent of the targeted population has used plants to calm dental pain, whereas 44.2% have reported using plants due to financial problems. About 65 species of plants are commonly used for oral health care and 63 of them treated caries. *Cajanus cajan* (L.) Millsp. was the most plant used. It was mostly used in crushed form of 5 to 9 leaves which were prepared and placed directly on the affected oral part or in the tooth cavity. In general, the treatment lasted about 5 days or minus. The ICF were 0.83 for caries and 0.81 for periodontal diseases.

Conclusion: This ethnobotanical survey will serve as database for further phytochemical and pharmacological study of plants in order to identify their active components and advise the population on the most effective administration.

1. Introduction

Oral diseases represent one of the major public health problems in the world (OMS, 2003). They include serious diseases such as cancers of the mouth, or curable diseases including dental caries and periodontal disease. Tooth decays affect 60–90% of adolescents and adults in industrialized countries (Petersen et al., 2005). In Madagascar, a national survey conducted in 1993 showed that the prevalence of tooth decays is up to 85% among children aged 6, 75% among adolescents aged 12, and 98% among adults aged 35–44. Fifteen to twenty percent of adults aged 35–44 suffered from severe periodontal disease leading to tooth loss that year (Razanamihaja and Petersen, 1996). According to the WHO, over 80% of the low-income population relies on the use of traditional herbal medicines for their primary health care needs (WHO, 2002). For centuries, plants have been traditionally used for the prevention and treatment of oral diseases (Taheri et al., 2011). A common example is the utilization of plants for tooth-cleaning use. Pieces of wood or twigs of shrubs known as "miswak plant" are used as tooth-rubs. Their use dates back from thousands of years, and the practices continue to be popular in many African and Asian countries (Almas, 2001; Ganesan, 2008; Jose et al., 2011; Rasingam, 2012). Indeed, health care remains one of the most important reasons for the resorting to medicinal plants uses, and recent studies have demonstrated the existence anti bacterial actions of some plants (Almas, 2001; Palombo, 2011; Shafiei et al., 2011). Given the limited access to dental health care for a large

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http://dx.doi.org/10.1016/j.jep.2016.07.076
0378-8741/

majority of the population due to financial difficulty, the non mastered dental caries, as well as the negative consequences on the overall health status the latter have (OMS, 2003), the search for alternative means of effective care and cost becomes a priority. This explains the wide use of medicinal plants in developing countries. Rasoamananjara et al. in 1999, reported that 60% of the local population in Ankarafantsika, an area situated in the North-West part of Madagascar, at 112 km from the city of Mahajanga, use plants for curing oral diseases and for oral hygiene (Rasoamananjara and Ralison, 1999). The government of Madagascar supports traditional medicine through an interministerial convention. A commission to study the regulations on traditional medicine and its pharmacopoeia was established in May 1996 and a National Advisor Committee on Traditional Medicine was created by decree No. 2339/2002 dated 28th August 2002. Later on, a framework agreement was signed between the Ministry of Public Health and the National Association of Traditional Healers in 2005, and the decree recognizing the practice of traditional medicine was enacted in 2007 (Ministère de la Santé publique, 2012).

Of all the many articles published on ethnobotanical surveys, rare are those which report on the use of medicinal plants for dental care only. In Madagascar, the knowledge of medicinal plants for dental care use is poorly documented. This study was carried out to investigate, identify and record the medicinal plants used by the local population in Mahajanga for curing tooth and mouth diseases.

2. Methods

2.1. Location and study area

Madagascar is the world's fifth largest island, the richness of its biodiversity is well known. There are at least 12,000 different species and each year more are identified. Furthermore, 86% of these plants are endemic (Ministère de l'Environnement, 1995).

The study was conducted in the former province of Mahajanga. Geographically, Mahajanga is located in the North Western part of Madagascar (Fig. 1). According to the National Institute of Statistics (INSTAT), it has a surface area of 150,023 km^2 with an estimated population of 2,491,832 inhabitants in 2010 (INSTAT, 2010).

The former "province" of Mahajanga is now divided into four regions namely Sofia, Betsiboka, Melaky and Boeny where the study was conducted. In Mahajanga, the climate is hot and dry, rain is rare and the temperature can reach 35° C. The fauna and flora are exceptional and rich in diversity (Ministère de l'Environnement, 1995).

2.2. Ethnobotanical investigation

2.2.1. Administrative and ethical considerations

Before starting the survey, various local authorities (the Fokontany Chief, the District Chief, and the Mayor) in each territorial subdivision were approached, and the objectives of the study were explained to them. The objectives of the study were also explained

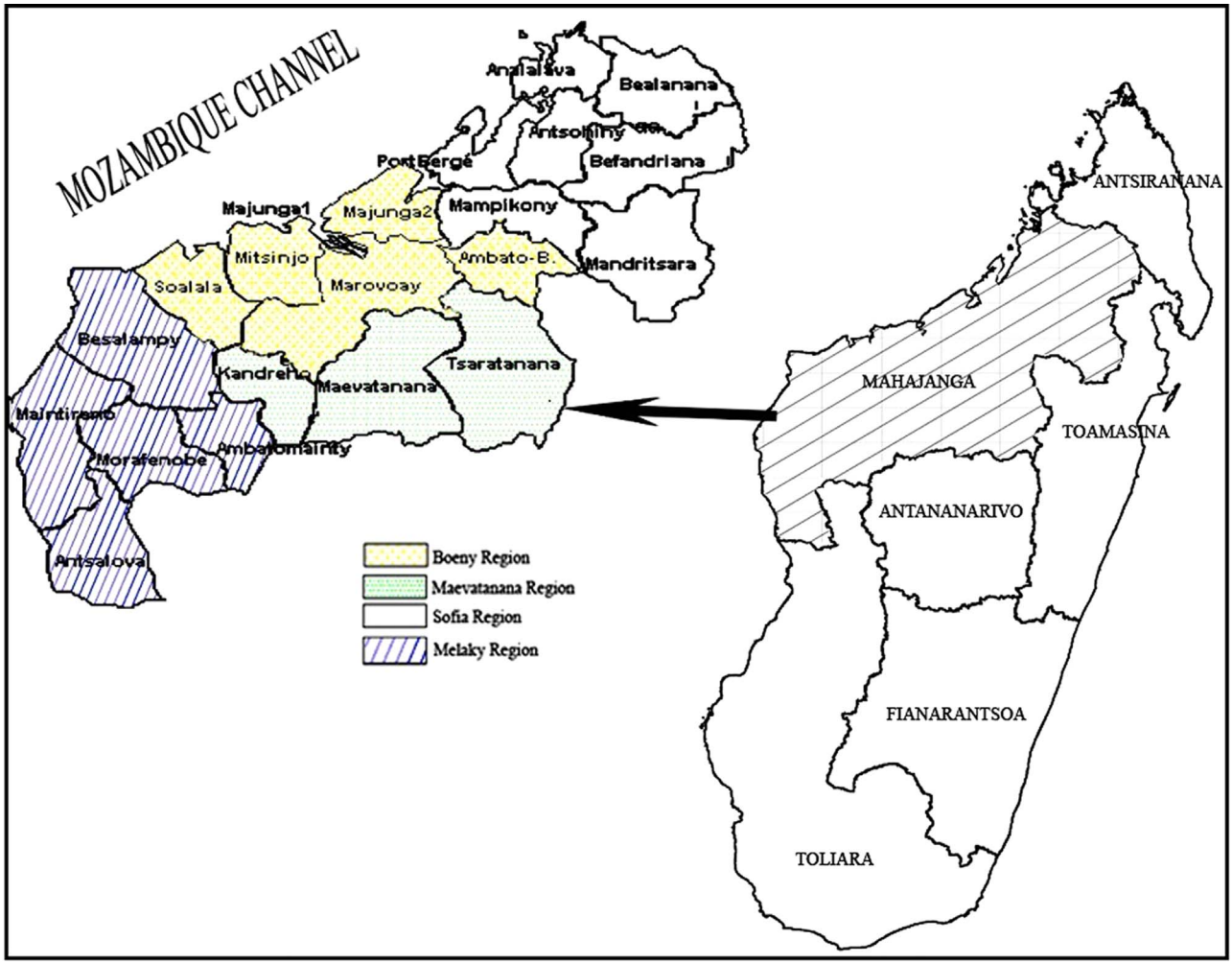

Fig. 1. Map of Mahajanga, North-west of Madagascar showing regions and districts.