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Review

African palm ethno-medicine



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ABSTRACT

Ethnopharmacological relevance: This study is the first to demonstrate the breadth and patterns of the medicinal applications of African palms. It sheds light on species with the potential to provide new therapeutic agents for use in biomedicine; and links the gap between traditional use of palms and pharmacological evaluation for the beneficial effects of palm products on human health. Last but not least, the study provides recommendations for the areas that should be targeted in future ethno-botanical surveys.

Aim of the study: The primary objective of this survey was to assemble all available ethno-medicinal data on African palms, and investigate patterns of palm uses in traditional medicine; and highlight possible under-investigated areas.

Materials and methods: References were found through bibliographic searches using several sources including PubMed, Embase, and Google Scholar and search engines of the State and University Libraries of Aarhus, National Library of Denmark and Copenhagen University Libraries, Harvard University Libraries, and the Mertz Library. Information about ethno-medicinal uses of palms was extracted and digitized in a database. Additionally, we used an African palm distribution database to compute the proportion of palm species that have been used for medicinal purposes in each country.

Results: We found 782 medicinal uses mentioned in 156 references. At least 23 different palm species (some remained unidentified) were used medicinally in 35 out of Africa's 48 countries. The most commonly used species were *Elaeis guineensis*, *Phoenix dactylifera*, *Cocos nucifera*, and *Borassus aethiopicum*. Medicinal uses were in 25 different use categories of which the most common ones were *Infections/Infestations* and *Digestive System Disorders*. Twenty-four different parts of the palms were used in traditional medicine, with most of the uses related to fruit (and palm oil), root, seed and leaf. Palms were used in traditional medicine mostly without being mixed with other plants, and less commonly in mixtures, sometimes in mixture with products of animal origin. Future ethno-botanical surveys should be directed at the central African region, because palm species richness (and plant species richness in general) is particularly high in this area, and only few ethno-botanical studies available have focused on this region.

Conclusion: The wide time span covered by our database (3500 years) shows that African palms have been used medicinally by many societies across the continent from time immemorial until today. Most medicinal use records for African palms were found in two categories that relate to most prevailing diseases and disorders in the region. By analyzing ethno-medicinal studies in one database we were able to demonstrate the value of palms in traditional medicine, and provide recommendations for the areas that should be targeted in future ethno-botanical surveys.

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1. Introduction

Species of the Palm family (Arecaceae) have played a prominent role for traditional cultures as a source of medicines. They are used throughout tropical and subtropical regions to cure a series of diseases and disorders (Ali, 1999; Bellomaria and Kacou, 1995; Betti, 2004; El-Kamali and Khalid, 1998; Hamill et al., 2003; Nadembega et al., 2011; Zambrana et al., 2007). Likewise, palms support other functions of daily life as they provide raw materials for consumption, construction, manufacture of utensils, etc. (Burkill, 1997; Byg and Balslev, 2001; Johnson, 2011; Lee and Balick, 2008; Macía, 2004; Macía et al., 2011).

Medicinal uses of palms have been reviewed thoroughly for South America (Sosnowska and Balslev, 2009; Macía et al., 2011). As yet, no such survey has been conducted for the African continent. Even though, palm diversity in Africa is relatively poor compared to South America and Asia, the African palm flora has extensive populations of several species and a variety of local uses (Burkill, 1997; Tuley, 1995).

In Africa up to 80% of the human population uses traditional medicine for the management of prevailing diseases (WHO, 2002). Primary health care is practically synonymous with traditional medicine in rural areas. Also, urban residents supplement the care they receive in clinics and hospitals with treatment from traditional healers (Fasola, 2006; Oreagba et al., 2011). Some traditional palm-derived medicines have proven to be pharmacologically effective and we cite a range of pharmacological reports validating traditional use. Yet, countless healing properties of palms remain to be investigated through meticulous laboratory trials.

There is a need to link the gap between existing ethno-medicinal data and potential pharmacological studies to fully investigate beneficial effects of palm-derived medicines on human health.

The primary objective of this bibliographical survey was to combine ethno-medicinal data on African palms, and investigate patterns of palm uses in traditional medicine. We were particularly interested in answering the following questions:

- Which African palm species are most often used for medicinal purposes?
- Which conditions are most commonly treated with medicines derived from palms?
- Which palm parts are most used in traditional medicine?
- How are the remedies prepared and applied?
- What are the distribution and geospatial patterns of medicinal palm uses across the African continent?

We believe that answering these questions will help to identify palm species that have the potential to be explored in future laboratory trials. We also hope to highlight eventual under-investigated areas.

2. Materials and methods

2.1. Data collection

The study embraces ethno-medicinal uses of palms on the African continent. Apart from palms native to Africa the introduced but now naturalized *Areca catechu* and *Cocos nucifera* are included (Tuley, 1995). We found 156 scientific papers and books that provided information on medicinal uses of African palms, dating back to the ancient *Papyrus Ebers* from 1550 BC (described in Ebbell, 1937) and ending up in very recent publications (Vossen et al., 2014). Information was extracted and digitized in a database (Appendix A). References were found through bibliographic searches using several sources including PubMed, Embase, and Google Scholar and search engines of the State and University Libraries of Aarhus, National Library of Denmark and Copenhagen University Libraries, Harvard University Libraries, and the Mertz Library.

Medicinal use record was characterized by each distinctive activity/disorder, plant part used, mode of preparation, application, country of use or ethnic group mentioned for a certain palm species in every publication. Almost all information found was traced back to the primary references; this proved to be important because some of the secondary references did not precisely reflect the information found in the primary sources. Care was taken not to duplicate the same palm use records when they were cited in secondary references and it was unfeasible to access and review the primary source. In case of books searches where the references to primary sources of information were not always given directly in the text, each encountered use record was crosschecked with the bibliography of the book to prevent duplicating the records.

2.2. Data preparation

Palm nomenclature follows the *World Checklist of Palms* (Govaerts et al., 2014), and author names are included in Appendix A. *Borassus* sp. aff. *flabellifer* was updated to *Borassus akeassii* following Bayton (2007). When the scientific name of the palm was not mentioned by the author we attempted to identify the species by the part used. For example, it was assumed that palm oil and palm kernel oil were extracted from the native African oil palm *Elaeis guineensis*, since processing of the fruits for edible oil has been traditionally practiced in Africa for thousands of years (Johnson, 2011; Tuley, 1995). Medicinal uses referring to “coconut” were assigned to *C. nucifera* given the palm is naturalized to the African continent, and there are no other palm species with fruits of similar morphology (Tuley, 1995). Medicinal uses referring to “date” were assigned to date palm *Phoenix dactylifera* since this is the only *Phoenix* sp. occurring in Egypt where the uses came from (Govaerts et al., 2014). Some palms remained unidentified, such as those used for palm wine, which can be produced from several

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