Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
https://www.phytojournal.com
JPP 2024; 13(1): 06-10
Received: 07-10-2023
Accepted: 08-11-2023

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Ethnomedicinal uses and bioactive compositions of different species of palm fruits in Karu local government area of Nasarawa State, Nigeria

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DOI: https://doi.org/10.22271/phyto.2024.v13.i1a.14805

Abstract
Palms belong to Arecaceae family and are the most acknowledged and extensively dispersed variety of productive tree throughout the globe that has given a large scale range for edibles and remedies to Homo sapiens. The aim of the groundwork was to record the several multifariousness of palms used as culinary and drugs in Karu, Nigeria and to find out the empirical authentication for the abundant plant-derived constituents that could explicate its native values as professed by the people in the vicinity. Individuals that are perceived by the people of Karu to have enormous proficiency and mastery in herbal practices were contacted by oral korero on the various categories of palms used for the control of vast group of ailments and the inputs assembled were recorded for further justification. Outcome of the discovery indicated that, distinct heterogeneity of palms used by the people includes: Oil palm tree, coconut palm tree, African fan palm tree, African fan palm shrub and date palm tree. These palms were used as therapy for a wide range of diseases and ailments such as: Poisoning, blurred vision, skin problems, heart diseases, high blood pressure, weakness, dehydration, brain dysfunctions, constipations, hemorrhage, mouth sores, inflammation, infertility, tumors, asthma and infections. The variations of palms used were picked out and documented by their respective scientific names, English names, and vernacular names.

Keywords: Oil palm tree, coconut palm tree, date palm tree, African fan palm tree, African fan palm shrub

Introduction
The descend Arecaceae or Palmae of the plant domain is a gross categorization holding about 2, 500 arborical race that are situated across equatorial, tropical, and subtropical areas of the world [1]. Palms belong to this lineage and are the notable and diversified category of conifers globally that have long given a wide range of foods and medicines to humankind **[1]**. Many palms are tagged ecological keystone species because large numbers of animals and humans depend on their fruits, flowers, liquids, and oil benefits [2]. 6 of the 10 most common tree species in the Amazon rain forest are palms [3]. Renninger and Phillips in 2016 differentiated palms by their physiological and morphological features [4]. The family of palms exhibits a variety of growth patterns, ranging from small shrubs to lianas and large trees. About 40% of palm species are capable of growing stems to 10 cm or more in diameter at 1.3 m above the ground commonly called “palms trees” [5]. Palm trees mainly occur in tropical and subtropical regions, with most genus and species found in Asia, Indonesia, and the Americas. In the Americas, 67 genus and approximately 1440 species can be found; among these, 39 genus and 200 species occur in Brazil [6]. These trees are very important economically, due to the huge diversity of compounds that they produce in their fruits and seeds and are seen as an important source of funds and are widely used in the local and international industries [6]. All the oilseed palm trees are also used as food due to the presence of starch, proteins, vitamins, and oils [6]. Their fruits are traditionally consumed fresh, boiled or as juices and the high amount of starch are sometimes used in fermentation processes [6]. We have three major categories of palm trees [6] the Dura palms that have kernels with a thick shell; the Pisifera palms that have kernels with no shell; and the Tenera palms which are the cross between the two palm varieties (dura and pisifera) that have kernels with a thin shell [6]. Coconut and African palm fruits, oil palm fruits and date palm fruits belong to Dura, Pisifera and Tenera categories respectively [6]. Of 730 species of palms, evidence has provided that 106 species have known medicinal uses, ranging from treatments for diabetes and leishmaniasis to prostatic hyperplasia [7].

Thus, the number of palm species with known uses had increased from 48 to 250 in 2022. Furthermore, the pharmacological bases for many of the effects are now understood [7].

Materials and Methods

Study Design: Illustrative prevalence research was determined in Karu Local Government Area of Nasarawa State, Nigeria to establish the types of palms used as ethnomedicines by the people.

Study Area: Karu is a Local Government Area in Nasarawa central Nigeria. It is close in proximity to the Federal Capital Territory of Nigeria. It has an area of 2, 640 Km^2. The Karu local government has its headquarters in New Karu town. It was originally built to house the capital's civil servants and lower income families, but had no running water or good sanitation system. Karu has grown in population beyond its original planned capacity. The main ethnic groups are the Gbagi, Koro, Yeskwa, Gbandara and Gade. Other settlers of the minority groups include Idoma, Mada, Eggon, Hausa-Fulani, Igbo, Tiv, and Yoruba who migrated to take the advantage of the economic potentials in the area. Farming, nomadic, hunting and commerce are the preoccupation of the people and a population of about 333, 800 in 2022 with more of the youths (18-49 years) than the older population (50- 90 years). Karu Local Government Area have three main primary health care as healthcare delivery System with few and primitive facilities namely: Primary healthcare centre Roguwa village, Mararaba primary health centre and new Karu primary health centre renovated church new room and at least twenty type 1 non registered herbal clinics; making over 60% of the entire population to depend on traditional medicine care facilities. Most of the youths in remote villages have left for cities in search of education and white collar jobs; allowing the huge-wealth of the knowledge in traditional medicine with the uneducated and old folks who are mainly farmers, business men, hunters, and herbalists and who may soon be dead and the precious knowledge lost forever.

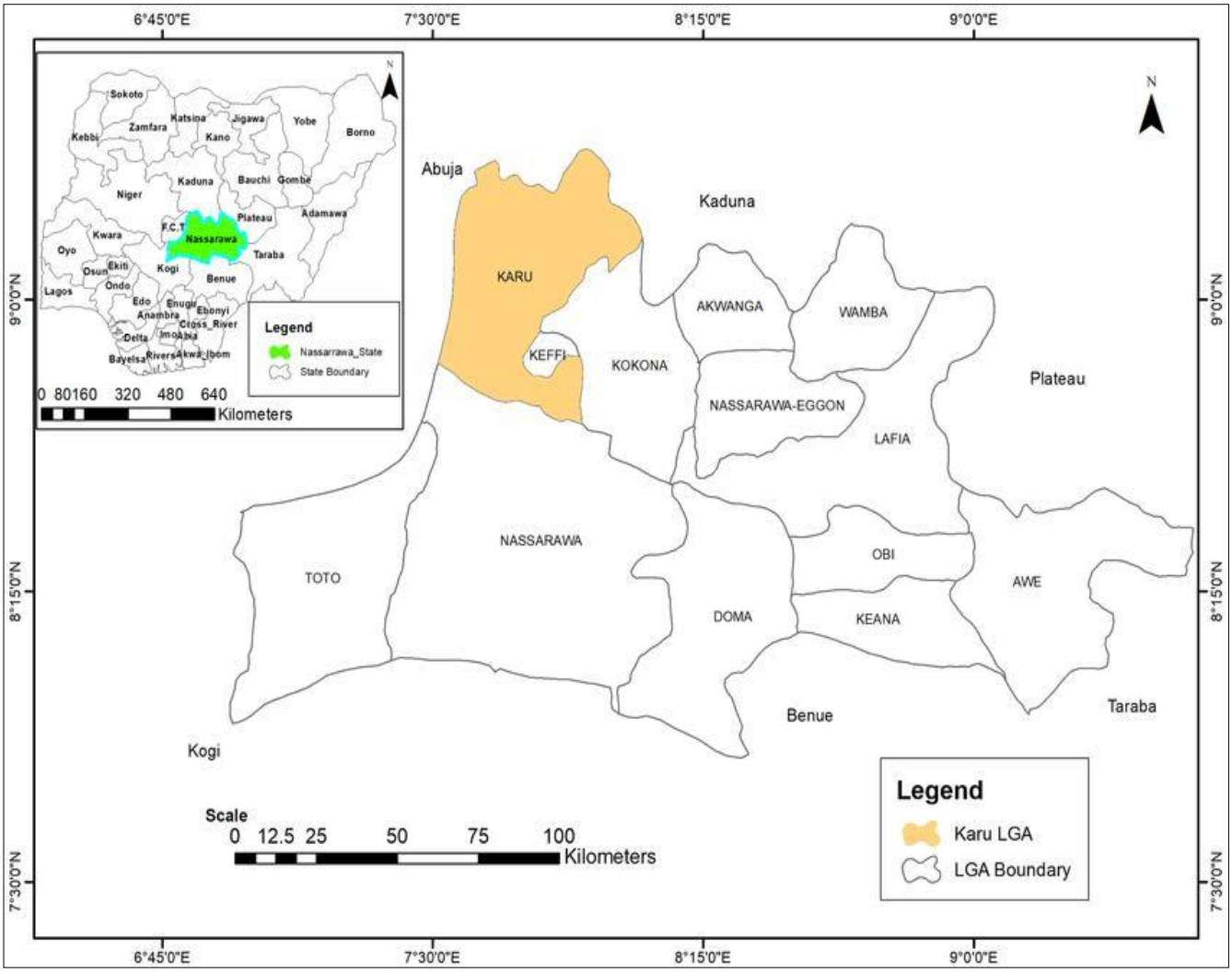

Fig 1: Map of Karu Local Government Area of Nasarawa State, Nigeria

Study Population

The documented raw information includes patients on traditional medicine products, farmers, hunters, and herbalists or any person recognized and accepted by the locality to have knowledge and experience on herbal medicine for at least 10 years and above. The area captured individuals from the age of ≥ 35 years that are known to have lived in the metropolis for ≥ 10 years.

Sample Size

The formula, A = B ^{2} C (1-C)/D^2 was adopted in the computation of sample size.

Where
A = Approximate sample size
B = Standard value correlating to the preference measure of probability
F = Error of clarity
C= People acquiring healthcare from herbal medicine products (95%).

Note: Placing the non-respondent rate (5%) to the final sample size of 350 but 400 was used as the sample size for the research.

Oral Interview
The method used by [8] was used for the study. Data on various varieties of palms from Karu Local Government Area were gathered by oral interview of peoples with knowledge and experience in herbal medicine using structured question banks. Elders, herbalists, hunters, traders and civil servants were among the people interviewed. Plant materials were gathered with the help of the people and digital photographs of the plant samples were captured. For the periods of the study, common plant names, useful medicinal parts, mode of preparation and application, dosage and duration of treatment were documented. The study took about one year to be completed (September 2022 to September 2023).

Plant Collection and Identification
Different varieties of palm leaves, flowers and fruits were identified and collected from Karu in Nasarawa Local Government Area of Nasarawa State, Nigeria between 1st September, 2022 and 19th January, 2023. The plants were identified in the field using keys and Pharmacognostical tools and terms in the 'Flora of West Tropical Africa' and the 'Woody plants of Ghana" adopted by [8]. The identities of the plants were authenticated at the Department of Horticulture and Landscape technology, Federal College of Forestry, Jos, Nigeria and assigned voucher numbers by Mr. Joseph Jeffrey Azila and the specimens were deposited in the herbarium of the same institution.

Results

Table 1: Identification of the Varieties of Palms in Karu Local Government Area, Nasarawa State, Nigeria

S. No.	Botanical Name	Authority	Family	English Name	Idoma Name	Ibo Name	Hausa Name	Yoruba Name	Voucher Number
1	*Elaeis guineensis*	Jacq	Arecaceae	Oil palm tree	Ikpali gano nowa	Akwu ojokwu, Nkwu mmanu	Dabinon mai, Kwaran mainja	Epo ope	FHJ 333
2	*Cocos nucifera*	L.	Arecaceae	Coconut palm tree	Ikpali ganta				FHJ 334
3	*Phoenix dactylifera*	L.	Arecaceae	Date palm tree	Idabino	Anobi	Dabino	Ojo/Eso	FHJ 335
4	*Borassus aethiopum* (Tree)	Mart	Arecaceae	African fan palm tree	Ondo	Ubiri	Giginya	Abgon-eye	FHJ 336A
5	*Borassus aethiopum* (Young Plant)	Mart	Arecaceae	African palmyra palm shrub	Ondo	Ubiri	Giginya	Abgon-eye	FHJ 336B

Table 2: Ethnomedicinal uses of the varieties of palms in Karu local government Area, Nasarawa State, Nigeria

S. No.	English Name	Ethnomedicinal Uses
1	Oil palm tree	(a) Red oil is taken orally as antidote for poison (b) Red oil is regularly eaten with cooked yam to improve blurred eyesight (c) Kernel oil is rubbed on the skin to improve healthy skin (d) Palm wine is taken as beverage to improve blurred eyesight (e) Palm wine is taken as beverage to promote lactation of nursing mothers
2	Coconut palm tree	(a) Coconut water is taken as beverage in the treatment of dehydration due to diarrhoea (b) Coconut water is taken as beverage in the treatment of high blood pressure (c) Coconut water is taken as beverage to improve brain functioning (d) Coconut water is taken as beverage by pregnant women in preeclampsia and eclampsia (e) Coconut water is taken as a remedy for constipation, flatulence and stomach ulcer
3	Date palm tree	(a) Juice made from the fruit is taken orally as remedy for cough (b) Juice made from the fruit is taken orally as remedy for asthma & difficulty in breathing (c) fruits are eaten with coconut fruits and mandrake roots as aphrodisiac (d) fruits are eaten with coconut fruits as remedy for infertility
4	African fan palm tree	(a) Decoction of the leaf is taken orally as aphrodisiac (b) Decoction of the leaf is taken orally as remedy for sore throat (c) Decoction of the leaf is taken orally as remedy for bronchitis & asthma (d) Ripe fruits are eaten as remedy for constipation, flatulence & stomach ulcer
5	African palmyra palm (young plant)	(a) Roots of the young plant is boiled and eaten as aphrodisiac (b) Roots of the young plant is boiled and eaten as remedy for sore throat (c) Roots of the young plant is boiled and eaten as remedy for bronchitis & asthma

Discussion
Many mothers living in Karu Local Government Area of Nasarawa State, Nigeria and Africa at large are very conversant with palm oil. It is believed to be an "éérό" or "apóró" in local Yoruba language which is translated literally as 'that which neutralizes poison'. It is believed that the oil chelates the effects of poisons like acids, cyanide, kerosene, petrol, bleach, etc., by preventing the absorptions of the ingested toxins by its organ effect, or by inhibiting the conversion of the toxins to more toxic metabolites [9-15]. Researches established that, the chelating effects of palm oil could be due to the chemical compositions of the oil such as palmitic acid (43%), oleic acid (41%), linoleic acid (10%), and trace amounts of linolenic acid and palmitoleic acid [9-15]. It is to be noted as a serious caution that, the oil can get into the lungs or its fumes can be inhaled when one tries to force a child to drink it [9-15]. This can lead to breathing problems or a form of pneumonia [9-15]. In some other cases, the children die

from the palm oil remedy than then poisoning [9-15] due to esophagus's reflux by regurgitation causing asphyxia; a condition when the body is deprived of oxygen, leading to unconsciousness or death as a result of a condition called reflux esophagitis [9-15]. Reflux esophagitis is the inflammation of the esophageal reflux disease (GERD), a condition in which the stomach contents poured into the esophagus or beyond (oral cavity, larynx, or lungs), causing troublesome symptoms and complications [9-15]. The use of the kernel oil to improve healthy skin may be attributed to triglycerides (which consists nearly 64% of lauric and myristic acids), palmitic acid, linoleic acid and oleic acid [9-15]. These fatty acids act as emollients or moisturizers for skin, nails, and hairs [9-15]. Palm wine promotes lactation and improves eyesight due to its yeast and folic acid contents [9-15]. The use of coconut water for rehydration in diarrhoea might be due to the sodium and potassium contents [16, 17]. The body uses sodium and potassium to control electrolyte balance and blood volume and for the normal functioning of the muscles and nerves [17, 18]. Potassium, sodium, magnesium, and calcium present in coconut water are known to control blood pressure [17-20]. Coconut water contains fats, vitamin E, vitamin K and iron [17-21]. Fat is a source of essential fatty acids which the body cannot make itself; it helps the body reabsorb vitamin A, D, and E. Vitamin A improves eyesight; vitamin E and K reduce markers of oxidative stress and improves antioxidant defenses, and iron is a mineral that the body needs for growth and development. The body uses iron to make hemoglobin, a protein in red blood cells that carries oxygen from the lungs to the brain and other parts of the body, and myoglobin, a protein that provides oxygen to the brain and muscles and improves their performance [17-21]. Date palm fruits are known to treat and prevent cough and difficulty in breathing, treat infertility and increase sexual performance [21-30]. Date palm fruits contain phenolic acids and carotenoids [21-30]. Phenolic acids, hydrolysable tannins, and flavonoids have fertility, performance, anticacinogenic and antimutagenic properties because they act as antioxidants for Deoxyribonucleic acids, inactivating stress, inflammation and carcinogens and inhibiting pro- carcinogen activating enzymes, and activating xenobiotic detoxification enzymes [21-30]. Dietary carotenoids are established to provide health benefits in decreasing the risk of diseases, particularly certain cancers, erectile dysfunction, deficiencies of sex hormones and eye diseases due to β- carotene, lycopene, lutein and zeaxanthin contents [21-30]. Finally, the use of African fan palm as aphrodisiac, and for the management of sore throats, bronchitis, flatulence, constipation, and peptic ulcer could be attributed to the chemical compositions such as hemicellulose, cycloxen, acetate, β- terpene, α- terpene, δ- cymene, β-ocimene, α-terpeneol, carveal, D- limonene, and antiseptic, antiplasmodial, astringent, digestive and diuretic properties [31-43].

Conclusion

Four (4) different varieties of palms in Karu, Local Government Area of Nasarawa State, Nigeria used as foods and medicines were identified and documented with their Authority, Family and their Botanical, English, Idoma, Ibo, Yoruba and Hausa names as these languages among others are commonly used as means of communication by the locality. Their Ethnomedicinal uses and the bioactive constituents that could be responsible for the various activities were also documented. The evidence could explain why oil palm, coconut palm, date palm and African fan palm were used for the management of conditions such poisoning, blurred eyesight, skin problems, lactation problems, dehydration, high blood pressure, brain dysfunction, constipation, flatulence, asthma, sore throats, weak erection, infertility and stomach ulcers.

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