

## Research Paper

# Ethnobotanical Survey of plants used in the treatment of malaria by the Rumaya people of Kauru Local Government Area of Kaduna State

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Ethnobotanical survey of herbal plants used by the Rumaya people of Kauru Local Government of Kaduna State for the treatment of malaria was carried out. The survey was aimed at identifying the plants used in the treatment of malaria among Rumaya people. Information was collected by interviewing indigenous Rumaya herbal medicine practitioners, herb sellers, and farmers, using interviews and structured questionnaire. A total of 30 plant species belonging to 16 families were recorded from the surveys that are being used in herbal antimalarial recipes. *Fabaceae* was most represented with 6 species (20%), followed by *Combretaceae* with 5 species representing (16.67%), *Malvaceae*, *Lamiaceae*, *Mytaceae*, *Euphorbiaceae*, and *Rutaceae* were represented by 2 species each (6.67), while the remaining 9

families had 1 species each (3.33%). Investigations were carried out on the plant part used, method of preparing the herbal antimalarial recipe and how it is administered. The results indicated that water was the main medium of antimalarial recipe preparations, irrespective of the part, whole plant or combination of parts or whole plants used. Though large number of plants that are traditionally used for the treatment of malaria were identified, scientific validation of the claims of antimalarial potency is required.

**Keywords:** Ethnobotanical, survey, plants, treatment, malaria, Rumaya people

## INTRODUCTION

Malaria is one of the five major life threatening childhood conditions causing more than half a million deaths of African children annually (Snow et al., 2005). Malaria is regaining its earlier reputation as being one of the greatest threats to mankind especially in sub-Saharan Africa with *Plasmodium falciparum* possessing a number of efficient genetic mechanisms that enables it evolve resistance against most of the anti-malaria drugs that are presently available for treatment. The global strategy for malaria control mainly focuses on case management through early diagnosis and prompt effective treatment as an essential tool for reducing the morbidity and mortality

of malaria through provision of drugs capable of reducing or eliminating the parasites (WHO 1993; Schaphira et al., 1993). In the absence of appreciable vector control measures the control of malaria through treatment on demand is the most feasible strategy.

The emergence of insecticide resistant *Anopheles* mosquitoes and rapidly spreading resistance of malaria parasites particularly *Plasmodium falciparum* to first-line anti-malarial drugs such as chloroquine which has been the drug of choice for malaria control for over 40 years in most regions of the world (Collins and Jeffery, 1996) has underlined the necessity to develop additional methods

for the control of mosquito vectors and the elimination of the parasites in their human hosts once the latter are infected. For the second point, two approaches may be considered: The development of new chemotherapeutic agents and or the development of malaria vaccines. The development of effective malaria vaccines as an urgent response to the appearance of drug resistant *P. falciparum* strains is in progress.

The clinical trials of the vaccine SPF 66 revealed that the risk of developing malaria in children who received the vaccine was lowered by 34% (Alonso, 1994). However, these results are still not impressive therefore; there is still an urgent need to develop new chemotherapeutic agents for malaria, since even if vaccine is developed, slip out patients will need to be treated. In this respect, plant resources are potential targets for research development of alternative malarial drugs. Information on the use of natural plant products for anti-malarial activity has not been fully explored and utilized. While the search for effective modern drugs continues, there is need for proper detailed studies on natural plant product for their anti-malarial activities.

The fact that the drug Artemisinin from the Chinese antipyretic *Artemisia annua*, as well as Quinine from the Peruvian Cinchona tree which are the two most effective drugs for malaria today emerged as products of century long applications in traditional medicine, demonstrates the huge potential of plants as a source of drugs. A vast number of herbal plants have been reported to be used traditionally in the treatment of a variety of feverish conditions and quite a number of them have been found to be effective and safe when used against malaria. These remedies are utilized in many communities and laboratory investigations have shown many of them to have anti-plasmodia activities, which include *Azadirachta indica*, *Erythrina senegalensis* *Nauclea latifolia* which are widely used to treat malaria (WHO, 2005).

Studies have documented over 1,200 plant species from 160 families used in the treatment of malaria or fever (Wilcox and Bodoker, 2004). Plants used in traditional medicine are more likely to yield pharmacologically active compounds (Farnsworth and Kass, 1981). The available knowledge on the use of plant preparations in traditional medicines allows a direct search for such compounds following scientifically established norms. Ethnobotanical survey is an important step in the identification, selection and development of the therapeutic agents from medicinal plants. In ethnobotany and natural products chemistry the mode of preparation and administration of herbal preparations are often crucial variables in determining efficacy in pharmacological evaluation (Lewis et al., 1998; Albers-Schonerg, 1997).

The aim of this study was to collate information from an indigenous group of Rumaya people living in Kuru Local Government Area of Kaduna State about their current traditional uses of plants for the treatment of malaria, the

plant part(s) used, method of preparation and mode of administration.

## MATERIALS AND METHODS

### Study area

The study area is situated in the northern part of Kuru Local Government Area of Kaduna State North Central Nigeria. The geographical coordinates of the community are latitude 10.57° 48' N, and longitude 8.14° 89' E. The community is made up of 7 different villages namely Agaladimawa, Agalmadai, Aguta, Asham, Kuyanbana, Madam and Kudu (Figure 1).

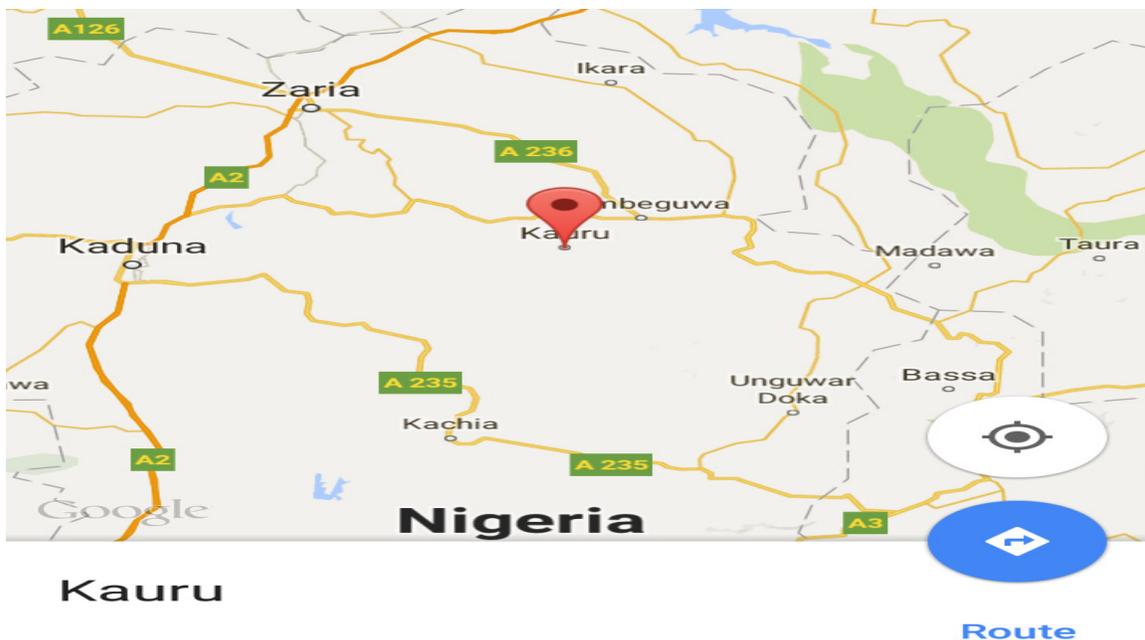
### Questionnaire administration and collection of plant samples

Ethnomedicinal information was collected between March and June 2016 by means of oral interview with local herbal practitioner and herb sellers using structured questionnaire from the different villages. Information on the demographic structure of respondents (age and sex) were generated from the questionnaire, the respondents provided information on plant part used, mode of preparation, method of administration and other medicinal uses. The respondents helped in identification and collection of the indigenous plants.

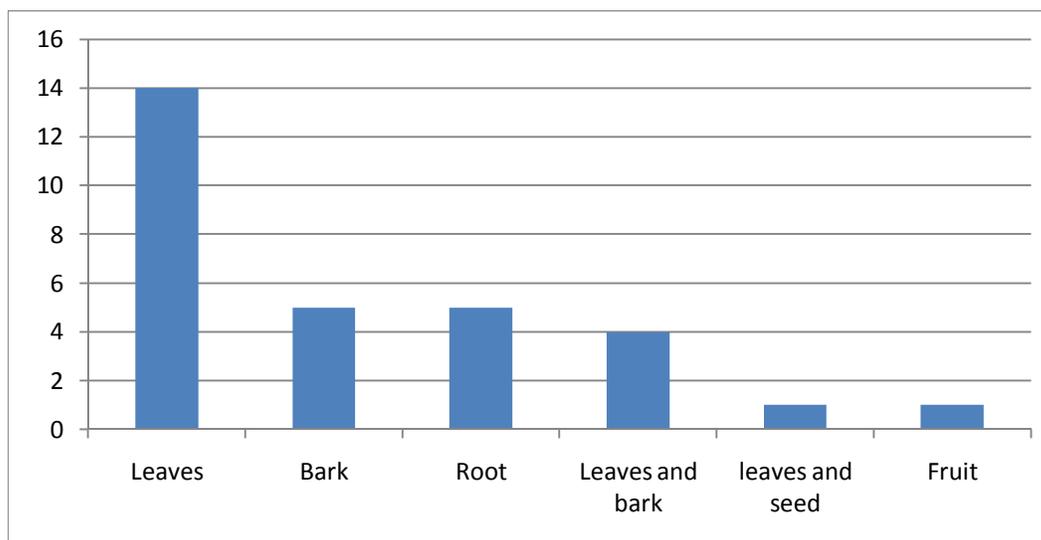
## RESULTS AND DISCUSSION

The information obtained through the ethnobotanical interview were tabulated based on the following parameters: scientific name, family name, vernacular name, parts of the plant used to treat malaria and mode of administration. The survey has provided information about 30 species of plants used in the treatment of malaria by the Rumaya people of Kuru Local Government of Kaduna State for the treatment of malaria. According to the respondents the plants have been used from generation to generation and have been found to be effective in the prevention and treatment of malaria (Table 1 and Figure 2).

The result of the study has also revealed that the most common plant parts used are the leaves and the bark, and there is usage of plants in combination which has proven effective at treating malaria and this may be due to the synergistic effect of these plants in the destruction of the *Plasmodium* species. Though various other plants (traditionally used in the treatment of malaria) have been identified by other ethnobotanical studies like [Idowu et al., 2010; Kayode et al., Olowokudejo et al., 2008; Ajibesin et al., 2008; Odugbemi et al., 2007) in Nigeria, there is no documented report on the plants traditionally



**Figure 1.** Map Showing Kuru Local Government.



**Figure 2.** Showing plant parts used.

used by the Rumaya people for the treatment of malaria. The majority of the herbal preparations identified in this study involved boiling the plant material and then drinking the extract. However, none of the people interviewed provided any information about how they might “standardize” treatments and the amounts used were generally vague. Thus the quality could vary greatly among prescriptions. Thus, further studies that might lead

to the identification of new and cheaper anti-malarial drugs will be required.

It is recommended that screening of all the plants for anti-malarial activity be carried out in order to justify their local usage. These studies might lead to the isolation (and possibly the identification) of potentially active compounds, which may be regarded as future promising phyto-therapeutics in the treatment of malaria.

**Table 1.** Medicinal plants or herbs used among the Rumaya people in the scientific name, family name, part of plant used and mode of administration.

Species name	Family name	Vernacular name	Part used	Mode of administration
<i>Acacia spp.</i>	Fabaceae	Kandii	Root	Powdered roots taken for a period of 3days morning and evening.
<i>Acacia polyacantha</i>	Fabaceae	Karo	Bark	Bark is boiled and taken two times a day for 3days.
<i>Adansonia digitata</i>	Fabaceae	Kuka	Root	Dry Root powdered prepared as a mash, to be taken morning and evening.
<i>Anogeissus leiocarpus</i>	Combretaceae	Marke/u'shunu	Bark	Bark is boiled and taken 2times a day for 3days.
<i>Carica papaya</i>	Caricaceae	Gwadda massar	leaves	Leaves are boiled or squeezed to be taken once or twice daily.
<i>Ceiba pentendra</i>	Malvaceae	-	leaves	Leaves boiled and taken for 3days.
<i>Combretum glutinosum</i>	Combretaceae	Taramniya	Bark and leaves	Leaves and bark are boiled together to be taken for a week.
<i>Citrus spp.</i>	Rutaceae	lemu	Fruit	Fruit mix with mango and pawpaw leaves to be boiled and taken for 3days, morning and evening.
<i>Delonix regia</i>	Fabaceae	Furen gadu	Bark	Bark boiled and taken for a period of 3days.
<i>Eucalyptus spp.</i>	Mytaceae	-	Bark	Bark is boiled and taken for 3days can bath with the boiled water.
<i>Ficus exasperata</i>	Moraceae	kwandari	Leaves	Decoction of leaves is used to wash patient's head and taken orally 3 times with hand for 3 days.
<i>Gmelina arborea</i>	Moraceae	Barkono	Leaves	Paste of leaves is used to rub on the patient's head.
<i>Jatropha Curcas</i>	Euphorbiaceae	Cafar	Leaves	Leaves are boiled with slice of citrus and taken for 3days.
<i>Khaya senegalensis</i>	Combretaceae	Madachi/U'tan	Seed and leaves	Leaves and seed are pounded together and taken orally for a week.
<i>Lophira lanceolata</i>	Ochnaceae	Namijin kande	Root	Root concoction is taken morning and evening.
<i>Mangifera indica</i>	Anacardiceae	Mangwaro	Leaves	With Pawpaw leaves boiled together and taken for 3 days.
<i>Mitragyna inermis</i>	Rubiaceae	Amuzak/U'chinkafa	Bark	Bark boiled and taken for a week, can also be use to bath 2 times a day.
<i>Nauclea latifolia</i>	Rubiaceae	Marga	Root	Root is boiled and taken.
<i>Newbouldia laevis</i>	Bignoniaceae	Adoroku	Leaves	The leaves decoction is taken.
<i>Parinari curatellifolia</i>	Chysobalanaceae	Gawassa	Leaves	Leaf decoction is either drunk or bath with morning and evening.
<i>Phyllantus amarus</i>	Euphorbiaceae	Geron-tsuntsaye/U'tinie	Leaves	Boiled and taken morning and evening.
<i>Phyllanthus reticulatus</i>	Phyllanthaceae	-	Leaves	Decoction of leaves
<i>Piliostigma thonningii</i>	Fabaceae	Kalgo	Leaves and bark	Leaves and bark boiled together and taken for 3 days.
<i>Prosobis africana</i>	Fabaceae	Kiryia/Kabou	Leaves	Leaves boiled and taken for 3 days
<i>Psidium guajava</i>	Myrtaceae	Gwaba	Leaves	Leaves boiled with citrus spp. either bath or drink decoction.
<i>Securidaca longepedunculata</i>	Polyalaceae	Uwar magunguna	Root	Root can be chewed or boiled and taken foe 3 days
<i>Senna occidentalis</i>	Fabaceae	Ba'zamfari/U'shark	Root	Root boiled with 'kafi wari' and taken for a period of 3days.
<i>Tectonia grandis</i>	Lamiaceae	Tsadar lamarudu	Leaves	Fresh or dried leaves taken for a week
<i>Terminalia catapa</i>	Combretaceae	Baushe	Leaves	Fresh leaves boiled and taken for 3days.
<i>Terminalia glaucescens</i>	Combretaceae	Kwandari	Leaf and bark	Fresh or dried leaves or bark decoction taken for 3 days

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