

DOCUMENTATION OF MEDICINAL PLANTS TRADITIONALLY USED BY THE JAKUN PEOPLE OF ENDAU-ROMPIN (PETA) FOR TREATMENTS OF MALARIA-LIKE SYMPTOMS

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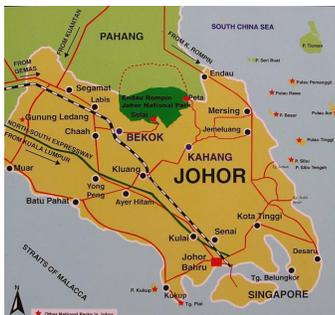
Izdihar Ismail^{a*}, Alona Cuevas Linatoc^a, Maryati Mohamed^a, Lili Tokiman^b

*Corresponding author
gw130023@siswa.uthm.edu.my

^aDepartment of Heritage & Technology, Faculty of Science Technology and Human Development, Universiti Tun Hussein Onn Malaysia, Parit Raja 86400 Batu Pahat, Johor, Malaysia

^bJohor National Parks Corporation, Kota Iskandar, 79576 Nusajaya, Johor, Malaysia

Graphical abstract



Abstract

Malaria continues to kill over a million people each year. Malaria is caused by parasites of the genus *Plasmodium* and is one of the leading infectious diseases in many tropical regions including Malaysia. Many of the local people in the rural areas still use plants as remedies against fever and other symptoms of malaria as reported herein. Although the potentials of plants to be useful in traditional healthcare are acknowledged, currently survey and documentation of medicinal plants used by Jakun people in Endau-Rompin, Johor is lacking. As such there is an urgent need to document information on herbal remedies traditionally used for treatment diseases such as malaria and malaria-like symptoms. An ethnobotanical survey of medicinal plants used by the indigenous people in Kg. Peta, Endau-Rompin, Johor for the treatment of malaria and malaria-like symptoms infection was conducted. Data was collected from key informants in that community using a semi-structured interview. Investigation was carried out on the names of plants (vernacular), plant parts used, methods of preparations and how it is administered were all recorded. The result of the survey revealed that 10 plant species from 9 families were regarded for treating malaria and malaria-like symptoms. Leaves and plant sap are the most frequently used plant parts while decoction is the most common methods involved in the preparation. This study acknowledges the local people's knowledge about malaria and the traditional treatment practices used by the local people in the study area. Herbal remedies are commonly used by the local people because it is cost-effective and more accessible. Hence, the need for documentation of these plants to avoid knowledge erosion and lost in the succeeding generations make this study highly necessary.

Keywords: Malaria, medicinal plant, ethnobotany, Jakun people, Taman Negara Johor Endau-Rompin

Abstrak

Malaria terus membunuh lebih daripada satu juta orang setiap tahun. Malaria disebabkan oleh parasit genus *Plasmodium* dan merupakan salah satu penyakit berjangkit yang utama di kawasan tropika termasuk Malaysia. Kebanyakan penduduk tempatan menggunakan tumbuhan sebagai rawatan bagi melawan segala penyakit termasuk demam dan simptom-simptom malaria yang lain. Sungguhpun potensi tumbuhan dalam penjagaan kesihatan tradisional diakui dewasa ini, kajian serta pendokumentasian tumbuhan ubat-ubatan yang digunakan oleh orang-orang Jakun di Endau-Rompin, Johor sangat kurang. Ia menyebabkan tindakan segera perlu diambil bagi mengelakkan kehilangan pengetahuan tradisional yang berharga ini. Satu kajian etnobotani tumbuhan ubat-ubatan yang digunakan oleh penduduk asli di Kg. Peta, Endau-Rompin, Johor bagi rawatan malaria berdasarkan simptom-simptomnya telah dijalankan. Data dikumpulkan daripada pemberi-

pemberi maklumat menggunakan soal selidik separa berstruktur. Kajian yang dijalankan secara terperinci meliputi nama tempatan tumbuh-tumbuhan, bahagian tumbuhan yang digunakan, kaedah persediaan dan cara pengambilan semuanya direkodkan. Hasil kaji selidik ini menunjukkan bahawa 10 spesies tumbuhan daripada 9 famili berbeza dapat merawat malaria berdasarkan simptom-simptomnya. Daun dan sap tumbuhan adalah bahagian yang sering digunakan manakala rebusan pula adalah kaedah yang paling biasa digunakan dalam kaedah penyediaan. Kajian ini juga mengakui tentang maklumat pengetahuan tradisional daripada penduduk tempatan mengenai malaria dan amalan rawatan tradisional yang digunakan oleh mereka di kawasan kajian. Tumbuhan ubat-ubatan biasa digunakan oleh penduduk tempatan kerana penjimatan kos dan lebih mudah didapati. Kepentingan kajian pendokumentasian tumbuh-tumbuhan ini adalah untuk mengelakkan hakisan pengetahuan tradisional daripada generasi lama ke generasi baru.

Kata kunci: Malaria, tumbuhan ubat-ubatan, etnobotani, orang Jakun, Johor National Park Endau-Rompin

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1.0 INTRODUCTION

Malaria remains a major public health problem in Malaysia even though active campaign was launched over the last few decades, which has greatly reduced the incidence of infection [1].

Malaria is a vector-borne disease transmitted from one human to another via the bite of a female *Anopheles* mosquito [2]. The causative agent is a parasite belonging to the genus *Plasmodium*. Four species of plasmodia are known to cause malaria in man, *P. falciparum*, *P. vivax*, *P. malariae* and *P. ovale* [3]. *P. knowlesi*, a simian malaria parasite, is now recognized as the fifth cause of human malaria [4]. Among these five species, infection by *P. falciparum* is the most severe and responsible for about 90% of malaria-caused mortality [5].

The early signs and symptoms of malaria are presented by fever, chills, headache, loss of appetite, vomiting, dizziness, muscle and joint aches, fatigue and nausea [6]. If not treated immediately, malaria can quickly become life-threatening by disrupting the blood supply to vital organs [7]. Therefore, people living in rural areas where access to hospitals and other medical facilities is a challenge are in great danger of succumbing to the infection.

The Jakun community of Endau-Rompin (Peta), Johor still in some ways depends on the forest for livelihood and daily healthcare. They have strong knowledge about the medicinal uses of medicinal plants in their surroundings. This knowledge has been passed down from one generation to the next.

However, due to the influence of modernization and socio-economic development, most of this knowledge has not been documented and often neglected as the young generations rely on modern medicine in the treatment of illness and diseases. This study aimed at documenting ethnobotanical information for potential anti-malarial plants in Kg. Peta, Johor National Park Endau-Rompin (TNJER), Mersing, Johor, Malaysia.

2.0 EXPERIMENTAL

2.1 Study Area

The study was conducted on selected indigenous people living in Peninsular Malaysia, in the northern-east part of Johor particularly the Jakun community in Kg. Peta, Johor National Park Endau-Rompin (TNJER), Mersing, (Figure 1). In 2013, the total population in Kg. Peta is 222 individuals in 63 households [8]. Many of the residents are staff of Johor National Park Endau-Rompin (TNJER).

Sampling was conducted around Johor National Park Endau-Rompin assisted by key informants for the local village.

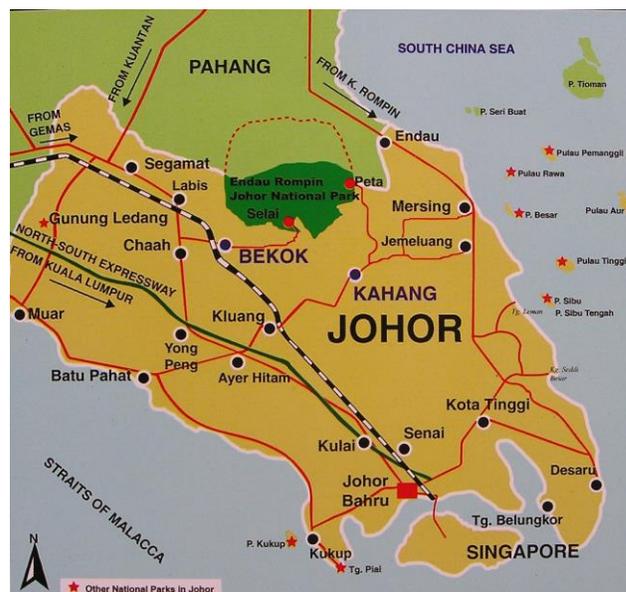


Figure 1 The location of Kampung Peta in Johor National Park Endau-Rompin

2.2 Methods

The ethnobotanical survey was carried out from March to September 2014. Key informants selected were preliminarily based on recognition by the community as local specialists (*pengamal perubatan*), which were then endorsed by TNJER staff for their active involvement in practicing traditional knowledge. Another criterion used in the selection of key informants is the experience in herbal formulations, field identification and identification of medicinal plants.

Data were collected from key informants using semi-structured questionnaires. Prior informed consent (PIC) was obtained before conducting the interviews. The respondents were asked about commonly-used herbs, parts of plants used for anti-malarial remedies, other medicinal uses, mode of preparation, mode of administration, dosage and duration of treatment; and possible side effects (if any). Interview sessions usually lasted between two to five hours including a field-walk to collect plant specimens and highly depend on the convenience of the subject informants.

Voucher specimens of medicinal plants recorded were collected and plant identification was verified by experts from the Forest Research Institute Malaysia (FRIM). Voucher specimens were deposited at the Universiti Tun Hussein Onn Malaysia (UTHM) Herbarium.

3.0 RESULTS AND DISCUSSION

Five key informants, one male and four females aged between 40-70 years old provided relevant information on the plants used in the treatment of malaria and malaria-like symptoms. The main reasons for using herbal remedies were that they are cost-effective, readily and easily available and its effectiveness. Interestingly, one of the informants declared that they had been using medicinal plants to patients even after receiving treatment from the hospital. These provided patients complete healing and fully recovered.

However, this vital information on the traditional use of medicinal plants in the treatment of malaria and malaria-like symptoms are now becoming less and less popular to the younger generations. According to the informants, the younger generations were less interested in practicing the traditional knowledge and generally rely on the convenience of modern medicine for treatments. This will result to the erosion of ethnobotanical information/traditional knowledge. Among the 222 individuals in local community, only five (5) possess significant knowledge on traditional practices and if this has not been passed to their children will eventually be lost. Therefore, proper documentation is indeed important to prevent this precious knowledge from being forgotten. Moreover, this traditional knowledge holds key to future drug discovery that has to be unveiled by intensive research.

Table 1 show the uses of plants for the treatment of various symptoms and is a common practice among

communities in Kg. Peta. Ten (10) species of plants from nine (9) families were used in the treatment of malaria and/or related symptoms. From the data, it shows that Jakun community had been using different plant types as a source of remedies. The most frequently use herbal remedies are from shrub followed by climbers.

The interview also revealed that leaves and plant sap or exudates were the most commonly used in the preparation of herbal remedies. Plant sap exuded from cut climber roots of *Hodgsonia macrocarpa*, *Tetracera macrophylla* and *Rhodamnia cinerea* are drunk directly; while leaves from tree or shrub are applied externally (like *Tacca integrifolia*) or consumed orally (such as *Camptosperma auriculatum* and *Saprosma corymbosa*)^{[9][10]}.

Simaroubaceae (*Eurycoma longifolia*) and Rubiaceae (*Saprosma corymbosa* and *Rennelia elliptica*) families are commonly used for medicinal purposes compared to any other plant families. One of the key informants revealed that *Eurycoma longifolia* is a famous species and is popularly used as 'ubat lelaki' (man's medicine). Researchers in Universiti Putera Malaysia (UPM) reported that roots of *Eurycoma longifolia* indeed contains anti-malarial activity against *P. falciparum*^[1]. Similarly, root extracts from *Rennelia elliptica* has been reported to have anti-plasmodial activity against *P. falciparum*^[11]. Hence, to support the claim of the informants, scientific studies show that specific chemical compounds isolated from *Eurycoma longifolia* and *Rennelia elliptica* were thought to be responsible for its anti-malarial properties^{[1][11]} that are able to provide healing to patients showing malaria-like symptoms.

Some herbal remedies can be consumed orally like the decoction of *Elaeocarpus ferrugineus* (Elaeocarpaceae), *Eurycoma longifolia* (Simaroubaceae), *Camptosperma auriculatum* (Anacardiaceae) and *Rennelia elliptica* (Rubiaceae). They claimed, decoctions are intended for immediate use.

Table 1 Species of plant used for the treatment of malaria-like symptoms in the Kg. Peta, Endau-Rompin, Mersing, Johor

Species name (voucher specimen number)	Family	Vernacular names	Parts used	Habit	Major symptoms and other disease treated	Preparation	Dose
<i>Elaeocarpus ferrugineus</i> (Jack.) (SUNR018)	Elaeocarpaceae	Tampoi burung 	Stem bark	Shrub	Diarrhea	Cut in small pieces and decoction about small handful in a pot with ½ of water	2 to 3 times/per day about ¼ of a cup until recover
<i>Eurycoma longifolia</i> Jack (SUNR029)	Simaroubaceae	Tongkat ali putih 	Roots	Shrub	Dizziness, joint pain, fever, tiredness	Cut in small pieces and decoction in a pot with ½ of water	2 to 3 times/per day about ¼ of a cup until recover
<i>Campnosperma auriculatum</i> (SUNR028)	Anacardiaceae	Habong 	Roots, leaves	Tree	Dizziness, vomiting	Decoction for the roots part while for leaves are taken orally	2 to 3 times/per day about ¼ of a cup and can be consumed as a daily drinks

<i>Hodgsonia macrocarpa</i> (SUNR001)	Cucurbitaceae	Akar terua 	Plant sap	Climber	Fever, rigors	Drinking directly once cut in the forest and fed into a cup	About ¼ of a cup once take it
<i>Saprosma corymbosa</i> (SUNR023)	Rubiaceae	Sekentut 	Leaves	Shrub	Headache, dizziness	Consume orally in unlimited leaves	2 to 3 times/per day and unlimited dose
<i>Scaphium macropodum</i> (SUNR021)	Malvaceae	Kembang semangkuk 	Fruits	Tree	Fever	Maceration/soaking the fruits in a bowl with water until fluffy	3 times a day and can be consumed as daily drinks
<i>Tacca integrifolia</i> (SUNR 015)	Taccaceae	Pelemah urat 	Leaves	Herb	Joint pain, muscle aches, knee pain, swollen, sprain	Apply externally to the area with warm up the leaves at both side	Unlimited pieces

<i>Tetracera macrophylla</i> (SUNR002)	Dilleniaceae	Hempelas 	Plant sap	Climber	Fever, rigors	Drinking directly once cut in the forest and fed into a cup	About ¼ of a cup once take it and about 2 to 3 times/per day until recover
<i>Rennelia elliptica</i> (SUNR011)	Rubiaceae	Sengilur 	Root	Shrub	Body weakness, jaundice, tiredness	Decoction a few minutes until the water turns to yellowish	2 to 3 times until recover and can be consumed as a daily drinks
<i>Rhodamnia cinerea</i> (SUNR019)	Myrtaceae	Pelongot 	Plant sap	Climber	Fever, tiredness	Drinking directly once cut in the forest and fed into a cup	About ¼ of a cup once take it and about 2 to 3 times/per day until recover

* handful - how Orang Asli Jakun use the measurement for preparation of herbal remedies

* 'drink a little' assume ¼ of a cup

Key informants believed that the best time to collect medicinal plants is from 6:00 to 7:00 o'clock in the morning. They claimed that it is most effective in treating symptoms and enhance patient's recovery if plants/plant parts were collected during this time. This however, has to be proven scientifically.

As for plant sap/exudates, it is suggested to drink it immediately after cutting the plant to effectively reduce the fever. It is known that the sap/exudates of the plant undergo immediate chemical reaction upon exposing to air, hence change in color upon prolonged exposure to air. As a precaution, the informants do not allow anybody with no fever to drink the plant sap/exudates.

Even it is a small community, there are variations in the traditional practices of medicinal plants as used by the Jakun people. This indicates the rich traditional knowledge that they possess which passed down by their ancestors to the younger generations. This also needs for further scientific validations as one claim is said to be effective as the other.

Members of the Jakun community were born and raised in the area and had lived there for most of their lives. However, as the young generations attend school and obtain employment outside their local community, the reliance to traditional practices has been significantly declining. Hence, there is an immediate need to document this valuable traditional knowledge to prevent it from being forgotten. The possible impact of not documenting this herbal remedies or not passing it on to the young generations would eventually lead to this beautiful knowledge being lost forever and also lost opportunity for future drug discovery.

4.0 CONCLUSION

This study has shown that the people in Kg. Peta possess their own knowledge about medicinal plants in the treatment of malaria and malaria-like symptoms. Herbal remedies were commonly used because they were cost-effective and easily available.

This study has documented for the first time the species of plants used for the treatment of malaria and malaria-like symptoms by the Jakun community in Johor National Park Endau-Rompin (TNJER) the study area. It is important to document such traditional knowledge to prevent it from being lost in the succeeding generations.

The herbal remedies used needs to be investigated for ethnopharmacology study in order to ensure that people get effective treatment of malaria. More importantly, the results of this

documentation increases the possibility of discovering potential new drugs to treat malaria perhaps find alternatives to the compound resisted by *Plasmodium sp.*

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