

## The applications of betel-leaf in traditional therapeutic practices among the Mualang Dayaks in Western Kalimantan

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### Abstract

*Piper betle* L., commonly referred to as Betel, is extensively cultivated in southern and southeast Asia. Historically, the residents of Southeast Asia were enthusiastic consumers of betel leaf, which held significant significance in their traditional healing practices and cultural rituals. This study aimed to examine the roles of betel leaf in the traditional medicinal practices of the Mualang Dayak community. The research objective was to develop a model that could determine the correlation between the use of betel leaf in traditional healing and cultural behaviours. A qualitative approach was employed in this study, utilising face-to-face interviews with key informants such as shamans, community leaders, and elderly individuals. The findings revealed that betel-chewing was a common practice among the Mualang Dayaks, who believed that betel leaf possessed therapeutic properties for treating ailments like najam and nipu darah in conventional healing. Within the realm of ethnomedicine, the Mualang Dayaks attributed a sacred status to betel leaf and incorporated it into their traditional healing practices. In conclusion, the established model illustrates that betel leaf is more closely associated with the integration of magico-religious beliefs in the treatment of illnesses, rather than being supported by scientifically proven medicinal properties.

### 1. Introduction

Betel, scientifically known as *Piper betle* L., belongs to the Piperaceae family (Figure 1). It is a perennial creeper or vine plant and is popularly cultivated and consumed in Bangladesh, Burma, China, India, Indonesia, Malaysia, Nepal, Pakistan, the Philippines, South Africa, Sri Lanka, and Thailand. The habit of chewing betel has a long history in South Asia and Melanesia, leading to the claim that it was the most widely used narcotic in human history (Reid, 1985). In India, betel leaf is a valuable cash crop that is commercially cultivated over an area of 50,000 ha and holds significant market value in India and other countries in South Asia and Southeast Asia (Maiti and Saikia, 2002). In Malaysia and Indonesia, the betel leaf is traditionally used for chewing together with the areca nut and lime. The betel quid consists of lime, areca nut, and betel leaf. In the early 19th century, it was recorded that the residents of Penang and the Prince of Wellesley (Peninsular Malaysia) consumed 6,211,400 bundles of one hundred betel leaves annually, while Riau and Sumatra supplied 120 million cubes (which weighed approximately 10 g) to Java, where the population was

less than six million in 1815. The practice of chewing betel has been abandoned and is now only observed by certain older indigenous generations. The betel-chewing culture has been replaced by tobacco, which was introduced to the Archipelago by Europeans (Reid, 1985).



Figure 1. *Piper betle* L. plant.

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This paper focused on investigating the medicinal and religious significance of the betel vine among the Mualang Dayaks in Western Kalimantan, Indonesia. The Mualang people reside in the Kecamatan Belitang area, approximately 300 km upstream from Pontianak, the capital city of the West Kalimantan province, along the Kapuas River (Figure 1). The estimated population of the Mualang people is 40,000. They embraced Christianity in the 1930s, with Catholics predominantly located in the downriver area of Belitang and Protestants in the upstream region. Even after adopting Christianity, they have preserved certain traditional customs and rituals, albeit with modifications to align with their Christian beliefs (Tjia, 2007). The knowledge and practices pertaining to the utilisation of betel leaf constitute an integral component of the cultural heritage of the Mualang community. However, regrettably, this wisdom is presently limited to the older members of society. The younger generation has not been able to inherit this indigenous knowledge. Therefore, conducting research on the traditional usage of this plant is of utmost importance for the preservation of culture and for generating awareness regarding endangered customs among the wider populace.

## 2. Materials and methods

The data utilised in this article were acquired in Melanjan, a Mualang village situated downstream from the Belitang River in West Kalimantan, Indonesia (Figure 1). This section will elaborate on the process of selecting key informants and collecting data for the purpose of this study.

### 2.1 Key informant selection

In the fieldwork, the "key informants" interviewed were: a Shaman (a traditional practitioner), locals, and Ketua Adat (literally: Chief of Cultural Customs). These individuals are experts in Mualang traditional practices. To maintain ethical standards, the names of the key informants have been anonymised. It is worth noting that all of the informants, with the exception of the individual who provided data on betel leaf consumption, are male. The term "key informant" is commonly used in anthropological studies to designate those with extensive ethnographic knowledge of their own social and cultural patterns. In qualitative research, the inclusion of key informants is crucial as they can provide researchers with implicit and nuanced information that may not be found in secondary sources. Key informants offer a broader perspective and comparative understanding of the problem or question being studied (Pahwa *et al.*, 2023). Table 1 presents a checklist provided by Pahwa *et al.* (2023), which was used in this study to validate the qualities of "good" key informants. Overall, the selected key informants for this study met all of the required criteria.

### 2.2 Data collection methods

This study is characterised as qualitative research, which "focuses on examining phenomena within the natural contexts of individuals or groups. The research involves the collection of rich narrative materials and employs a flexible research design" (Moser and Korstjens, 2017). The study of betel leaf practices within the cultural beliefs of the Mualang necessitates a qualitative approach as it affords the researcher the

Table 1. Checklist of the qualities of "key informant" in this study.

Criteria	Qualities of key informant
Community role: "unique access" to, "unique" social position.	<ul style="list-style-type: none"> <li>The Shaman selected is a highly skilled traditional practitioner hailing from the Mualang community.</li> <li>The Ketua Adat serves as the cultural consultant and official representative of the Mualang community.</li> </ul>
Knowledge: ability to "meaningfully" synthesise their experiences and to offer rich.	<ul style="list-style-type: none"> <li>The Shaman openly shared his knowledge on the utilisation of betel leaves for medicinal purposes.</li> <li>The ketua adat, or local community members, possess comprehensive knowledge and expertise in oral narratives about betel leaves, and they were willing to provide elaborate cultural insights on the subject.</li> </ul>
Willingness to engage with researchers/ Capacity to communicate "intelligibility" to the researcher	<ul style="list-style-type: none"> <li>One of the co-authors of this article is a Mualang Dayak individual and a post-graduate student. Consequently, the key informants and the researcher were able to establish effective communication and achieve complete collaboration during the data collection process.</li> </ul>
Impartiality	<ul style="list-style-type: none"> <li>The biases were derived from the fact that the traditional customs of Mualang are presently facing the threat of extinction. Consequently, the older key informants expressed their satisfaction at discovering that a young researcher from the Mualang community was dedicated to documenting this cultural heritage. As a result, the key informants are willing to impart all of their traditional knowledge to the researcher during the interviews.</li> </ul>

opportunity to develop a more comprehensive comprehension of the significance of betel leaf in Mualang culture, the medicinal advantages of betel leaf in treating illnesses, as well as the rituals and ceremonies associated with the healing practices. In terms of sampling, data were procured from key informants utilising purposive sampling strategies, wherein the selection of pertinent data was guided by the researcher's discernment in terms of its informativeness (Tenny *et al.*, 2022).

During the field research, the researcher conducted face-to-face interviews and made audio recordings. The researcher initially approached the key informants and explained the purpose of the research. Given the existence of different cultivars of *Piper betle* (for example, in India, there are four different cultivars of *Piper betle*: Banarasi, Calcutta, Kammar, and Kumbakonam (Smila *et al.*, 2014), and in the Malay archipelago, the cultivar of the betel vine species consists of three variants: sirih Melayu, sirih Cina, and sirih udang (Osman *et al.*, 2021)), betel leaves (sirih Melayu) from the species of *Piper betle* (Figure 2) were brought along and presented to the key informants to ensure the validity and accuracy of the investigated varieties of betel vine leaves. The data collected for this study is comprehensive, encompassing the traditional uses of betel leaf for consumption and medicinal treatments, as well as the spells performed during healing rituals. The data selected for analysis in this article consists of qualitative data related to the customary utilisation of betel leaf for medicinal purposes and consumption, along with the associated cultural beliefs.

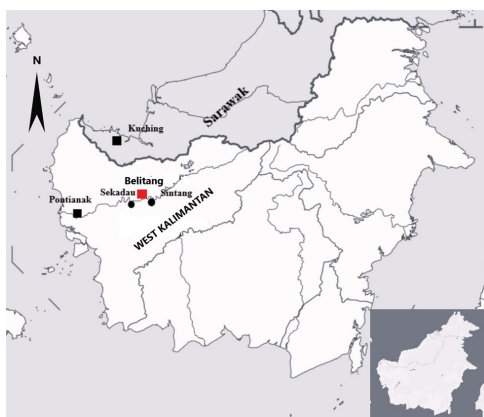


Figure 2. The distribution area of Mualang Dayaks in Western Borneo, Indonesia.

### 3. Results and discussion

#### 3.1 A brief historical depiction of betel leaf consumption culture

This section presents a comprehensive overview of the medicinal, religious, and ceremonial significance of the betel leaf. The discussion will primarily focus on

comparing the traditional uses of the betel leaf in India and the Malay Archipelago. Subsequently, a brief exploration of the religious values associated with the betel leaf will be provided. It is worth noting that contemporary therapeutic values will not be elaborated upon in this section. For further information on the modern therapeutic properties of the betel leaf, readers are referred to the works of Guha (2006), Ahuja and Ahuja (2011), Rai *et al.* (2011), Sunil *et al.* (2016), Valle *et al.* (2016), and other relevant sources.

According to Sengupta and Banik (2013), the betel leaf has long been employed in traditional medicine in South Asian regions for treating various ailments. In India, the betel vine plant is often referred to as the "green gold" of the country due to its significant contributions to agriculture, industry, economics, and pharmaceutical manufacturing. Notably, the betel leaf possesses analgesic and cooling properties, making it effective in relieving headaches, aiding in urination, treating nervous pains, addressing nervous exhaustion and debility, alleviating irritating coughs and sore throats, relieving constipation, and exhibiting beneficial effects in the treatment of inflammatory conditions such as arthritis and orchitis.

Inhabitants of earlier Southeast Asian societies commonly consumed betel leaf in conjunction with areca nuts as a customary practice. A betel quid typically consists of lime, areca nut, and fresh betel vine leaves. In Reid's (1985) study, he observed that the consumption of a betel quid may contribute to the prevention of dental decay and toothaches. It is also claimed that the fragrance of the leaf can freshen breath, while betel-chewing may aid in preventing post-meal belching, soothing the stomach, and minimising gastrointestinal and digestive disorders. In practices and rituals, the presence of areca nut and betel was often observed alongside the deceased during funeral ceremonies or as offerings to the spirits. Furthermore, these substances held significant importance in courtship and marriage rituals. Notably, the betel ingredients were commonly included as a component of the bride-price among the Javanese community (Reid, 1985).

#### 3.2 The significance of *Piper betle* L. leaf in Mualang culture

In the Mualang language, the betel vine plant is referred to as sireh or sirih. The leaf of the betel vine, known as daun sireh, has gained recognition among the locals as the "queen of the leaves," based on Mualang's folk story. The traditional use of betel leaf for medicinal purposes is facing the threat of extinction as Mualang society becomes increasingly urbanised and modernised. During the fieldwork, the researcher had the opportunity

to observe a 74-year-old elderly informant who consumed betel leaf quid. She emphasised that the betel quid contains gambir, lime, and buah pinang (areca nut) as additional ingredients. Gambir is an extract derived from the climbing shrub, *Uncaria Gambir*. The practice of adding gambir to betel chewing originated in Maluku, Indonesia, in the late 17th century (Reid, 1985). The habit of chewing betel quid mixed with gambir is also prevalent in the Mualang community. The combination of gambir, lime, and areca nut in the betel quid is believed to provide a taste sensation of bitterness and astringency. In addition to being consumed habitually, betel leaf and its accompanying ingredients are also traditionally used for medicinal purposes by the Mualang community. This section will discuss the medicinal benefits and rituals associated with the utilisation of betel vine leaves. Figure 3 illustrates the significance of betel leaf usage in the Mualang Dayak community.

### 3.2.1 Medicinal benefits

This subsection provides a brief overview of the nutritional and chemical components of the betel leaf. While numerous scientific studies have already examined the medicinal properties of the betel leaf, this subsection aims to provide a concise summary of the nutrients and chemical compositions of the betel vine leaf, drawing from the research conducted by Guha (2006) and Sunil *et al.* (2016). Guha (2006) identified the micro and macro nutrients present in a betel leaf as follows: water (approximate composition 85-90%), protein (3-3.5%), fat (0.4-1.0%), minerals (2.3-3.3%), fibre (2.3%), Chlorophyll (0.01-0.25%), Carbohydrate (0.5-6.10%), Nicotinic acid (0.63-0.89 mg/100 g), Vitamin C (0.005-0.01%), Vitamin A (1.9-2.9 mg/100 g), Thiamine (10-70 µg/100 g), Riboflavin (1.9-30 µg/100 g), Tannin (0.1-1.3%), Nitrogen (2.0-7.0%), Phosphorus (0.05-0.6%), Potassium (1.1-4.6%), Calcium (0.2-0.5%), Iron (0.005-0.007%), Iodine (3.4 µg/100 g), Essential oil (0.08-0.2%) and energy (44 kcal/100 g). In terms of medicinal values, Sunil *et al.* (2016)'s paper presents 13 chief chemical constituents of *Piper betle* leaves, namely: Chavibetol (53.1%), Caryophyllene (3.71%), Chavibetol acetate (15.5%), Allylpyrocatechol Diacetate (0.71%), Chavibetol methyl ether (0.48%), Campene (0.48%), f-Pinene (0.21%), Eugenol (0.32%), u-Limonene (0.14%), a-Pinene (0.21%), 1,8-Cineol (0.04), Saprobe (0.11%) and Allylpyrocatechol Monoacetate (0.23%).

For medicinal purposes, the Mualang people hold the belief that the betel vine leaf possesses specific medicinal properties and plays a crucial role in healthcare and treatments. Betel leaves are believed to be beneficial in the treatment of najam or masuk angin (literally means "the wind has entered the body"). The

symptoms of najam typically include abdominal pain, dyspnea, and shortness of breath. To alleviate this condition, a combination of chewed areca nut and betel leaf is applied to the affected area. Scientific studies have shown that betel leaf contains two chemical components, Caryophyllene and Eugenol, which have analgesic properties and can provide relief for various human ailments such as headaches, arthritis, nervous tiredness, nerve pain, joint pain, sore throat, and debility (Singh *et al.*, 2023). Furthermore, betel leaves are also known to be effective in treating menstrual disorders, particularly symptoms of oligomenorrhea. Oligomenorrhea, known locally as nipu darah (literally, "blood cheating"), refers to infrequent menstrual periods with a cycle length exceeding 35 days. Beyond the Mualang community, Madura women in Indonesia rely on betel leaves to regulate their menstrual cycles. Various plants, including manjakani, betel leaves, and kunci, are utilised as ingredients in order to prevent abnormal vaginal discharge and irregular menstruation (Putri *et al.*, 2018).

### 3.2.2 Traditional healing treatments and practices

From an ethnomedicine perspective, the betel vine possesses profound cultural significance in traditional rituals and is revered as sacred in the religious beliefs of the Mualang community. In addition to natural or herbal treatments, the Mualang Dayaks use bunyuh for magico-religious healing. Bunyuh is prepared by rubbing fresh betel leaves with lime, which is derived from crushed freshwater snail shells. During the healing practice, a practitioner, usually a Shaman, will apply the bunyuh while chanting. These chants, also referred to as spells, consist of poetic phrases used for prayer to God or communication with ethereal entities (Budiharso, 2016). The Mualang populations have historically practised chanting, as extensively documented by Dunselman (1959), during various activities such as harvesting honey from lalau trees, staying in forest huts while engaging in hunting, gathering, or head-hunting, and when receiving a severed head into the village.

To treat a skin abscess or boil, a traditional practitioner employs a ritual involving a bunyuh, recitation of a spell, and wiping the affected area. Similarly, for individuals afflicted with swollen lymph nodes, known as ngurak in the Mualang language, a practitioner recites a spell to the bunyuh and then makes the sign of the cross over the lymph node. For children who are prone to having fever, a practitioner will utilise the aforementioned techniques in an attempt to "alleviate" the fever or illness. The practitioner will recite the incantations upon a bunyuh and proceed to make the sign of the cross on the abdominal region of the children. Moreover, the practitioner utilises spells and the bunyuh to heal individuals who claim to be suffering

from masuk angin. After reciting the spell, the bunyuh is applied to the patient's spine, who is then instructed to grasp their spine firmly with either their fingers or toes.

From a cultural perspective, the Mualang Dayaks held the belief that Orangutans in the forest would utilise leaves to rub their infants' heads, known as marok in the Mualang language. These discarded leaves were considered sacred and subsequently employed for various therapeutic purposes rooted in tradition. To create a concoction for this purpose, a practitioner would combine these leaves with crushed areca nut and betel leaves. The resulting mixture would then be applied to a child's head. The underlying belief was that this practice would instil resilience in the child, enabling them to bear burdens on their head with strength and fortitude, termed as kuat ngemak in the Mualang language (Literally, "strong in carrying anything").

Based on the data analysis, it can be concluded that the *Piper betle* L. leaf plays a significant role in traditional healing treatments and holds cultural importance among the Mualang Dayaks community. The significance of this plant's leaf in therapeutic practices, based on its medicinal values and magico-religious beliefs, is illustrated in Figure 3.

#### 4. Conclusion

In conclusion, this paper has presented the elaborations on the use of betel leaf by the Mualang Dayaks who inhabited the remote area of Borneo. In fact, since ancient times, the betel vine has played a cultural

role mainly in South Asian and Southeast Asian societies. In the case of Mualang, although betel vine is not an integral part of modern life, its leaves have played an important function as a tangible cultural object in primordial culture. The leaves of the betel vine have even been designated the "Queen of Leaves" and are believed to have significant medicinal values in illness treatment. Because they were previously a nature-worshipping tribe, most of the treatments were integrated with magico-religious beliefs to aid in the cure of illnesses. In terms of contribution, a model has been outlined that illustrates the integration of the significance of *Piper betle* L. leaf in the Mualang Dayak community. It is believed that this model is also applicable to other indigenous communities, as the lives of indigenous communities are inherently intertwined with their natural environment. As this traditional culture is gradually being abandoned by the younger generation of Mualang, this study can also be considered an effort to document the indigenous wisdom that is on the brink of extinction.

#### Conflict of interest

The authors declare no conflict of interest.

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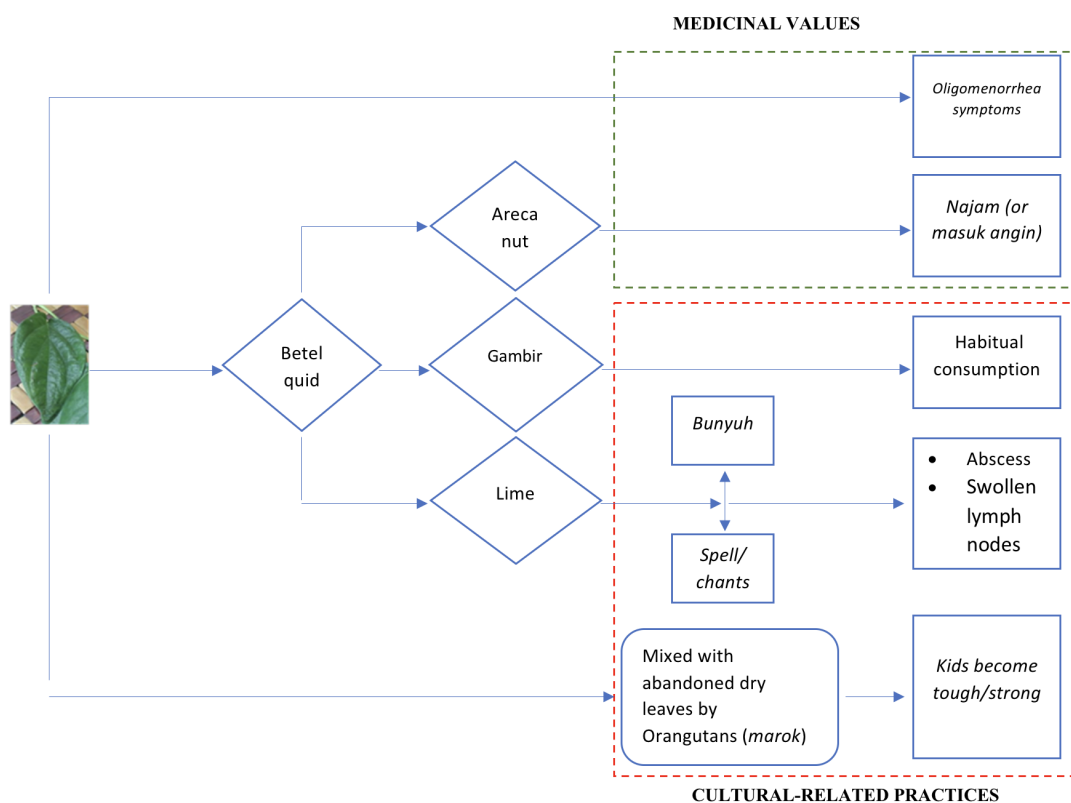


Figure 3. The significance of *Piper betle* L. in the Mualang community.

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