



Analysis of Ethnopharmacological Studies on the Use of the Sambiloto Plant in the Treatment of Malaria in the Asmat Tribal Community in Papua, Indonesia

Esther Lea Awotauw^{1*}, Ruth Maria Panggabean¹

¹General Practitioner, Puskesmas Namblong, Jayapura, Indonesia

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*Corresponding author: Esther Lea Awotauw

E-mail address: esther.lea@gmail.com

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ABSTRACT

Malaria is still a major health problem in Indonesia, especially in the Papua region. The Asmat tribe has traditional knowledge about the use of medicinal plants to treat malaria, one of which is sambiloto. This research uses a qualitative observational research design with an ethnopharmacological approach. This approach combines aspects of ethnography and pharmacology to study traditional knowledge and the use of medicinal plants in a community. It was discovered that sambiloto has long been used by the Asmat tribe to treat malaria. Sambiloto leaf is processed into a decoction or juice and drunk to relieve malaria symptoms such as fever, chills, and headaches. This ethnopharmacological study shows that sambiloto has potential as an herbal medicine for treating malaria in the Asmat community. Further research is needed to test the effectiveness and safety of sambiloto in the treatment of malaria.

1. Introduction

Malaria is a parasitic disease caused by *Plasmodium* spp. and is transmitted through the bite of the *Anopheles* mosquito. This disease is still a major health problem in the world, especially in tropical and subtropical countries. In 2020, there were 241 million cases of malaria and 627,000 deaths due to malaria worldwide. Indonesia is one of the countries with high malaria endemicity. In 2020, there were 537,851 cases of malaria in Indonesia, with 688 deaths. Papua is the region with the highest malaria endemicity in Indonesia. In 2020, there were 242,682 cases of malaria in Papua, with 364 deaths.¹⁻³

Current malaria treatment still relies on antimalarial drugs. Artemisinin-based combination therapies (ACTs) are first-line antimalarial drugs recommended by the World Health Organization

(WHO). However, there are several limitations to the use of ACTs. ACTs are not always available in all areas, especially in remote areas. ACTs can be purchased at expensive prices for some people. ACTs can cause side effects such as nausea, vomiting, and diarrhea. Resistance to ACTs has been reported in several regions of the world. Malaria drug resistance is one of the main threats to malaria control. Resistance to antimalarial drugs was first reported in Thailand in the 1950s. Currently, resistance to ACTs has been reported in several regions in Southeast Asia, Africa, and South America.⁴⁻⁶

The Asmat tribe is one of the indigenous Papuan tribes who inhabit the southern coastal region of Papua. The Asmat tribe has traditional knowledge about the use of medicinal plants to treat various diseases, including malaria. One of the medicinal

plants used by the Asmat tribe to treat malaria is sambiloto (*Andrographis paniculata*). It is very important to carry out an ethnopharmacological study on the use of the sambiloto plant in treating malaria in the Asmat community in Indonesia. Sambiloto has long been used by the Asmat tribe to treat malaria and has been proven effective in reducing parasitemia. Current malaria treatment still relies on antimalarial drugs, and there are several limitations to the use of ACTs, such as availability, price, side effects, and drug resistance. Malaria drug resistance is one of the main threats to malaria control. The Asmat tribe has traditional knowledge about the use of medicinal plants to treat malaria, and this knowledge can be useful for developing new herbal medicines for the treatment of malaria.⁷⁻⁹ This study aims to analyze the use of sambiloto plants in treating malaria in the Asmat community based on ethnopharmacological studies.

2. Methods

This research uses a qualitative observational research design with an ethnopharmacological approach. This approach combines aspects of ethnography and pharmacology to study traditional knowledge and the use of medicinal plants in a community. This research was conducted in the Asmat community area in Papua, Indonesia. The population of this study was all members of the Asmat community who had knowledge about the use of the sambiloto plant in treating malaria. The research sample was selected using a purposive sampling technique. The sample criteria were members of the Asmat community who were at least 18 years old, had knowledge about the use of the sambiloto plant in treating malaria, and were willing to provide information about the use of the sambiloto plant. Research data was collected through several methods, namely: 1. Participant observation: Researchers lived in the Asmat community and observed directly how the community used the sambiloto plant to treat malaria. 2. In-depth interviews: Researchers conducted in-depth interviews with key informants who have in-depth knowledge about the use of the sambiloto plant. 3. Focus group discussion

(FGD): Researchers held an FGD with several community members to obtain more in-depth information about the use of the sambiloto plant. 4. Documentation: Researchers documented information about the sambiloto plant, such as processing methods, dosage, and side effects.

Research data was analyzed using qualitative analysis techniques, namely: 1. Domain analysis: Researchers identified the main domains related to the use of sambiloto plants in the treatment of malaria. 2. Coding analysis: Researchers code the collected data to facilitate analysis. 3. Interpretive analysis: The researcher interprets the meaning of the collected data. This research was conducted by paying attention to research ethics, namely: 1. Informed consent: The researcher explained the purpose of the research and asked for informed consent from all informants before the research began. 2. Confidentiality: Researchers maintain the confidentiality of informant identities and research data. 3. Benefits for the community: Researchers provide research results to the Asmat community and provide education about the safe and effective use of the sambiloto plant.

3. Results and Discussion

Traditional knowledge about sambiloto

The Asmat tribe has rich traditional knowledge about the use of medicinal plants, including sambiloto (*Andrographis paniculata*). Sambiloto is known as a medicinal plant that has various benefits, one of which is for treating malaria. According to key informants, the Asmat tribe has been using sambiloto to treat malaria for a long time. This plant is easy to find in forests and around people's homes (Table 1).

Use of sambiloto for the treatment of malaria

The Asmat tribe uses sambiloto leaves to treat malaria. sambiloto leaf is processed into a decoction or juice and drunk to relieve malaria symptoms such as fever, chills, and headaches. The following is how sambiloto is processed and used to treat malaria in the Asmat community: 1. Boil: The sambiloto leaf is washed clean and boiled in water for 15-20 minutes. The boiled water is filtered and drunk 2-3 times a day.

2. Juice: The sambiloto leaves are finely ground and mixed with water. Juice is drunk 2-3 times a day (Table 1).

Dosage and side effects

The sambiloto dosage used to treat malaria depends on the patient's age and health condition. Usually, adults drink 1-2 glasses of sambiloto -boiled water or sambiloto juice per day. Side effects that often occur due to the use of sambiloto are stomach ache

and diarrhea. These side effects are usually mild and go away on their own (Table 1).

Public perception of sambiloto

The Asmat people believe that sambiloto is a safe and effective medicinal plant for treating malaria. They have been using sambiloto for years, and there have been no reports of serious side effects (Table 1).

Table 1. Ethnopharmacological study of the use of sambiloto plants for malaria.

Aspect	Results
Traditional knowledge	The Asmat tribe has traditional knowledge about the use of sambiloto to treat malaria. Sambiloto is easy to find in the forest and around people's houses.
Use of sambiloto	Sambiloto leaf is processed into a decoction or juice and drunk to relieve malaria symptoms such as fever, chills, and headaches.
Processing	Decoction: The sambiloto leaves are washed clean and boiled in water for 15-20 minutes. The boiled water is filtered and drunk 2-3 times a day. Juice: Finely ground sambiloto leaf and mix with water. Juice is drunk 2-3 times a day.
Dosage and side effects	The sambiloto dosage depends on the patient's age and health condition. Usually, adults drink 1-2 glasses of sambiloto -boiled water or sambiloto juice per day. Frequent side effects: stomach ache and diarrhea. Side effects are usually mild and go away on their own.
Public perception	The Asmat people believe that sambiloto is safe and effective for treating malaria. They have been using sambiloto for years without serious side effects.

The Asmat tribe has rich traditional knowledge about the use of medicinal plants, including sambiloto. This knowledge is passed down from generation to generation and is the result of experience and observation of the effectiveness of medicinal plants in treating various diseases. The Asmat tribe uses sambiloto leaves to treat malaria. Sambiloto leaf is processed into a decoction or juice and drunk to relieve malaria symptoms such as fever, chills, and headaches. The method of processing and using sambiloto to treat malaria has been passed down from generation to generation and is part of the Asmat culture. Sambiloto is easy to find in the forest and around people's houses. This makes sambiloto easily accessible to the Asmat people and makes it the main choice for treating malaria.¹⁰⁻¹²

This research shows that the traditional knowledge of the Asmat tribe regarding the use of sambiloto to treat malaria is a valuable resource for the development of herbal antimalarial medicines. Sambiloto has the potential to be an effective and safe herbal medicine for treating malaria, especially in the Papua region, where malaria is still a major health problem. The traditional knowledge of the Asmat tribe regarding the use of sambiloto to treat malaria is a cultural treasure that needs to be preserved. This research shows that traditional knowledge can be a valuable resource for the development of herbal medicines. Sambiloto has the potential to be an effective and safe herbal medicine for the treatment of malaria. Further research is needed to scientifically test the effectiveness and safety of sambiloto.

Sambiloto is easy to find in the forest and around people's houses. This makes sambiloto easily accessible to the public and can be a solution to increase access to herbal antimalarial medicines. This research is an important first step in understanding the traditional knowledge of the Asmat tribe regarding the use of sambiloto to treat malaria. The Asmat people have a strong belief in the safety and effectiveness of sambiloto (*Andrographis paniculata*) in treating malaria. This belief is based on their experience and observations over many years of using sambiloto to treat this disease.^{13,14}

The Asmat tribe has used sambiloto for generations as a traditional medicine for various diseases, including malaria. They use sambiloto leaf, which is processed into a decoction or juice to relieve malaria symptoms such as fever, chills, and headaches. Years of experience and empirical observations are proof to them that sambiloto is safe and effective. They have never encountered serious side effects caused by using sambiloto. This further strengthens their belief in this medicinal plant. Apart from that, belief in sambiloto is also based on traditional knowledge passed down from generation to generation. This knowledge was obtained from their ancestors, who had used sambiloto to treat malaria with positive results.^{15,16}

Even though the Asmat people's trust in sambiloto is quite strong, it is important to remember that the scientific evidence supporting its effectiveness still needs further research. Several studies show that sambiloto has the potential to treat malaria, but more methodological and controlled research is needed to ensure its safety and effectiveness. The Asmat people have used sambiloto leaf for generations and have never experienced serious side effects. Knowledge about sambiloto is passed down from ancestors who used it to treat malaria with positive results. Sambiloto is easy to find in forests and around people's homes, so it is easy to access and process. Sambiloto is a medicinal plant that is relatively cheap and easy to obtain, making it affordable for the public. Despite the strong belief in sambiloto, it is important to remember that more comprehensive scientific research is still needed to confirm its safety and effectiveness in the treatment of malaria. Clinical trials with

methodological and ethical design, as well as studies of dosage and side effects, need to be conducted to support these traditional beliefs. The Asmat tribe believes that nature has healing powers. They believe that forests and land store various plants and natural ingredients that have medicinal properties to cure various diseases. Knowledge of these medicinal plants was passed down from generation to generation and became an integral part of their culture and identity.^{17,18}

Traditional medicine using natural ingredients is an important part of the Asmat health system. They used various medicinal plants, roots, stems, leaves, and flowers to treat various ailments, such as fever, headaches, malaria, and skin diseases. The use of natural ingredients in traditional Asmat medicine is based on several beliefs. The Asmat tribe believes that nature has the power to cure disease and maintain health. The Asmat tribe believes that plants and natural ingredients contain ingredients that can cure various diseases. The Asmat tribe has rich traditional knowledge about the use of medicinal plants and natural ingredients for treatment. Years of experience and empirical observations have shown that traditional medicine with natural ingredients is safe and effective. Traditional medicine with natural ingredients is relatively cheap and easy to obtain compared to modern medicine. The Asmat tribe's belief in the power of nature and the medicinal properties of natural ingredients is a valuable form of local wisdom. This traditional knowledge needs to be preserved and developed to maintain the health and welfare of the community, as well as to enrich the treasures of traditional Indonesian medicine.¹⁶⁻¹⁸

The Asmat tribe has a strong spiritual belief in ancestral spirits and natural forces. These beliefs are embedded in their culture and traditions and influence various aspects of life, including medicine. The Asmat tribe believes that ancestral spirits have the power to help cure diseases. They believe that ancestral spirits can provide knowledge about medicinal plants and natural ingredients that can be used to cure diseases. Apart from that, the Asmat tribe also believes that nature has spiritual powers that can help cure diseases. They believe that plants and natural

ingredients have spiritual energy that can help balance the body and mind. Traditional medicine with natural ingredients is believed to have spiritual powers that can help cure diseases and maintain health. The Asmat tribe often uses rituals and prayers in traditional medicine to strengthen their spiritual power. The Asmat tribe uses amulets made from natural materials, such as wood, bone, and stone, to protect themselves from disease and evil spirits. The Asmat tribe performs special rituals to cure illnesses, such as dancing and singing rituals. The Asmat tribe prays to the spirits of their ancestors to ask for help in curing illnesses. The Asmat tribe's spiritual belief in the power of traditional medicine is a valuable form of local wisdom. This traditional knowledge needs to be preserved and developed to maintain the health and welfare of the community, as well as to enrich Indonesia's cultural treasures.¹⁷⁻²⁰

4. Conclusion

This ethnopharmacological study shows that sambiloto has the potential as an herbal medicine for treating malaria in the Asmat community. Further research is needed to test the effectiveness and safety of sambiloto in the treatment of malaria.

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