

Short Communication: Medicinal plants traditionally used to treat hypertension in Babane Village, Bengkayang, West Kalimantan, Indonesia

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Abstract. Panjaitan RGP, Kristi Y, Irawan B, Salleh LM. 2024. Short Communication: Medicinal plants traditionally used to treat hypertension in Babane Village, Bengkayang, West Kalimantan, Indonesia. *Biodiversitas* 25: 3121-3129. One of the non-pharmacological treatments to treat hypertension is by herbal therapy using medicinal plants. This study aims to document medicinal plants to treat hypertension by the people of Babane Village, Bengkayang District, West Kalimantan, Indonesia. The method used in this research is the descriptive qualitative method. Data collection was carried out by semi-structured interviews and observations to informants selected using a purposive sampling method including traditional healers. This research documented 26 species of medicinal plants used traditionally as antihypertensives by the people in Babane Village consisting of *Imperata cylindrica* (L.) Raeusch., *Ixora coccinea* Comm. ex Lam., *Eleutherine bulbosa* (Mill.) Urb., *Allium sativum* L., *Averrhoa carambola* L., *Pachyrhizus erosus* (L.) Urb., *Tinospora crispa* (L.) Miers ex Hook.f. & Thomson, *Andrographis paniculata* (Burm.fil.) Nees, *Gymnanthemum amygdalinum* (Delile) Sch.Bip. ex Walp., *Physalis angulata* L., *Moringa oleifera* Lam., *Ricinus communis* L., *Mitragyna speciosa* Korth., *Phaleria macrocarpa* (Scheff.) Boerl., *Morinda citrifolia* L., *Phyllanthus niruri* L., *Annona muricata* L., *Eurycoma longifolia* Jack, *Hibiscus sabdariffa* L., *Piper crocatum* Ruiz & Pav., *Passiflora foetida* L., *Leonurus japonicus* Houtt., *Melastoma malabathricum* L., *Curcuma xanthorrhiza* Roxb., *Cucumis sativus* L., *Syzygium polyanthum* (Wight) Walp. The leaves are the most commonly used part of the plant because of their antihypertensive properties while boiling is the most common processing technique.

Keywords: Herbs, hypertension, inventory, medicinal plants, species

INTRODUCTION

Hypertension is a non-communicable disease known as a silent killer since the majority of individuals inflicted with it are unaware of their medical condition. Traditionally, hypertension is characterized by an average Systolic Blood Pressure (SBP) of >140 mm Hg and a Diastolic Blood Pressure (DBP) of >90 mm Hg. American College of Cardiology/American Heart Association Blood Pressure Guidelines defined hypertension as persistent SBP of at least 130 mm Hg and DBP of at least 80 mm Hg (Whelton et al. 2018). According to World Health Organization (2015), around 1.13 billion individuals worldwide suffer from hypertension, indicating that 1 out of 3 people in the global population have been diagnosed with this condition. In Indonesia, the prevalence rate of hypertension increased from 25.8% in 2013 to 34.1% in 2018 (Kementerian Kesehatan Republik Indonesia 2018).

Many risk factors can influence the incidence of hypertension. These factors are classified into modifiable and irreversible risk factors. Modifiable risk factors include smoking, obesity, lack of physical exercise, excess of sodium (e.g. salt) intake, insufficient potassium intake, alcohol use, and stress. While risk factors that cannot be

changed include genetics, age, and gender. If hypertension is not handled properly, it can lead to the development of complex non-communicable conditions such as stroke, cardiovascular disease, renal failure, and other cardiometabolic disorders (Kementerian Kesehatan Republik Indonesia 2018; Al-Makki et al. 2022).

The treatment of hypertension includes pharmacological and non-pharmacological therapy. Pharmacological therapy use drugs with antihypertensive medication including diuretics, beta-blockers, vasodilators, calcium channel blockers, and ACE inhibitors, while non-pharmacological therapy consists of stopping smoking, losing excess of weight, physical exercise, reducing salt intake, increasing fruit and vegetable consumption, and reduce fat intake (Verma et al. 2021). One of the non-pharmacological treatments that can be an option for treating hypertension is herbal therapy using medicinal plants. Medicinal plants provide therapeutic properties in certain plant components such as roots, stems, leaves, fruit, seeds, and excretions, which can effectively heal ailments and alleviate pain (Az-Zahra et al. 2021). The bioactive ingredients or plant extracts can be utilized for the treatment of different ailments and can serve as a new formulation for medications in the pharmaceutical industry (Singh et al.

2017). Medicinal plants have many bioactive compounds with pharmacological and preventive effects that can be utilized for treating hypertension. The antihypertensive properties in medicinal plants include potassium content, antioxidant content, diuretic, antiadrenergic, and vasodilator properties (Rawat et al. 2016).

Kalimantan (Indonesian Borneo) is one of the five major islands in Indonesia dominated with wet tropical forests which have high level of plant species diversity. Kalimantan forest contains various plant species utilized for traditional medicine by the local community (Qamariah et al. 2018) including in West Kalimantan. There are several studies on medicinal plants in West Kalimantan, including in Karya Usaha Hamlet, Kubu Raya District which recorded seven plant species used to increase children's appetite (Panjaitan et al. 2020), and in Kayan Hilir Sub-district, Sintang District which recorded 25 species of medicinal plants used by local Dayak Tribe (Supiandi et al. 2020).

People in West Kalimantan have used plants as medicine since ancient times (Panjaitan et al. 2020). One of the areas where many medicinal plants are still utilized by local community is in Babane Village, Samalantan Sub-district, Bengkayang District. In this area, the local people still maintain their ancestral traditions by using plants as medicine to treat diseases. However, the knowledge about medicinal plants is currently declining due to cultural changes, modernization, lack of written documentation and limited interest of younger generation in medicinal plants, deforestation, and environmental degradation. The efficacy of utilizing plants for therapeutic purposes has been extensively substantiated, thereby necessitating the revival of community wisdom on the utilization of medicinal plants (Tambaru et al. 2023). Therefore, this study aimed to

document medicinal plants traditionally used to treat hypertension by local community in Babane Village, Samalantan Sub-district, Bengkayang District, West Kalimantan. We expected this manuscript can serve as documenting reference of ethnobotanical knowledge of plant for medicinal purposes especially in the context of antihypertensive, thus when the oral documentation is lost, we still have the written archive.

MATERIALS AND METHODS

Study area

The research was conducted in Babane Village, Samalantan Sub-district, Bengkayang District, West Kalimantan Province, Indonesia which can be reached by land transportation (Figure 1). This village has an area of 5,075.48 km². The total population of Babane Village was 2,311 at the 2020 census, consisting of ethnic Dayak, Batak, Javanese, Malay, and Chinese with the main livelihood is rice and corn farming (Arsip Desa Babane 2021).

Data collection

Data collection was conducted using semi-structured interviews, direct field observations, and documentation (Ristoja 2015). Informants was selected by purposive sampling based on certain considerations namely Babane Village residents who have a profession as traditional healers (*Batra*) and are considered to have knowledge and practice on the traditional uses of medicinal plants. There were eight selected informants, including one village head as a key informant, one village midwife, and six traditional healers.

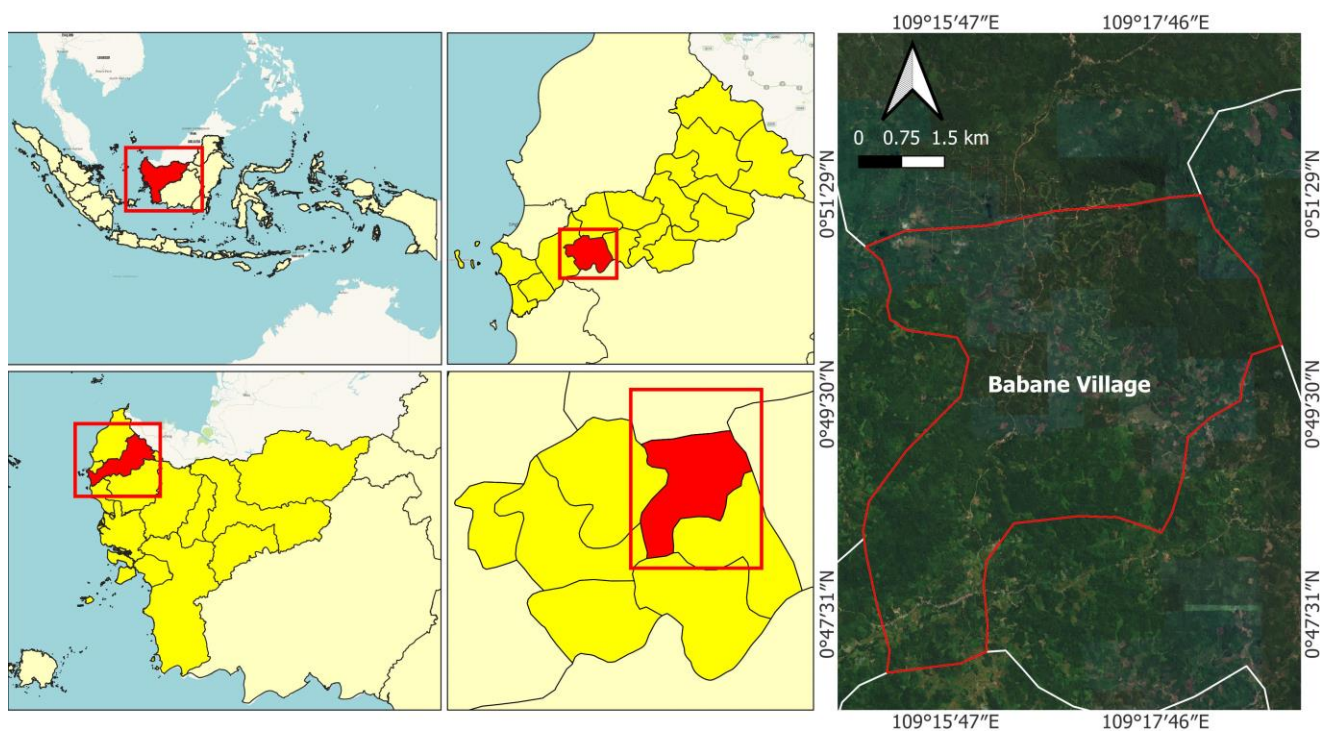


Figure 1. Map of the research area in Babane Village, Samalantan Sub-district, Bengkayang District, West Kalimantan, Indonesia

The interview consisted of questions related to the Babane Village community's experience and knowledge in using and processing each type of plant that they typically use as an antihypertensive. Field observations and the collection of medicinal plant specimens were carried out based on information obtained from informants. Observations were made on the traditions of the Babane Village community in using plants as antihypertensives as well as observations regarding the presence of these plants at the research location with the aim of taking samples of plants with antihypertensive properties in Babane Village. Documentation was carried out as a complement to the use of interview and observation methods by taking photos of plants that are used by the people of Babane Village to treat hypertension and are found in the Babane Village area.

Data analysis

The data analysis technique used in this research is descriptive qualitative analysis. Qualitative data from field observations was cross-checked, summarized, and synthesized (Ihsan et al. 2024). Information obtained from interviews, field observations, and various reports was cross-referenced with data obtained from another informant through the process of cross-checking. Afterward, a descriptive-analytical narrative was developed by summarizing and synthesizing the verified data. Information obtained from informants in the form of area names, plant parts used, and processing methods are presented descriptively in tables. The identification process for unknown plant species was carried out at the Biology Laboratory of the Faculty of Mathematics and Natural Sciences, Universitas Tanjungpura, Indonesia.

RESULTS AND DISCUSSION

Community knowledge and practice in treating hypertension

People in Babane Village who start to feel symptoms of hypertension in the form of intense headaches, blurred vision, nausea, and pain in the neck will immediately go to the nearest hospital or midwife to measure their blood pressure. If the measured blood pressure is a condition of hypertension, people will be given blood pressure-lowering medication to consume until the condition improves. For health conditions that can still be treated, people usually seek treatment by consuming medicinal plants, which are believed to be effective as medicines for hypertension. Traditional medicine derived from plants is preferred by the community because the ingredients are easy to find and mixed as medicinal ingredients. Medicinal plants used by the community can be obtained from yards, gardens, or forest edges in the area. People believe that treatment with this herbal plant is considered effective and does not cause many side effects for the body.

Traditional medicine includes systems of knowledge that have been built over generations based on original concepts, beliefs, and practices from diverse cultures before the era of modern medicine (Rawat et al. 2016). The

pattern of use of medicinal plants in a particular community is part of their traditional cultural knowledge which is passed down from one generation to the next and constitutes a cultural heritage. The utilization of plants for medicinal purposes has been extensively employed by the Indonesian population since ancient eras, with this wisdom being transmitted through successive generations (Panjaitan et al. 2020). Medicinal plants or herbs are an alternative for people to maintain their health and treat a disease, this is because the use of medicinal plants has a fairly affordable price and does not cause perverse effects compared to modern drugs or medicines made from chemicals.

Diversity of medicinal plants used to treat hypertension

The local wisdom of the people of Babane Village involves the collective knowledge and experience of employing plants as antihypertensives. This knowledge has been transmitted orally from one generation to another by their ancestors. Based on the results of interviews about medicinal plants used to treat hypertension by the people in Babane Village, 26 species of plants were documented (Figure 2 and Table 1). The local people in Babane Village utilize various species of medicinal plants, some of which are naturally found in the forest, while others are intentionally grown by the community in their yards and gardens. Medicinal plants cultivated by the community are types of plants that are easy to grow. Based on the literature study that has been conducted, the medicinal plants used by the people of Babane Village have various phytochemical compounds that are useful in the treatment of hypertension.

The data collected from the interviews included the name of the medicinal plant, the specific plant part used, and the method of processing. These details are presented in Table 1. The method of preparation varies based on the type of medicinal plant used. Several techniques for processing medicinal plants encompass boiling, formulating herbal medicines, and drinking boiled water. Parts of plants used as hypertension drugs are leaves, stems, roots, fruits, and rhizomes (Table 1). Leaf is the most commonly utilized part of the plant as a remedy for hypertension with a total of 14 species, followed by the subterranean part of the plant, including the roots, rhizomes, and tubers, with 10 species, and stems with 5 species, flowers with 2 species, and fruits with 2 species (Figure 3).

The use of leaves as medicinal ingredients is considered easier because they are easy to gather and are believed to have better properties than other plant parts. According to Zhang et al. (2022), leaf is the most frequently utilized component due to its ease of acquisition compared to other plant components, such as flowers, fruits, and seeds. The leaf organs contain more phytochemicals with medicinal properties such as flavonoids, alkaloids, phenols, tannins, and saponins. The presence of various phytochemicals in the leaves makes it a plant organ that has good medicinal potential (Ge et al. 2018). In addition, the use of leaves as medicine does not damage the plant because it can easily grow back.

Table 1. Plants used as antihypertensive by the people of Babane Village, Bengkayang District, West Kalimantan, Indonesia

Local name	Scientific name	Part used	Preparation method
Alang-Alang	<i>Imperata cylindrica</i> (L.) P. Raeusch	Roots	The roots are dried in the sun, then boiled using 1.5 cups of water until remain 1 cup, and drink
Asoka	<i>Ixora coccinea</i> Comm. ex Lam.	Flowers	One handful of flowers is washed, then brewed with hot water until the water is colored like tea, and drink
Bawang Dayak'	<i>Eleutherine bulbosa</i> (Mill.) Urb.	Tubers	3-5 sliced tubers are washed, then brewed with 1 cup hot water until they change color, and then filtered the brewing water. Drink when it is cold
Bawang Putih	<i>Allium sativum</i> L.	Tubers	One to two cloves peeled and washed and then consumed immediately
Belimbing Pasagi	<i>Averrhoa carambola</i> L.	Leaves	Seven leaves are washed, then brewed with 1 cup of hot water, and drink when it is cold
Bengkuang	<i>Pachyrhizus erosus</i> (L.) Urb.	Tubers	Tubers are peeled and washed, and then eaten directly
Brotowali	<i>Tinospora crispa</i> (L.) Miers ex Hook.fil. & Thomson	Roots	A half inch of the root is washed, then cut into pieces and brewed using hot water, and drink
Daun Afrika/ Penyambung Nyawa	<i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip. ex Walp.	Leaves	Seven leaves are washed, then brewed with 1 glass of hot water. Drink when it is cold
Empedu Tanah	<i>Andrographis paniculata</i> (Burm.fil.) Nees	Leaves, stem, root	One handful of leaves, stem, and root are washed, then brewed using 1 glass of hot water
Gaguntur	<i>Physalis angulata</i> L.	Leaves and stem	Seven shoots of young leaves and stems are washed, then brewed with hot water, and drink when it is cold
Kelor	<i>Moringa oleifera</i> Lam.	Leaves	The leaves are washed and boiled with 1.5 cups until remain 1 cup. Drink while warm
Korongan	<i>Ricinus communis</i> L.	Leaves	There are two ways of processing, the first is the shoots of the plant are washed, then brew it with hot water, and drink when it is cold. The second method involves cutting leaves into small pieces and dried, and the dried leaves can be brewed like tea
Kratom	<i>Mitragyna speciosa</i> Korth.	Leaves	Two to three tablespoons of dried leaves are brewed with hot water until the color changes, then filter it and consume while it is warm
Mahkota Dewa	<i>Phaleria macrocarpa</i> (Scheff.) Boerl.	Fruit	One to two ripe fruits are washed and can be consumed directly Another way of processing the fruit flesh is dried, then boil it, strain and drink when it is cold
Mengkudu	<i>Morinda citrifolia</i> L.	Leaves	Five to seven leaves are washed and then brewed using hot water, then drink when it is cold
Meniran	<i>Phyllanthus niruri</i> L.	Leaves, stem, root	Leaves, stems and roots are washed, then brewed using 1 cup of hot water, strain, and drink while warm
Nangka' Balanda	<i>Annona muricata</i> L.	Leaves	Seven mature leaves are washed, then boiled with 2 cups of water until remain 1 cup, drink the boiled water when it is cold
Pasak Bumi	<i>Eurycoma longifolia</i> Jack	Root	The roots are dried, then cut into pieces, brewed with 1 glass of hot water, and drink while warm
Rosella	<i>Hibiscus sabdariffa</i> L.	Flower	Flowers are cut into pieces, then put into boiling water until the color change. It can also be dried and made into rosella tea
Sirih Merah	<i>Piper crocatum</i> Ruiz & Pav.	Leaves	Three to five leaves are washed, then brewed with 1 glass of hot water, and drink when cold
Somban	<i>Passiflora foetida</i> L.	Leaves and young stem	The shoots of the leaves can be directly consumed as fresh vegetables. Another way is by brewing a handful of young leaves and stems with 1 glass of water, and drink when cold
Tainge	<i>Leonurus japonicus</i> Houtt.	Leaves, stem, roots	All parts of the plant are washed, cut into pieces and dried, 2-3 table-spoons of dried <i>Tainge</i> are brewed with 1 glass of hot water and drink
Takakng	<i>Melastoma malabathricum</i> L.	Shoot of plant	Five to seven shoots of leaves are washed, then can be eaten directly as fresh vegetables
Temulawak	<i>Curcuma xanthorrhiza</i> Roxb.	Rhizome	The rhizome (3-4 cm) is grated and filtered, then boiled using 1 cup of water. Another processing method is the rhizomes are washed and sliced, then boiled. It can be added with palm sugar, granulated sugar, or honey
Timun	<i>Cucumis sativus</i> L.	Fruit	The fruit is washed and then consumed directly
Ubah Ube	<i>Syzygium polyanthum</i> (Wight) Walp	Leaves	5-7 leaves are washed, then boiled with 1-5 cups of water until 1 cup remains, and drink

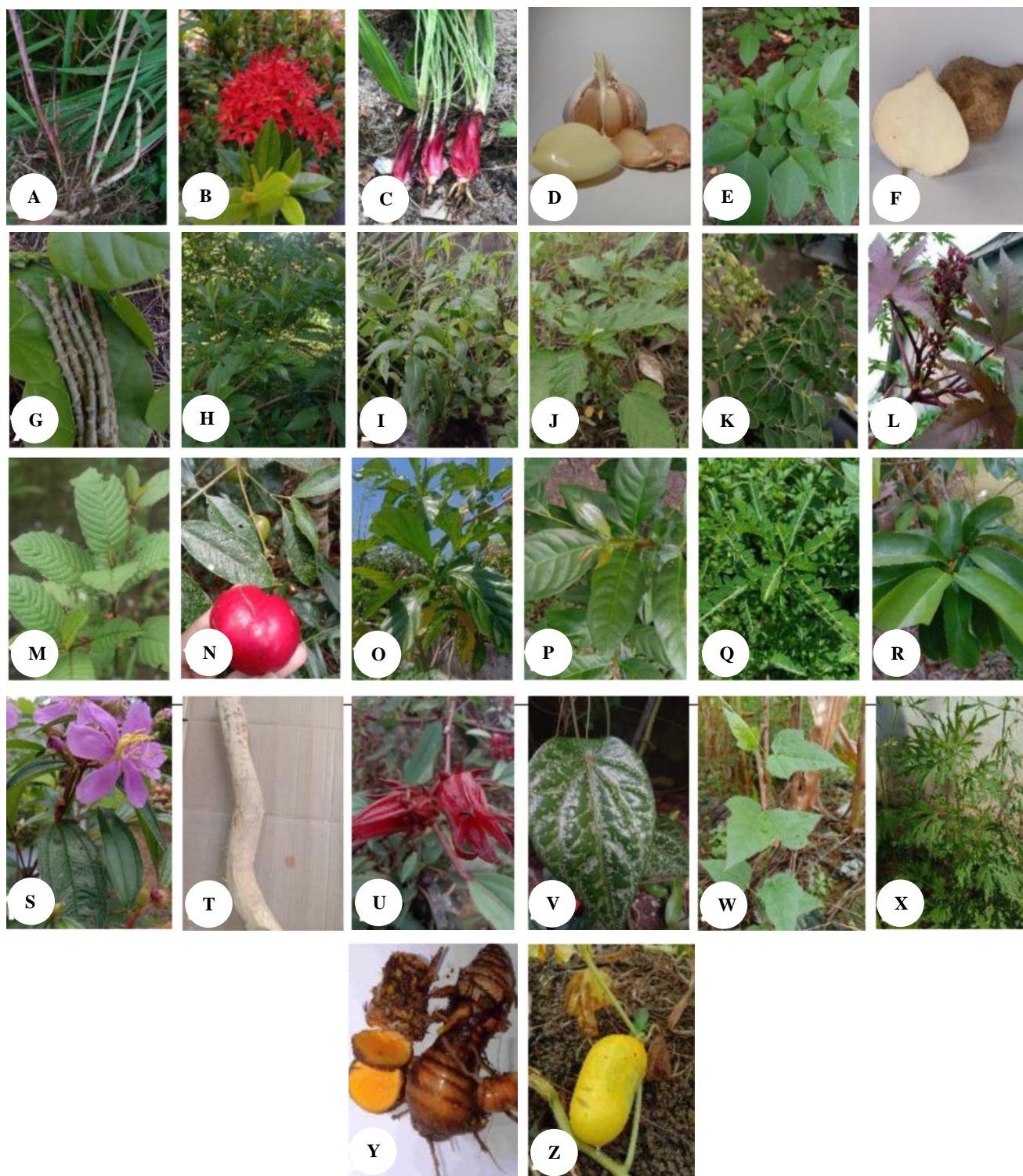


Figure 2. Plant species used as antihypertensive by the people of Babane Village, Samalantan Sub-district, West Kalimantan, Indonesia: A. Alang-Alang (*Imperata cylindrica*); B. Asoka (*Ixora coccinea*); C. Bawang Dayak (*Eleutherine bulbosa*); D. Bawang Putih (*Allium sativum*); E. Belimbing Pasagi (*Averrhoa carambola*); F. Bengkuang (*Pachyrhizus erosus*); G. Brotowali (*Tinospora crispa*); H. Daun Afrika (*Gymnanthemum amygdalinum*); I. Empedu Tanah (*Andrographis paniculata*); J. Gaguntur (*Physalis angulata*); K. Kelor (*Moringa oleifera*); L. Korongan (*Ricinus communis*); M. Kratom (*Mitragyna speciosa*); N. Mahkota Dewa (*Phaleria macrocarpa*); O. Mengkudu (*Morinda citrifolia*); P. Ubah Ube (*Syzygium polyanthum*); Q. Meniran (*Phyllanthus niruri*); R. Nangka' Balanda (*Annona muricata*); S. Takakng (*Melastoma malabathricum*); T. Pasak Bumi (*Eurycoma longifolia*); U. Rosella (*Hibiscus sabdariffa*); V. Sirih Merah (*Piper crocatum*); W. Somban (*Passiflora foetida*); X. Tainge (*Leonurus japonicus*); Y. Temulawak (*Curcuma xanthorriza*); Z. Timun (*Cucumis sativus*)

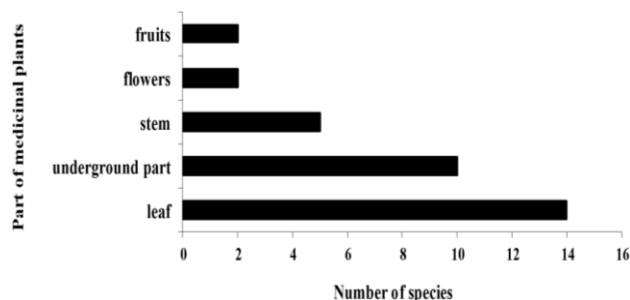


Figure 3. Part/organ of medicinal plants used by traditional healers in Babane Village, Samalantan Sub-district, Indonesia

Phytochemical constituents of plants

Rural communities still depend on natural remedies so they often consult a *Batra* (traditional healer) first before going to a doctor. In addition, they also rely on medicinal plants to cure certain diseases (Vicencio and Somoray 2023). Traditional knowledge about medicinal plants has contributed to modern pharmaceutical science in the form of important medicines. Based on the literature study that has been carried out, the medicinal plants used by the people of Babane Village have various phytochemical compounds that are useful in the treatment of hypertension. *Imperata cylindrica* roots contain the main compounds saponins, glycosides, flavonoids, coumarins, and phenol (Jung and Shin 2021). Consuming reed roots can lower blood pressure in patients with essential hypertension (Eff et al. 2020). *Asoka* flowers (*Ixora coccinea*) can be used as an antihypertensive agent, as well as treating irregular menstruation and tuberculosis (Sivaraj et al. 2019). In addition, this study also reported that *Asoka* flower extract contains phenolics and flavonoids (Sivaraj et al. 2019).

Flavonoid, phenolic, and tannin compounds in Dayak onions (*Eleutherine bulbosa*) have antioxidant activity (Lestari et al. 2019). Administering Dayak onion extract had a discernible impact on lowering blood pressure in vitro (Fikriah et al. 2021). Garlic (*Allium sativum*) ethanol extract contains flavonoids, alkaloids, tannins, and steroids (Efiong et al. 2020). The research findings demonstrated a significant impact of administering garlic paste on reducing hypertension (Okoro et al. 2023). The leaves of *Averrhoa carambola* contained saccharides, saponins, organic acids, flavonoids, essential oils, tannins, and phenols. The leaves of the sweet starfruit plant have been used traditionally to cure various diseases, such as hypertension and fever (Astiti and Ramona 2021). *Bengkuan* (*Pachyrhizus erosus*) was reported to contain flavonoids, quinones, tannins, saponins, alkaloids, and triterpenoids (Wathoni et al. 2018). The results of the research conducted showed that yam root juice can reduce diastolic blood pressure (Thapimthong et al. 2016).

Phytochemical analysis on *Brotowali* (*Tinospora crispa*) revealed the presence of alkaloids, flavonoids, flavone glycosides, furanoditerpenoids cis-type clerodane, lactones, sterols, lignans, and nucleosides (Ahmad et al. 2016). *Brotowali* extract provides hypotensive activity and this supports the use of this *Brotowali* as an antihypertensive (Haqae et al. 2023). The chemical content

of bitter or soil bile (*Andrographis paniculata*) consists of flavonoids and lactones. The main active substance of this plant is andrographolide, which is derived from a lactone component. The content of andrographolide can increase the body's defense system such as the production of white blood cells that attack bacteria and other foreign bodies. High potassium in Sambiloto is useful for removing water and salt to treat hypertension (Sumarni et al. 2022).

Gaguntur (*Physalis angulata*) has secondary metabolites found in the leaves, including alkaloids, saponins, and steroids. The stem contains alkaloids, saponins, steroids, and flavonoids, while the fruit contains alkaloids, saponins, and triterpenoids (Sharma et al. 2015). *Gaguntur* juice has been proven to be beneficial in lowering systolic blood pressure in individuals with hypertension. Moringa (*Moringa oleifera*) is a medicinal plant that has antidiabetic and antioxidant properties. The ethanol extract of Moringa leaves contains alkaloids, flavonoids, phenolics, triterpenoids/steroids, and tannins (Muhammad et al. 2016). From several studies that have been conducted, it was found that moringa leaf decoction can reduce blood pressure in people with hypertension (Okorie et al. 2019). Leaves and seeds *Korongan* (*Ricinus communis*) showed higher antioxidant activity than other plant parts. Important phytochemicals such as flavonoids, saponins, glycosides, alkaloids, steroids and gallic acid, quercetin, gentisic acid, epicatechin, and ellagic acid as the main phenolic compounds that have antioxidant activity from dried leaves (Chouhan et al. 2021). The *R. communis* exhibits several beneficial properties such as antioxidant, antidiabetic, hepatoprotective, anti-inflammatory, antibacterial, central nervous system stimulant, lipolytic, wound healing, insecticidal, and larvicidal activities (Chouhan et al. 2021).

Leaves of *Kratom* (*Mitragyna speciosa*) contain alkaloids, phenols, flavonoids, triterpenoids, tannins, and saponins (Ramanathan et al. 2021). In Indonesia, traditionally *Kratom* is used to increase stamina, treat pain, rheumatism, gout, hypertension, stroke symptoms, diabetes, insomnia, wounds, diarrhea, coughs, cholesterol, typhoid, and increase appetite (Wahyono et al. 2019). Phytochemical tests on *Mahkota Dewa* (*Phaleria macrocarpa*) showed secondary metabolites including flavonoids, saponin glycosides, phenolic compounds, terpenoids, steroids, and tannins (Lay et al. 2014). According to the findings of conducted research, *Mahkota Dewa* demonstrates antidiabetic, antioxidant, antihypercholesterolemia, and antihypertensive activities (Mia et al. 2022).

Phytochemical test results on *Mengkudu* leaves (*Morinda citrifolia*) showed that positive *Mengkudu* leaves contained anthraquinones, alkaloids, flavonoids, terpenoids, and saponins (Ly et al. 2020). Phytochemical screening results on the ethanol extract of *Mengkudu* fruit showed the presence of alkaloids, flavonoids, tannins, steroids, and saponins (Sina et al. 2021). It was further reported that the ethanolic extract of *Mengkudu* leaves and fruit and their combination significantly reduced blood pressure (Wigati et al. 2017).

Phytochemical screening of *Meniran* herb powder and 70% ethanol extract of *Meniran* herb (*Phyllanthus niruri*)

indicated the presence of flavonoids, tannins, coumarins, saponins, quinones, triterpenoids, and essential oils (Kaur et al. 2017). Extracts of this herb have been shown to have therapeutic effects in many clinical studies. Some of the therapeutic properties of *Meniran* extract include anti-hepatotoxic, antilytic, antihypertensive, anti-HIV, and anti-hepatitis B (Nisar et al. 2018). Phytochemical analysis showed soursop leaf extract (*Annona muricata*) contains saponins, terpenoids, steroids, flavonoids, tannins, alkaloids, coumarins, lactones, anthraquinones, cardiac glycosides, phenols, and phytosterols (Dev and Joseph 2021). Based on several research results that have been done, giving soursop leaves can reduce blood pressure in people with hypertension (Mutakin et al. 2022).

The root extract of *Pasak Bumi* (*Eurycoma longifolia*) is rich in various bioactive compounds such as quassinoids, eurycomaoside, eurycolactone, eurycomalactone, eurycomanone, triterpenes of squalene and tirucallene types, canthin-6-one and -carboline alkaloids, biphenylneolignans and pasakbumin-B. Alkaloids and quassinoids form the main part (Rehman et al. 2016). *Pasak Bumi* root showed antihypertensive activity (Mokhtar et al. 2017). Rosella flowers contain several substances such as saponins, tannins, gossypetin, glucosides, hibiscin, flavonoids, theaflavins, catechins, and anthocyanins (Da-Costa-Rocha et al. 2014). Hypertensive patients who consumed decoctions and infusions of rosella flowers experienced a decrease in blood pressure (Walton et al. 2016).

Red betel (*Piper crocatum*) is widely used by the community for the treatment of hypertension, inflammation of the liver, inflammation of the eyes, vaginal discharge, ulcers, breast cancer, joint pain, lowering and controlling blood sugar levels, as well as for cosmetics. This plant contains essential oils (monoterpenes, sesquiterpenes), alkaloids, flavonoids (auron group), tannins-polyphenols, steroids, and neolignan compounds, while pharmacological tests show that this plant has anti-inflammatory, antimicrobial, antifungal, antihyperglycemic, antiproliferative, and antioxidant activities (Suri et al. 2021).

Somban (*Passiflora foetida*) contains several phytochemical components ranging from alkaloids, phenols, glycosides, flavonoids, and cyanogenic compounds and passifloricins, polyketides, and alpha pyrones. Leaf extract is reported to possess anti-inflammatory effects and analgesic activity, antihistamine, antidepressant effects, and antidote for anxiety and hypertension (Chinnasamy et al. 2018).

Tainge (*Leonurus japonicus*) has been used in lowering blood pressure, promoting urination, as a pain reliever, sedation, and promoting menstruation (JeGal et al. 2018). Various types of chemical compounds have been isolated from this plant, including phenylethanoid glycosides, sesquiterpene glycosides, essential oils, and other compounds with the main components being alkaloids, diterpenes, and flavonoids (Shang et al. 2014). Extract of *Takakng* leaves (*Melastoma malabathricum*) showed high antioxidant activity, this activity was indicated by high levels of total phenolic and flavonoid levels (Danladi et al. 2015). The research findings showed the ethanol extract derived from the leaves of *M. malabathricum*, exhibited

significant antidiabetic and antihyperlipidemic effects in diabetic rats (Balamurugan et al. 2014).

Temulawak rhizome (*Curcuma zanthorrhiza*) contains polyphenols, flavonoids, quinones, steroids/triterpenoids, and curcuminoids. *Temulawak* has properties as an antioxidant, antidiuretic, anticancer, antihypertensive, antihepatotoxic, antibacterial, and antifungal effect (Salleh et al. 2016). Another study conducted on cucumber (*Cucumis sativus*) contains potassium, magnesium, calcium, phosphorus, fiber, and vitamin C. In addition to mineral and fiber content, cucumber contains several phytochemical components such as alkaloids, saponins, flavonoids, steroids, glycosides, and tannins (Foong et al. 2015). The results showed that consuming cucumber juice regularly can reduce blood pressure in people with hypertension (Sari et al. 2021). Ubah ube, or commonly known as bay leaf (*Syzygium polyanthum*), has a chemical content of essential oils, flavonoids (catechins and rutin), tannins, sesquiterpenes, triterpenoids, steroids, and saponins. The results showed that consuming bay leaves can lower blood pressure in people with hypertension (Ismail and Ahmad 2019).

This research documented 26 species of traditional medicinal plants used as antihypertensives by the people in Babane Village consisting of *I. cylindrica*, *I. coccinea*, *E. bulbosa*, *A. sativum*, *A. carambola*, *P. erosus*, *T. crispa*, *A. paniculata*, *P. angulata*, *Gymnanthemum amygdalinum*, *M. oleifera*, *R. communis*, *M. speciosa*, *P. macrocarpa*, *M. citrifolia*, *P. niruri*, *A. muricata*, *E. longifolia*, *Hibiscus sabdariffa*, *P. crocatum*, *P. foetida*, *L. japonicus*, *M. malabathricum*, *Curcuma xanthorrhiza*, *C. sativus* and *S. polyanthum*. The leaves are the most commonly used part of the plant because of their antihypertensive properties while boiling is the most common processing technique.

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