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Ethnobotany of traditional medicine in Akit Tribe, Teluk Setimbul Village, Karimun District, Indonesia

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Abstract. *Dewi TM, Sumarni W, Handayani L, Muhiri. 2024. Ethnobotany of traditional medicine in Akit Tribe, Teluk Setimbul Village, Karimun District, Indonesia. Biodiversitas 25: 2696-2704.* The Akit Tribe has long been using indigenous knowledge of medicinal herbs for their purposes. Unfortunately, due to their wasteful lifestyle, lack of written records, and oral transmission of knowledge, the Akit Tribe's native wisdom is today in danger of disappearing. This study aims to document traditional medicinal plants used by the Akit Tribe. The research approach used is descriptive qualitative using a field survey. Informants were selected using the purposive sampling method. The informants interviewed consisted of the main resource person (customary leader), key resource person (shaman), and individuals knowledgeable in the identification and collection of medicinal plants. Data were obtained through in-depth interviews and participatory observations. Data analysis used descriptive qualitative. This study obtained 40 plants from 23 families used for traditional medicine of the Akit Tribe, were with the Zingiberaceae family as the most widely used family (5 species). The parts of the plant used by the Akit Tribe for treatment are leaves, roots, stems, fruits, flakes, rhizomes, and the whole plant with leaves being the most widely used part of the plant (19 species). The way of processing medicinal plants is also still considered simple, processing by boiling and then drinking is the most widely used. This research has significant implications for cultural preservation, biodiversity conservation, pharmacological research, socio-economic development, public health, and education. It serves as a critical step in safeguarding the traditional knowledge of the Akit Tribe while also exploring its potential contributions to wider fields.

Keywords: Akit Tribe, ethnobotany, indigenous knowledge, plants, traditional medicine

INTRODUCTION

Indonesia's rich diversity of medicinal plants has been globally recognized for millennia (Cahyaningsih et al. 2021). It boasts the world's second-largest biodiversity, with about 40.000 unique species, including around 6.000 with known medicinal properties (Elfahmi et al. 2014; Nugraha et al. 2021). Plants have long been used as traditional herbal remedies to cure a variety of diseases, and the creation, research, and development of new drugs have been influenced by the natural compounds found in medicinal plants (Chaachouay and Zidane 2024). The field of ethnobotany studies these plant-human interactions, focusing on indigenous knowledge and customs (Mesfin et al. 2013). Medicinal plants are widely used to treat and prevent diseases, and traditional knowledge offers valuable insights for drug discovery (Jamshidi-Kia et al. 2018).

Ethnomedical studies have significantly contributed to the development of both natural and synthetic medicines (Fabricant and Farnsworth 2001). However, preserving traditional ethnomedicinal knowledge and techniques, which are usually passed down orally through generations, is crucial due to the extensive historical expertise of traditional healers with medicinal plants (Nadembega et al. 2011). Through oral communication, the traditional knowledge of medicinal plants has been passed down from generation to generation (Shinwari 2010) which then forms local wisdom in how they behave and interact with the environment where they live. As a result, not all of this information is recorded systematically (Zhou et al. 2023). This documentation is very important so that knowledge about medicinal plants can be used from generation to generation.

The use of medicinal plants by local communities in various aspects of life can be part of efforts to preserve the environment by maintaining biodiversity, as a way to meet their living needs. Traditional knowledge plays a crucial role in bolstering environmental conservation initiatives. The traditional knowledge of medicinal plants that was once ingrained in rural and indigenous people has been steadily disappearing as a result of industrialization (Ramli et al. 2021a). Furthermore, overharvesting of established medicinal plants and environmental degradation are putting some medicinal plants at risk of losing their habitat. Therefore, it is necessary to conduct an ethnobotanical study of medicinal plants based on local wisdom that brings a lot of valuable information in developing treatments for increasingly complex human diseases.

Indigenous knowledge of medicinal plants from elders and professionals in the area is gathered and recorded through ethnobotanical surveys in a way that describes plants that can be a source of medications to treat illnesses (Sarwat et al. 2012).

Studies on medicinal plants have been conducted in various countries around the world such as Vietnam (Nguyen et al. 2019), Thailand (Numpulsuksant et al. 2021) and Ethiopia (Mekonnen et al. 2022). Numerous studies have been carried out on the documenting of native medicinal plant knowledge used by Indonesian populations for healthcare purposes (Mulyanto et al. 2024), where a large number of Indigenous peoples traditionally utilize medicinal plants, such as: the Kaili Rai Tribe in Central Sulawesi (Agung et al. 2018); the Dayak Kanayatn Tribe in West Kalimantan (Riadi et al. 2019); the Serawai Tribe in Bengkulu (Fadila et al. 2020); the Malay Tribe in Lingga, Riau Islands (Qasrin et al. 2020) and Gorontalo tribe in Gorontalo (Masyita 2023). The first step in safeguarding these natural resources is the recording and documenting of plant diversity (Raj and Toppo 2014). Documentation is therefore essential to the management, usage, and sustainability of medicinal flora. Information is scarce on the ethnomedicinal use of plants from the Akit Tribe of Karimun District, Riau Islands Province, Indonesia.

The Akit Tribe is a traditional community group that still holds fast to the values inherited from their ancestors (Syamsidar 2014). The Akit Tribe in Teluk Setimbul is one example of a community that still actively uses plants as medicinal ingredients. The lack of information and studies on ethnobotany, especially in the use of medicinal plants by the Akit Tribe in Teluk Setimbul, can lead to the possibility of losing local heritage amidst the current flow of cultural modernization that continues to grow today. Therefore, research in the field of ethnobotany is needed to document and deepen understanding of the use of medicinal plants in this community. This study is conducted to specifically document the species of medicinal plants, as well as their uses and traditional medicinal plant preparation methods. It also seek to identify the properties of medicinal plants based on community knowledge of local usage and traditional medicinal plant processing methods.

MATERIALS AND METHODS

Study area

The study was conducted from February to April 2024 in Teluk Setimbul Hamlet, Pasir Panjang Village, Meral Sub-district, Karimun District, Riau Island Province, Indonesia. Geographically, Teluk Setimbul Village is located at 1°06'39.3"N 103°19'46.4"E. The area of this village is around ±10 km^2 (Figure 1), with their activities more concentrated in the coastal area. The 2021 recapitulation data from the Pasir Panjang Village office in 2023 shows that the number of Indigenous people in Teluk Setimbul Village spread across three villages is 201 Heads of Families or 788 people. This village consists of two Citizens' Associations and five Neighborhood Associations (Risamasu 2023).

Data collection

The study employed a qualitative approach with field surveys. On the use of medicinal plants in this study were obtained from the main resource person (customary leader), key resource person (shaman), and individuals knowledgeable in the identification and collection of medicinal plants. The main resource persons were determined using purposive sampling technique. Determination of key informants and recommendations using the snowball sampling technique with the selection of sources from the recommendations of previously selected sources.

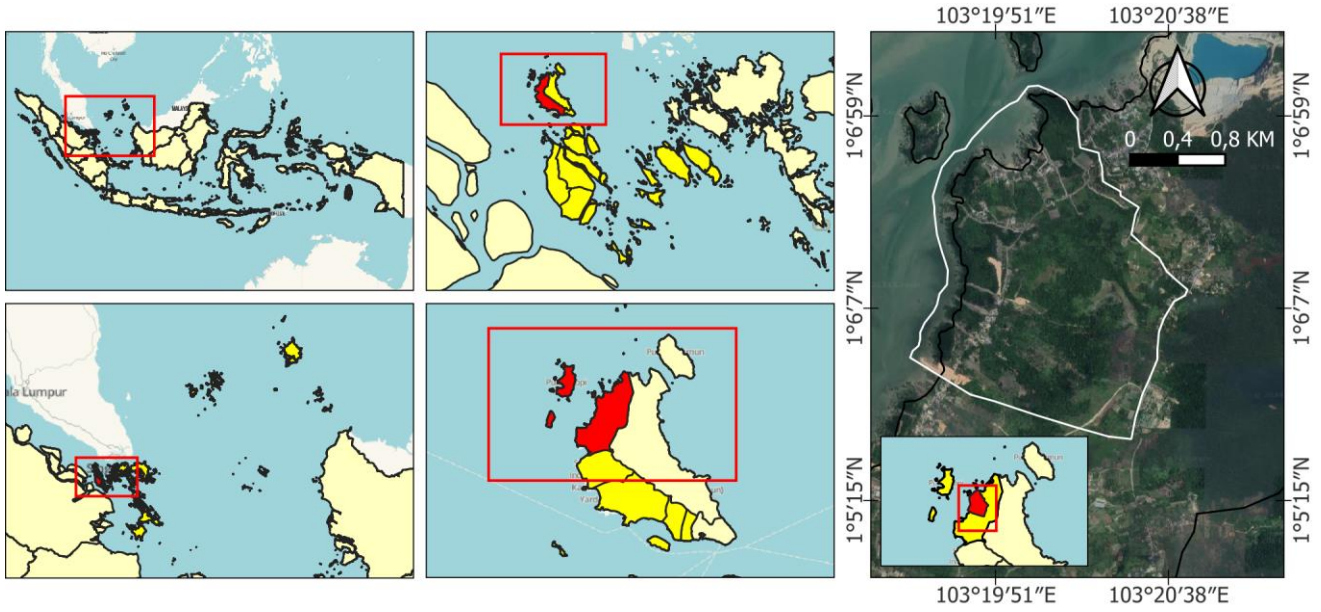

Figure 1. Map of research area in Teluk Setimbul Hamlet, Pasir Panjang Village, Meral Sub-district, Karimun District, Riau Island Province, Indonesia

Data were gathered using interview guides, observation sheets and ethnobotanical documentation as study instruments. Data on the use of medicinal plants in the Teluk Setimbul people were collected by: (a) In-depth interviews were conducted by asking open-ended questions so as to enable the informants to provide broad answers about medicinal plants, (b) Field observations were carried out to verify medicinal plant species obtained from in-depth interviews with resource persons who have an understanding of medicinal plants, (c) Documentation is carried out by searching for data in the form of notes, pictures, archives or other records that are useful for completing and obtaining data related to the use of medicinal plants in the Teluk Setimbul people.

Data analysis

The data on medicinal plants were subjected to a multi-stage qualitative descriptive analysis, which involved the collection, reduction, presentation, and drawing of findings (Miles and Huberman 1994). Research data on the use of medicinal plants were analyzed qualitatively in the following way: (1) Data collection: we collected data related to medicinal plants used by the Akit Karimun Tribe tribe, (2) Data reduction: we separated data according to research objectives, (3) Data presentation: data on medicinal plants used by the Akit Karimun Tribe are presented in the form of tables and descriptions, and (4) Draw conclusions: we made conclusions according to the results and discussions that have been carried out.

RESULTS AND DISCUSSION

The results of the study obtained from the exploration in Teluk Setimbul Hamlet, Pasir Panjang Village, Meral Sub-district, Karimun District, Riau Island Province, Indonesia showed that the surrounding community still utilizes several types of plants as medicinal plants. As many as 40 species from 23 families were obtained and utilized by the community for traditional medicine (Table 1).

Discussion

According to extensive interviews and participant observations conducted with members of the Akit Tribe, up to 40 plant species from 24 families were identified as being utilized in traditional medicine. The Akit Tribe's home was close to the forest where the medicinal herbs were found. The fact that different species of medicinal plants have been found indicates that the surrounding environment is still naturally occurring (Supiandi et al. 2021). According to Hidayat et al. (2021), woods are important natural resources that may yield medicinal ingredients. The tradition of using medicinal plants for traditional medicine is a cultural heritage that has been passed down from generation to generation from ancestors. The surrounding community has a unique method of utilizing medicinal plants to treat various diseases, which is based on experience gained from family or closest relatives.

From Table 1, it can be seen that the plants most widely used by the community as medicinal plants come from the Euphorbiaceae family (3 species), Myrtaceae (3 species), Rubiaceae (3 species), Asteraceae (2 species), Fabaceae (2 species), Malvaceae (2 species), Moraceae (2 species), Oxalidaceae (2 species), Piperaceae (2 species), Zingiberaceae family (5 species) such as *temulawak*, white turmeric, ginger, turmeric and *kencur*, and other plant families that have 1 species of plant. Zingiberaceae, known as the ginger family, is a group of spices that are abundant and popular in Southeast Asia because they have a distinctive taste, and beauty, and have been recognized as having medicinal properties (Aggarwal and Shishodia 2006; Zahara et al. 2018). The Zingiberaceae family is used by people of many ethnic backgrounds worldwide due to its abundance in nature, unique flavor, and aroma, which set it apart from other families (Bidiarti et al. 2023).

The Zingiberaceae family has the highest species diversity in Southeast Asia. Plants in the Zingiberaceae family are adapted to a wide range of ecological situations; they are most commonly found in tropical rainforests and other humid places. They have been used for a wide variety of purposes, and traditional knowledge of their use has been passed down through the years, especially in Southeast Asia (Boonma et al. 2023), such as: Zingiberaceae is the plant family that the Orang Asli in Malaysia use the most frequently in Kampung Donglai Baru Selangor (Ramli et al. 2021a), Kampung Pasik Kelantan (Zaki et al. 2019), and Kampung Masjid Ijok Perak (Ramli et al. 2021b). This shows that the Malay and Orang Asli communities in Peninsular Malaysia more frequently utilize the Zingiberaceae family of medicinal plants. The majority ethnic group in Thailand, the Karen, grow a wide variety of Zingiberaceae medicinal plants in their home gardens (Tangjitman et al. 2015) and traditional utilization of Zingiberaceae in Nakhon Nayok Province, Central Thailand (Boonma et al. 2023). In the mountain ranges of Northern Antique, the Philippines, Zingiberaceae is used ethnomedically (Dalisay et al. 2018). According to Jadid et al. (2020), Zingiberaceae is the most commonly utilized plant family by the Tengger people in Ngadisari Village, Indonesia.

The Akit people used Javanese turmeric for cough medicine, white Javanese turmeric for stomaches, Javanese turmeric domestica to relieve menstrual pain, ginger to treat swelling due to injury and postpartum recovery and *kencur* to treat colds in babies. Since ancient times, *Curcuma xanthorrhiza*, also known as *temulawak* in the local dialect, has been widely used in Indonesia as a nutritious and medicinal plant. This plant's rhizome is a key component of *jamu* formulation, a herbal remedy used in Indonesia. Traditionally, *C. xanthorrhiza* has been used to treat a variety of conditions, including bloody diarrhea, children's fevers, constipation, dysentery, hemorrhoids, hypotriglyceridemia, lack of appetite, liver illnesses, rheumatism, skin eruptions and stomach disorders (Rahmat et al. 2021).

Table 1. The list of medicinal plants used by Akit Tribe in Teluk Setimbul Hamlet, Pasir Panjang Village, Meral Sub-district, Karimun District, Riau Island Province, Indonesia

Family	Local name	Scientific name	Part use	Mode of preparation	Use
Acanthaceae	*Hempedu bumi*	*Andrographis paniculata* (Burm.F.) Wall.ex Nees	Leaves	Boiled, drunk	Reducing hypertension
Araceae	*Keladi*	*Colocasia esculenta* L.	Whole plant	Boiled, eat	Treating high blood pressure
Arecaceae	*Pinang*	*Areca catechu* L.	Fruit	Boiled, drunk	Treating vaginal discharge
Asphodelaceae	*Lidah buaya*	*Aloe vera* L.	Leaves	Juiced	Treating dental problem, hyperglycemia
Asteraceae	*Tutup bumi*	*Elephantopus scaber* L.	Leaves	Crush the fresh leaves until smooth	Treating inflammation and pain
	Sambung nyawa	*Gynura procumbens* (Blume. Miq)	Leaves	Boiled, drunk	Lowering blood sugar
Caricaceae	*Betik*	*Carica papaya* L.	Leaves	Boiled, drunk	Treating malaria fever
Crassulaceae	*Sedingin*	*Kalanchoe blossfeldiana* Poelln.	Leaves	Soaked, drained	Treating fever
Euphorbiaceae	*Dukung anak*	*Phyllanthus urinaria* L.	Leaves	Boiled, drunk	Treating kidney stones and urinary tract infections
	Jarak	*Jatropha curcas* L.	Stem	Smeared	Treating mouth ulcer, sprue
	Pinisilin	*Jatropha multifida*	Stem and leaves	Take the sap from the stem or leaves and apply it directly to the wound or infected skin area after cleaning it.	For wounds and skin infections
Fabaceae	*Putri malu*	*Mimosa pudica* L.	Root	Boiled, drunk	Treating asthma symptoms
	Asam jawa	*Tamarindus indica* L.	Fruit	Boiled, drunk	Overcoming constipation and digestive disorders, treating liver
Lauraceae	*Alpukat*	*Persea americana* Mill	Fruit	Consumption for eating	Lower cholesterol and maintain heart health
Lythraceae	*Inai*	*Lawsonia inermis* L.	Leaves	Pounded	Overcome skin problems
Malvaceae	*Bunga raya*	*Hibiscus rosa-sinensis* L.	Leaves	Crushed	Treating fever
	Pucuk pelungut	*Urena lobata* L.	Leaves	Boiled, drunk	Treating fever
Moraceae	*Ampelas*	*Ficus ampelas* Burm.f.	Stem	Take the sap from a fresh sandpaper stick and apply it	Treating wounds and overcome skin problems
	Sukun	*Artocarpus altilis* (Parkinson) Fosberg	Fruit	Consumption for eating	Lowers cholesterol levels in the blood
Myrtaceae	*Pucuk merah*	*Syzygium myrtifolium* Walp.	Leaves	Pounded mixed with water, and the water is dripped on the bodies that are sick.	Treating scabs on the skin
	Pucuk kemunting	*Rhodomyrtus tomentosa* (Aiton) Hassk.	Leaves	Mashed, taped	Treating wounds and scabs
	Jambu batu	*Psidium guajava* L.	Leaves	Chewed leaves	Treating diare
Oxalidaceae	*Belimbing bintang*	*Averrhoa carambola* L.	Fruit	Consumption for eating	Boost the immune system and lower cholesterol
	Belimbing wuluh	*Averrhoa bilimbi* L.	Fruit	Consumption for eating	Improve the immune system and overcome diabetes
Pandanaceae	*Pandan wangi*	*Pandanus amaryllifolius* Roxb. ex Lindl.	Leaves	Compressed	Relieve pain or inflammation
Piperaceae	*Sirih merah*	*Piper crocatum* Ruiz & Pav.	Leaves	Pounded, drunk or pasted	Treating jaundice/liver/hepatitis
	Sirih	*Piper betle* L.	Leaves	Boiled, water vapor is directed to blurred eyes or eyes soaked in boiled water that has cooled	Treating blurred eyes
Poaceae	*Ilalang*	*Imperata cylindrica* (L.) Raeusch	Roots	Pounded, smeared	Treating the throat
Rubiaceae	*Mengkudu*	*Morinda citrifolia* L.	Leaves	Boiled, drunk	Treating yellow pain
	Gambir	*Uncaria gambir* (W.Hunter) Roxb.	Fruit	Boil and gargle	Treating mouth ulcers and mouth diseases
	Sebau	*Paedaria foetida* L.	Leaves	Decoction	Treating urogenital and gynecological problems (leucorrhea)
Rutaceae	*Limau*	*Citrus aurantifolia* (Christm)	Fruit	Squeezed	Treating cough
Simaroubacceae	*Pasak bumi*	*Eurycoma langifolia* Jack.	Roots	Boiled, drunk	Treatments to address decreased energy
	Kumis kucing	*Orthosiphon aristatus* (Blume) Miq.	Leaves	Brew the dried leaves, drunk	Treating kidney stones
Thymelaeaceae	*Gaharu*	*Aquilaria malaccensis*	Flakes	Compressed	Anti-inflammatory
Zingiberaceae	*Temulawak*	*Curcuma xanthorrhiza* Roxb.	Rhizome	Mashed, boiled, drunk	Treating aches and pains, jaundice
	Kunyit putih	*Curcuma mangga* Val.	Rhizome	Mashed, boiled, drunk	Treating stomach pain
	Jahe	*Zingiber officinale* Rocs.	Rhizome	Pounded, mixed water, drunk	Treating swelling from injury and postpartum recovery
	Kunyit	*Curcuma domestica* Val.	Rhizome	Mashed, boiled, drunk	Relieve menstrual pain
	Kencur	*Kaempferia galanga* L.	Rhizome	Pounded, smeared	Treating colds in babies

Curcuma mangga rhizome is empirically used in traditional medicine to alleviate inflammation and pain associated with asthma, bronchitis, hemorrhoids, and sore throats (Salman and Indriana 2020). Likewise *Curcuma domestica* has an active compound called curcumin which functions to antioxidant, antioxidant, antitoxin, anti-inflammatory, and lower cholesterol (Hunjri and Rahmah 2019). According to John and Noushad (2021), ginger's anti-inflammatory qualities may help lower blood pressure, diabetes, and certain types of cancer. *Kampferia galanga* is commonly utilized as an ethnomedicinal (Labrooy et al. 2018).

The Akit people also utilized plants from the Myrtaceae and Euphorbiaceae family for traditional medicine. The Myrtaceae family used by the Akit Tribe people were *Syzygium oleana* for treating scabs on the skin, numerous secondary metabolite substances with antibacterial properties, such alkaloids, flavonoids, and tannins, are found in *S. oleana* (Sari et al. 2022); *Rhodomyrtus tomentosa* is used to treat wounds and scabs, it has been demonstrated that the acylphloroglucinol rhodomyrtone found in *R. tomentosa* leaves may be an effective anti-inflammatory agent (Vo and Ngo 2019), and *Psidium guajava* is used to treat diarrhea, young leaves of *P. guajava* are rich in tannins and essential oils, making them effective for treating diarrhea (Husin 2002). For a very long time, *R. tomentosa* has been used in traditional Vietnamese, Chinese, and Malaysian medicine to treat wound healing, gynecopathy, diarrhea, and dysentery (Vo and Ngo 2019). Pharmacological research on *P. guajava* revealed this plant's enormous potential for treating a variety of conditions, including acne, allergies, cardiovascular disorders, coughs, dental plaque, diabetes, diarrhea, malaria, and wounds (Salazar et al. 2006; Ghaderi et al. 2022). The Euphorbiaceae plants used by the Akit people were *Phyllanthus urinaria* for treating kidney stones and urinary tract infections; *Jatropha curcas* is used to treat mouth ulcers, sprue; and *Jatropha multifida* is used for wounds and skin infections. The annual perennial herbal species *P. urinaria* is found in tropical Asia, America, China, and the islands in the Indian Ocean. In traditional medicine, *P. urinaria* is used to treat diabetes, jaundice, malaria, and liver disorders (Geethangili and Ding 2018). *Jatropha curcas* is a traditional medicine that is used empirically by the public in the treatment of burns (Sompah et al. 2023). The flavonoids, saponins, and tannins found in *J. curcas* have an effect on the healing process of burns (Laguliga et al. 2021; Maroyi 2024)

Plants from the Rubiaceae, Asteraceae and Fabaceae families are also used by the Akit Tribe in medicine, such as: the Rubiaceae family, *Morinda citrifolia* for treating yellow pain; *Uncaria gambir* to treat mouth ulcers and mouth diseases and *Paedaria foetida* for treating urogenital and gynecological problems (leucorrhea). Because of its several intrinsic routes, *M. citrifolia* is thought to be a potentially useful medicinal plant in the treatment of cancer (Chanthira Kumar et al. 2022). The plant *Uncaria gambir*, often known as *gambir* locally, is indigenous to Borneo, Malaya, and Sumatra. This plant has the potential to be used in local medicine wisdom. *Gambir* was a traditional remedy for fever, diarrhea, wound healing, and diabetes in Sumatra (Oswari et al. 2019). Chinese, Ayurvedic, and other traditional medical systems have long used *P. foetida* to treat a wide range of conditions, including arthritis, vesical calculi, inflammation, asthma, diarrhea, dysentery, piles, diabetes, and seminal weakness (Quang et al. 2002; Dutta et al. 2023). Numerous nutraceutical polyphenols, including alizarin, arjunolic acid, caffeine, cafestol, cephalin, chelidonic acid, cinchonide, copareolatin, quinine, and quinovic acid, have been identified in the Rubiaceae family indicates that the prebiotic activity, radical scavenging ability, and immunomodulatory qualities of secondary metabolites generated from Rubiaceae species have antioxidant, anti-inflammatory, and regulatory effects on metabolic organs (González-Castelazo et al. 2023).

The plants from the Asteraceae families are: *Elephantopus scaber* for treating inflammation and pain and *Gynura procumbens* for lowering blood sugar. A plant known as *E. scaber* is easily found in Indonesia and may be utilized as a traditional medicine to treat anemia, cough, diarrhea, fever, fluor albus, headaches, hepatitis, influenza, jaundice, and laryngitis (Junairiah et al. 2021). Southeast Asian plant *G. procumbens* is a useful treatment for diabetic sores that do not heal (Sutthammikorn et al. 2021). Numerous Asteraceae species have been shown to contain a variety of chemical components, including essential oils, flavonoids, phenols, polyphenols, and terpenes through phytochemical investigations. The main phytochemicals in the Asteraceae family with a range of biological activity are sesquiterpene lactones. They may have antibacterial, anticancer, antimalarial properties, and antiviral (Rustaiyan and Faridchehr 2021).

The plants from the Fabaceae family are: *Mimosa pudica* for treating asthma symptoms and *Tamarindus indica* for overcoming constipation and digestive disorders. *M. pudica* was utilized in ethnomedicine to cure and prevent several diseases, including alopecia, cancer, diabetes, diarrhea, and urinary tract infections (Adurosakin et al. 2023). Many medical benefits of using tamarind, such as lowering fever, relieving constipation, treating asthma, treating diabetes, lowering pregnancy nausea, reducing flatulence, lowering itching, using it as a body slimming element, and treating lung diseases (Andi Indrawati et al. 2023). The roots of the *M. pudica* plant contain flavonoid compounds, phytosterols, alkaloids, amino acids, tannins, glycosides and fatty acids that can function as immunomodulators, antioxidants and antibacterial (Ahmad et al. 2012; Widodo et al. 2019). While the pulp of the *Tamarindus indica* plant contains organic acids (acetic, citric, formic, malic, succinic and tartaric) which can function as antioxidant, hatoregenerative, hepatoprotective and hypolipemic (Menezes et al. 2016; Widodo et al. 2019).

The Akit people also utilized plants from the Malvaceae, Moraceae and Piperaceae families for traditional medicine. *Hibiscus rosa-sinensis* and *Urena lobata* from the Malvaceae family is used for treating fever. According to (Jeffery and Richardson 2021), traditional medicine has historically employed hibiscus

species to cure a wide range of illnesses, including abscesses, bilious diseases, cancer, cough, fever, gastrointestinal discomfort, neurosis, scurvy, urinary tract disorders and weariness. *U. lobata* has been utilized as a medicinal plant to cure edema, fever, and infections (Purnomo and Tilaqza 2022). Certain Moraceae species have been utilized as traditional medicine in the area, and others show promise for usage as herbal remedies (Sahromi 2021). Many people use piper as a folk treatment to cure inflammatory illnesses, gastrointestinal, and gastroprotective (Arunachalam et al. 2020). Piperaceae species are also frequently utilized for their antibacterial, antifungal, and antiprotozoal properties (Sauter et al. 2012). *Averrhoa carambola* and *Averrhoa bilimbi* are plants from the Oxalidaceae family that are useful as medicinal plants, *A. bilimbi* is primarily used as an antibiotic and in folk medicine to treat diabetes mellitus and hypertension (Alhassan and Ahmed 2016). *Andrographis paniculata* from the Acanthaceae family is useful for reducing hypertension. This plant has long been used as a remedy for some infectious diseases, including antioxidants, diarrhea, fever from various infections, hypertension cardiovascular health tonics, jaundice, liver, and the common cold (Hossain et al. 2014). *Carica papaya* from the Caricaceae family is useful for treating malaria because it has the effect of methanol leaf extract on anti-malarial properties (Oraebosi and Good 2021).

The Akit Karimun tribe utilizes plants from the Asphodelaceae family, namely *Aloe vera* for treating dental problems, and hyperglycemia. According to Abu-Seida and Seif (2023), several further oral and dental issues have been treated and prevented with *A. vera. Imperata cylindrica* from the Poaceae family is also used to treat throat. *Eurycoma longifolia* and *Orthosiphon aristatus* from the Simaroubacceae family are useful for treating malaria and kidney stones respectively. In addition to treating the throat, Imperata stolon extract is effective in killing *Aedes* sp. mosquito larvae (Antou et al. 2022). Traditional "anti-aging" treatments often use *E. longifolia* to treat hormonal imbalances, libido, low energy, and mood (Muniandy et al. 2023). A traditional herb called *O. aristatus* is used to treat a variety of conditions, including acute, cystitis, chronic nephritis, and epilepsy (Chiang et al. 2024). Fruits' *Areca catechu* from the Arecaceae family for treating vaginal discharge. Research in modern pharmacology has shown that areca nut exhibited a variety of biological activities, such as analgesic, anti-allergic properties, antifungal, antiparasitic, and antiparasitic, as well as anti-inflammatory, antioxidant, and hypoglycemic properties (Ji et al. 2022). *Persea americana* from the Lauraceae family if consumption for eat, it can lower cholesterol and maintain heart health. *Aquilaria malaccensis* from the Thymelaeaceae can be anti-inflammatory (Eissa et al. 2022), *Lawsonia inermis* from the Lythraceae family for overcoming skin problems (Niazi et al. 2022), *Colocasia esculenta* from the Araceae family for treating high blood pressure (Vasant et al. 2012), *Citrus aurantifolia* from the Rutaceae family for treating cough (Enejoh et al. 2015), *Pandanus amaryllifolius* from the Pandanaceae family for relieving pain or inflammation (Bhuyan and Sonowal 2021), and *Kalanchoe blossfeldiana* from the Crassulaceae family for treating fever (Milad et al. 2014).

Medicinal plants are all-natural plants that contain certain chemical compounds found in specific parts of the plant, such as roots, stems, leaves, and shoots. These parts are then used in making herbal medicines to treat various diseases, often in the context of traditional medicine (Karmilasanti and Supartini 2011). Leaves are part of a plant organ that is often used as an ingredient in traditional medicine (Kasmawati et al. 2019; Qasrin et al. 2020; Weking et al. 2023). The use of leaves in making herbal medicines is considered more practical than bark, stems, and roots (Syamsiah et al. 2016; Utami et al. 2019). Leaves are easily accessible, have good therapeutic effects, and are not dependent on a particular season. In addition, the use of leaves does not damage the plant because the leaves can grow back easily and can be used sustainably (Martins et al. 2023).

Based on Figure 2, it can be seen that, the Akit people make use flakes, fruits, leaves, plant's root, rhizomes, stem, and even all parts of the plants as medicine. The most widely used part is the leaves which was 19 plants. Alkaloids, flavonoids, morphine, saponins, and tannins are among the secondary metabolite chemicals found in leaves that have medicinal uses (Ahmad et al. 2015). Secondary metabolites, which are active molecules present in plant organs, have been shown to have anticancer, antidiabetic properties, anti-hepatoxic, anti-inflammatory, antioxidant, and antiviral (Al-Mijalli et al. 2022).

The Akit people utilize simple techniques of processing medicinal plants: mashing, boiling and drinking, applying and pounding, chewing, boiling and eating, applying and pounding, juicing, eating, mixing with water, and dropping. These techniques are used because: (i) they are easy to use, (ii) they do not require expensive equipment, (iii) they are affordable, and (iv) anyone can do them. The process of pounding and applying plants to cure external ailments typically causes the affected area to react (Shedoeva et al. 2019). Eating it after it has been boiled is a common way to cure internal illnesses and promote healing (Ambu et al. 2020).

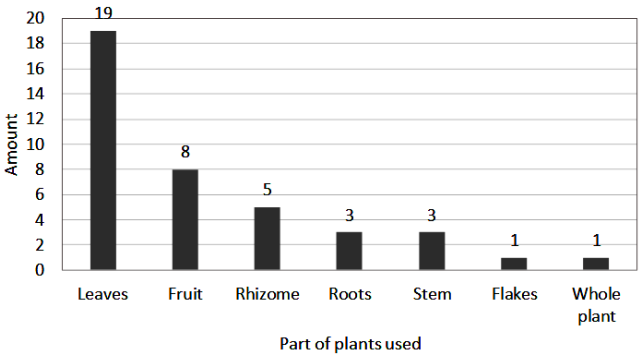

Figure 2. Parts of plants used as medicine by Akit Tribe in Teluk Setimbul Hamlet, Karimun District, Riau Island, Indonesia

The Akit Tribe's knowledge of employing plants to treat a variety of ailments must be practiced consistently and transmitted to the next generation. This phenomenon is an attempt to preserve the locals' knowledge of therapeutic plants and their cultural identity to prevent them from going extinct. Because medical plants are beneficial to those in need, the initiative also aims to introduce locally utilized medicinal plants to a wider audience.

This study concluded that the Akit people, who live in Teluk Setimbul Village, Karimun District, Riau Islands Province, are still knowledgeable about using plants for traditional medicinal purposes. The development of modern medicine can benefit from knowledge about the Akit Tribe's traditional medicines.

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