



Ethnobotany of Medicinal Wild Plants in the Community of Kutorejo Subvillage, Buffer Area of Alas Purwo National Park Banyuwangi Regency

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Abstract. Alas Purwo National Park has a buffer area, namely Kutorejo Subvillage, Kalipahit Village, Tegaldlimo District, Banyuwangi Regency. The communities around the buffer area have local wisdom in the use of medicinal plants. Therefore it is important to carry out an ethnobotanical study in this area as a means of documenting the local knowledge of the community of Kutorejo Subvillage. The purpose of this study is to identify the use of medicinal wild plants and identify the potential of medicinal wild plants used by the Kutorejo Subvillage community. The population of this research is the people of Kutorejo Subvillage. The research sample consisted of people who understand medicinal plants. Sample determination is done by random sampling. The study was conducted from May to June 2021. The results showed that identified as many as 17 species from 14 families of medicinal wild plants used by the community of Kutorejo Subvillage from several habitus groups. The largest Species Use Value (SUV) is *Heliotropium indicum* (0.8). The largest percentage of use of plant organs as medicinal ingredients is leaves at 82.36%. There are 4 species of medicinal wild plants originating from the Alas Purwo forest that have the potential to be developed and cultivate, namely *Alstonia scholaris*, *Melaleuca leucadendra*, *Ardisia elliptica*, and *Amomum dealbatum*.

Keywords: Ethnobotany · medicinal wild plants · buffer area · Alas Purwo National Park

1 Introduction

Alas Purwo National Park is located in Kalipahit Village, Tegaldlimo District, Banyuwangi Regency. Alas Purwo National Park which was established according to the Decree of the Minister of Forestry No. 283/Kpts-11/1992 on February 26, 1992, has an area of 43,320 ha. The area known as the Blambangan peninsula is a representative type of lowland rainforest ecosystem in Java [1, 2]. This area is rich in flora and fauna. Recorded at least 584 plant species consisting of grass, herbs, shrubs, lianas, and trees inhabit this area. Many types of medicinal plants that grow in the tropics have not been empowered, including species from Alas Purwo [1].

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Alas Purwo National Park has a buffer area that surrounds the National Park outside the conservation area, the use of this area is limited to provide protection for the National Park. However, the community who live directly adjacent to the buffer area can still take advantage of the forest potential in the buffer area, including medicinal plants, under applicable regulations. So that the needs of the community are still met and the forest is sustainable [3, 4]. One of the buffer areas of Alas Purwo National Park is Kutorejo Subvillage, Kalipait Village, Tegaldlomo District. The community of Kutorejo still often use traditional medicines from plants that are around their places, including plants that grow wild in nature. Many wild plants are used as medicinal ingredients in curing disease. Wild plants are considered to have higher efficacy than cultivated plants [5, 6]. Wild plants produce most of the pharmacologically important compounds during defense mechanisms when plants are stressed in nature and other secondary metabolites are produced due to the ability of plants to respond to chemical and physical stimuli [7, 8].

The use of this wild plant has been done for a long time. The knowledge of the local community that is obtained accidentally continues to develop from generations to become indigenous knowledge. However, the knowledge of the utilization has begun to fade. Ethnobotany research is carried out as a tool to document the knowledge of traditional communities that have used various kinds of plant services to support their lives. Therefore, it is important to do conservation efforts through ethnobotanical research on medicinal plants. This research was conducted with the aim of identifying the use of medicinal wild plant species and identifying the potential of medicinal wild plants used by the Kutorejo community.

2 Method

The research was conducted in an area directly adjacent to Alas Purwo National Park, namely Kutorejo Subvillage, Kalipait Village. Data collection was carried out from 17th May to 5th June 2021 periodically. The method used in this research is descriptive-quantitative and tabulation methods. Data collection techniques are observation, semi-structured interviews, recording, and literature study. The interviews data were quantitatively analyzed using the calculation of Species Use Value (SUV) and Plant Part Used (PPU).

Species Use Value

$$SUV = \frac{\sum SU_i}{n} \quad (1)$$

SU_i: The number of each plant species cited by the informant

n: Total number of informant

Plant Part Used

$$PPU(\%) = \frac{\sum \text{Particular plant organ used}}{\sum \text{Plant Organ Used}} \times 100\%$$

The study was arranged by conducting a field orientation. Respondents were determined by random sampling, that are the peoples who live directly adjacent to forest areas

and old (having an age range of 40 years and over) because they are considered to have more knowledge about the use of medicinal wild plants. The respondents were 15 people from Kutorejo Subvillage. Primary data collected is the type of plant used includes local names, parts used, origin of acquisition, and medicinal benefits. The secondary data collected includes the general condition of the research location, the condition of the community in the research location, and reports related to the research.

3 Result and Discussion

3.1 Wild Plants as Medicine

According to the results of interviews and field observations, there are 17 species of wild plants used as medicine by the Kutorejo community from 14 different families. The wild plants as medicines used by the community of Kutorejo Subvillage can be seen in Table 1. All identified species came from several habitus groups ranging from herbs, shrubs, shrubs, lianas to trees. Medicinal wild plants are obtained by the community from various locations around their living environment such as yards, farms, and forests. The wild plants in question are not plants that are premeditated cultivated.

3.1.1 Species Use Value (SUV)

The result of SUV calculation is shown in Fig. 1, Species with high use value (UV) is *Heliotropium indicum* (0.80). This plant is often used by the Kutorejo community because of its easy processing, it usually grows wild in the yard and plantation areas. The community of Kutorejo use it as a shock sedative for toddlers or children, by pounding it and rubbing it into the stomach, this method is believed to relieve the shock so it doesn't cause seizures. In addition, for adults the *H. indicum* plant can relieve migraine pain, by taking a handful of *H. indicum* leaves, cleaning them, then put in warm water and used for bathing. The ethanol extract of the leaves of *H. indicum* has sedative power, this is because the leaves contain terpenoids (essential oils) and alkaloids. The essential oil of *H. indicum* leaves has chemical properties similar to those of myristicin and asarone. Myristicin compounds are antiseptic and anesthetics, while asarone are anticonvulsant, hypothermic CNS depressant, and psychoactive [10].

The use Value of other plant species is almost the same, ranging from 0.2 to 0.4. The low utilization is due to several factors, including access to plant retrieval that is not easy, the type of disease being treated, or the community's knowledge of the benefits of the plant. For example, the ingredients used by the Kutorejo community are herbs from the leaves of *C. odorata* and *S. jamaicensis*, which are believed to treat hypertension and diabetes. Likewise, *A. elliptica*, is used as a herb to treat diabetes. However, knowledge about the benefits of this herb is not widely known, even the Kutorejo community in general, so it is rarely used. In addition, some medicinal plants come from the forest which are not easily obtained, which becomes an obstacle in utilizing.

3.1.2 Plant Part Used (PPU)

The value of using plant organs as medicinal ingredients is shown in Fig. 2. There are 4 plant organs used for medicinal ingredients, that are leaves, seeds, fruit, and bark.

Table 1. Medicinal wild plants used by the Kutorejo Subvillage community

Family	Latin name	Local Name	Use	Plant's Part
Acanthaceae	<i>Andrographis paniculata</i>	Sambiloto	Rheumatic, gout	Leaves
Acoraceae	<i>Acorus calamus</i>	Dlingu/Jeringau	Fever, flatulence	Rhizome
Annonaceae	<i>Annona muricata</i>	Muris/sirsak	Gout, hypertension	Leaves
Apocynaceae	<i>Alstonia scholaris</i>	Pule	Fever, diarrhea	Bark
Asteraceae	<i>Elephantopus scaber</i>	Tapak liman	Fever, flu, cough	Leaves
	<i>Chromolaena odorata</i>	Balakacida	Wounds, diabetes, hipertensi	Leaves
Boraginaceae	<i>Heliotropium indicum</i>	Sengketan	Fever, wounds	Leaves
Euphorbiaceae	<i>Ricinus communis</i>	Jarak	Wounds	Leaves
Lamiaceae	<i>Ocimum sanctum</i>	Kemangi	Wounds	Leaves
Myrtaceae	<i>Psidium guajava</i>	Jambu biji	Stomachache, diarrhea	Leaves
	<i>Syzygium polyanthum</i> ,	Salam	Gout, diabetes, hiperkolesterolemia	Leaves
	<i>Melaleuca leucadendra</i>	Kayu putih	Flatulence, reduce pain	Leaves
Piperaceae	<i>Piper betle</i>	Sirih	Wounds, cough	Leaves
Polypodiaceae	<i>Drynaria quercifolia</i>	Pakis arab	Fever, headache	Leaves
Primulaceae	<i>Ardisia elliptica</i>	Lempeni	Hypertension, diabetes, digestion	Leaves
Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Pecut kuda	Maag, diabetes, hypertension	Leaves
Zingiberaceae	<i>Amomum dealbatum</i>	Wresah/Hangasa	Feverish, sprue	Fruit

Calculation of PPU is useful to determine the dominant plant organs and can be used as medicinal ingredients.

The results of the PPU calculation show that the percentage of plant organs that are often used as medicinal ingredients is leaves, which is 82.36%. The leaves have been known for generations to be used more for medicine than other parts. Leaves are often used because they are relatively easy to obtain and process compared to other

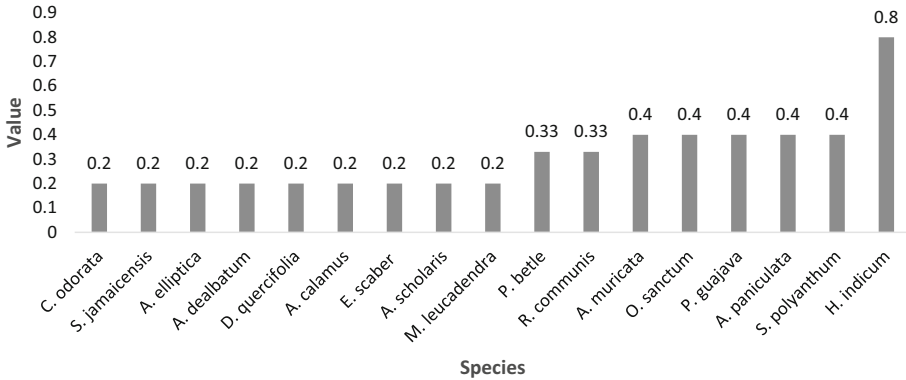


Fig. 1. Species Use Value (SUV) of medicinal wild plants for the Kutorejo Subvillage community

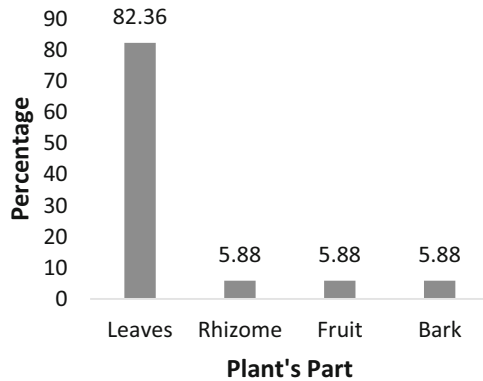


Fig. 2. Percentage of plant parts used as medicine

plant organs [11]. The leaves also contain high secondary metabolites. Leaves are the main organ in the process of anabolism through photosynthesis to produce primary metabolites. Furthermore, the primary metabolites undergo some secondary reactions to produce other organic materials which are commonly called secondary metabolites [12]. The abundance of leaves also makes people tend to use them as medicinal ingredients. The proper taking of plant leaves does not threaten the survival of a plant, unlike the removal of rhizomes and bark of trees which tend to kill the plant.

3.2 Potential Medicinal Wild Plants

The medicinal wild plants used by the Kutorejo community include those from the Alas Purwo forest. This plants growth in forest of the buffer area of the national park, where the abundance is still high [1, 13]. These plants include *Alstonia scholaris*, *Melaleuca leucadendra*, *Ardisia elliptica*, and *Amomum dealbatum*. These herbs are used traditionally for various ailments from minor to chronic.

A. scholaris is a rare medicinal plant species that can be found in the Alas Purwo area with fairly even distribution and a large number of individuals [1]. *A. scholaris* has been used by the Kutorejo community as a medicine for fever and diarrhea. This species has one of the main constituents in the form of Alkaloids. Among other constituents are iridoids, coumarins, flavonoids, leucoantocyanins, steroids, saponins, tannins Isookanin-7- α -l-rhamnopyranoside, flavanone glycoside and alstonoside, a secoiridoid glucoside. The phytochemical content of *A. scholaris* is reported to have antitussive, anti-asthmatic and expectorant, anti-inflammatory and analgesic, antipyretic, anti-ulcerogenic, antipsychotic, anxiolytic, antioxidant and free radical scavenging activities, immunostimulant, hepatoprotective, wound healing, antinociceptive, antidiabetic and antihyperlipidemic activity. Antihypertensive, aphrodisiac. Alstonine, an alkaloid, is reported to have anticancer properties [14].

The leaves of *M. leucadendra* are traditionally used by the Kutorejo community as a remedy for flatulence and reduce pain. Utilization of *M. leucadendra* leaves is quite simple by pounding it and rubbing it into the stomach or body part that feels pain. Commercially, *M. leucadendra* has been widely used as an ingredient in cosmetics, the food industry, and traditional medicine. Plants of the genus *Melaleuca* usually contain lots of essential oils. In addition, it contains various phytoconstituents, especially phenolics and terpenoids, flavonoids, phenylpropanoids, and polyphenols. The genus *Melaleuca* has shown several pharmacological activities, such as antimicrobial, antiparasitic, antioxidant, anti-inflammatory, acetylcholinesterase inhibition, neuroprotective, molluscicidal, antischistosomal, immunostimulant, anticancer, antihistamine, cardiovascular, hepato-protective, antisecretory, and antiulcerogenic activities [15].

A. elliptica is widely found in the wild, but this plant is easy to cultivate so it has the potential to be developed. The community of Kutorejo community uses *A. elliptica* as a treatment for diabetes. *A. elliptica* is rich in polyphenols, triterpenoid saponins, isocoumarins, quinones, and alkylphenols. The phytochemical content of *A. elliptica* is reported to have anti-HIV, anti-salmonella, anti-viral, and anti-cancer activities. Traditional medicinal uses related to *A. elliptica* include reduction of liver cancer, diarrhea, birth complications and improving blood circulation [16, 17].

The fruit of *A. dealbatum* has been used by the Kutorejo community to treat canker sores and treat feverish bodies. Utilization of *A. dealbatum* fruit is consumed directly, or dried first and then crushed into powder to be used as herbal drinks. Plants of the genus *Amomum* contain many naturally occurring non-volatile compounds, including flavonoids, terpenoids, diarylheptanoids, coumarins, etc. Triterpenes and flavonoids are the main constituents of these compounds and may take effect an important role in direct or indirect activities. Pharmacological studies reveal that the extract has significant antioxidant, anti-inflammatory, anti-allergic activity [18].

The potential of this medicinal wild plant needs to be domesticated or cultivated. Given that medicinal plants in Indonesia are still 3–4% cultivated and used commercially [19]. Cultivation of wild plant helps make it easier for people to use it. This effort is also a plant conservation measure at a simple level. Cultivation of medicinal plants can be done in the yard, making it easier and faster to obtain. Cultivation techniques help in increasing the stock of species in natural forests thereby reducing the level of rarity [20].

4 Conclusion

Identified as many as 17 species from 14 families of medicinal wild plants used by the community of Kutorejo Subvillage from several habitus groups. The largest Species Use Value (SUV) is *Heliotropium indicum* (0.8), commonly used for sedative and migraine drugs. The largest percentage of use of plant organs as medicinal ingredients is leaves at 82.36%. There are 4 species of medicinal wild plants originating from forest of the buffer area of Alas Purwo National Park that have the potential to be developed and cultivated, namely *Alstonia scholaris*, *Melaleuca leucadendra*, *Ardisia elliptica*, and *Amomum dealbatum*.

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