

A Study of the Tengger Tribe's Use of Medicinal Plants in East Java, Indonesia, from the Perspective of Ethnopharmacology

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ABSTRACT: Ethnopharmacy is a strategy that focuses on exploring and documenting an ethnic group's or community's local knowledge of the usage of a medication for medical purposes. The Tengger tribe is one of the few in Indonesia that still has ancient medicinal expertise. This study examines medicinal plant species and traditional knowledge about degenerative diseases and other disorders in the Tenggerese population of Ngadas Village in TNBTS, Indonesia. Approach: The Snowball Sampling approach is used in this study, which starts with Purposive Sampling to identify essential samples. Next, the data is evaluated qualitatively. Results: This study describes 29 traditional medicinal plants divided into 15 groups that are used to cure 14 different ailments. The inventory of the 29 selected medicinal plants reveals that the leaf part, preparation as a decoction, and use as a drink are the most prevalent outcomes. The most widely utilized family in traditional medicine is Asteraceae. Conclusion: The Tengger tribe population continues to use plants to treat a variety of ailments today. The reported medicinal plant species will serve as a basic reference in phytochemistry for future research into new active chemicals as well as conservation methods. In this sense, it is critical to prioritize the conservation of traditional medicinal plants and indigenous medical knowledge in the Tengger tribal area of Ngadas Village in order to conserve them for future generations.

Keywords: Ethnopharmacy, Tengger Tribe, Ngadas Village, Indonesia

I. INTRODUCTION

Indonesia is a country with abundant natural resources, including the second-largest tropical forest after Brazil. Indonesian woodlands are rich in medicinal plants, with about 20,000 species, 1,000 of which have been recorded and 300 used in traditional medicine [1]. Furthermore, Indonesia is home to a variety of indigenous tribes, each with its own distinct and fascinating culture. Each ethnic group has its own distinct local wisdom

based on customs, culture, and traditions passed down through years by ancestors. Similarly, each tribe/community interprets the notions of health, illness, and health-maintenance treatments. This includes the use of certain plants as a treatment for a sickness passed down through generations, as thought by their ancestors[2]. Despite the fact that modern medicine has been applied, the community continues to use traditional medicine in daily life. The community continues to believe in knowledge passed down from ancestors, the use of natural resources, or the services of someone said to be able to treat diseases [2]. Second, the exorbitant cost of synthetic pharmaceuticals and the negative health impacts they produce have pushed individuals to return to traditional treatment [3]. Traditional medicine has been passed down through generations, and many medicinal herbs are still scientifically confirmed to be useful. Third, improvements in science and technology, namely the advent of synthetic (non-herbal) medications made in a modern manner and packaged in appealing and easy-to-consume forms, have contributed to a decline in the use of traditional medicine [4].

The absence of documentation on the usage of medicinal plants by specific groups makes it difficult to conserve traditional medicine. Furthermore, the modernity caused by the entry of foreign cultures, particularly those accepted by the younger generation, has degraded indigenous knowledge within certain groups.

Ethnopharmacology is one method for investigating local knowledge in specific groups on the use of plants as medicine. This study allows us to trace traditional medicinal compounds and their use as cultural identifiers within a specific group.

The Tengger tribe of East Java is one of the few tribes in Indonesia that has managed to keep its culture and traditions. This tribe is distributed over four regencies: Probolinggo, Pasuruan, Lumajang, and Malang. Geographically, the Tengger tribe in Lumajang and Malang regencies is far from the epicenter of Tengger traditional rites, which are

typically held near the Bromo crater. This is because the Tengger tribe in these areas tends to modernize faster as a result of foreign cultural influences. Furthermore, Islamization has happened in the area, allowing the Tengger indigenous culture to vanish, including knowledge of plant medicine. As a result, an ethnopharmacological study is required to determine whether plants are still being used by the indigenous Tengger tribe to cure various ailments.

II. METHODS

Research location

The investigation was carried out in Ngadas Village, Poncokusumo District, Malang Regency, East Java Province, Indonesia. Ngadas settlement is situated at an altitude of 2,174 meters above sea level, earning it the title of the highest settlement on the island of Java, and is flanked by Mount Bromo and Mount Semeru. [5]. This village's geography is mountainous, and the climate ranges from 0 to 20°C. Ngadas Village and its surrounds have a soil composition of dust, sand, and clay, which is classed as regosol and sitosol. These soil types are key predictors of the distribution of vegetation and commodities [6]. Ngadas Village covers 414 km², accounting for 4.2% of Poncokusumo District's total area. Due to the steep terrain, agriculture accounts for the majority of the community's economic activities [7].

Determine informants and collect data

Data were gathered through semi-structured and structured interviews with informants who know or use plants as medicine. This technique is commonly employed in ethnopharmacology research [8]. Interviews were done to further comprehend and investigate traditional knowledge about the use of medicinal plant varieties, their applications, the parts used, preparation methods, and usage ways. The interview activities were carried out entirely using a questionnaire. The snowball sampling technique was used to select informants, with key informants (local customary head/village head) identified first using the purposive sampling technique. Key informants are those who wield significant power in the community and possess ancestral local knowledge. The prior respondent's direction guides the following informant [9].

Research instruments

This study's instruments include interview instructions (questionnaires), documentation tools (computerized cameras and recording devices), and

note-taking instruments. Meanwhile, the research materials consist of numerous plants utilized as traditional medicine by the Tengger Tribe in Ngadas Village, Poncokusumo District, Malang Regency, East Java, Indonesia.

Data analysis

In this study, the researcher conducts qualitative data analysis. This step attempts to collect information about plants, their use, plant parts, and how to prepare them [10].

III. RESULTS AND DISCUSSION

This ethnopharmacy study was conducted in Ngadas Village, Poncokusumo District, Malang Regency, with the village's indigenous Tengger tribe serving as the research subjects. The overall number of informants in this study is 28, with 15 women and 13 men. There were 21 people aged 19 to 59, with the remaining 7 people over the age of 60. In this study, the researcher conducted additional interviews with female informants. This is because women spend more time at home caring for their children and are more concerned about their development than males, who are the family's breadwinners and must work. This is reinforced by Dewi's (2019) research, which discovered that 52.98% of women understand and apply traditional medicine better than men [11]. Not only did Chaachouay et al. (2019) perform research in Indonesia, but they also found similar results in their Moroccan study. However, another study found that males use traditional medicine more than women [12], [13].

According to the study's findings, the majority of respondents (75%) were between the ages of 19 and 59, placing them in the adult age category. A person's knowledge can be influenced by their age; as they become older, they gain more knowledge. However, as people get older, their ability to receive and remember information declines. Most of the informants who practice traditional medicine here are above the age of 40. According to Hafid's research (2019), people over the age of 40 are considered mature, and they are among the most likely to use the services of shamans because, based on their experience and belief in the shaman's ability to cure various diseases, they prefer to consult a shaman before seeking medical treatment [14]. This is reinforced by another study that included respondents above the age of 35. The majority of responders in their productive age improve a person's comprehension

and thinking, making it easier to obtain knowledge on reasonable substances. [15].

The majority of the interviewees in this study, 21 in total (75%), have completed elementary school. The amount of education has a significant impact on society's thinking and conduct. The availability of educational facilities and infrastructure in Ngadas Village contributes to the village's low level of education. This community has only two elementary schools and one junior high school, each with very basic school facilities and infrastructure. The locals' traditional attitudes toward education, which has not yet become a basic necessity, but education is still regarded as a barrier to the social and cultural patterns of life in this town. In terms of treatment selection, the community always values the information and expertise they have, thus therapy is also chosen based on their level of education [14]. In the researcher's interviews with the informants, they stated that when they were sick, they sought traditional medicine before seeking medical attention. However, if the disease does not improve after a few days, they will seek medical attention at community health centers, clinics or hospitals. Furthermore, the healthcare center is more than 20 kilometres from home. According to the locals, this distance is pretty far, so they either employ local therapies or simply rest.

The majority of Ngadas Village's people (78.57%) work as farmers. Due to the steep terrain, agriculture accounts for the majority of the community's economic activities. The climate and location of Ngadas Village are ideal for growing horticulture crops. Potatoes are the most famous agricultural crop in Ngadas Village. This is consistent with the findings of Gifari et al. (2019), who found that the level of human resources in Ngadas Village is below average, with the majority of students only completing elementary school.

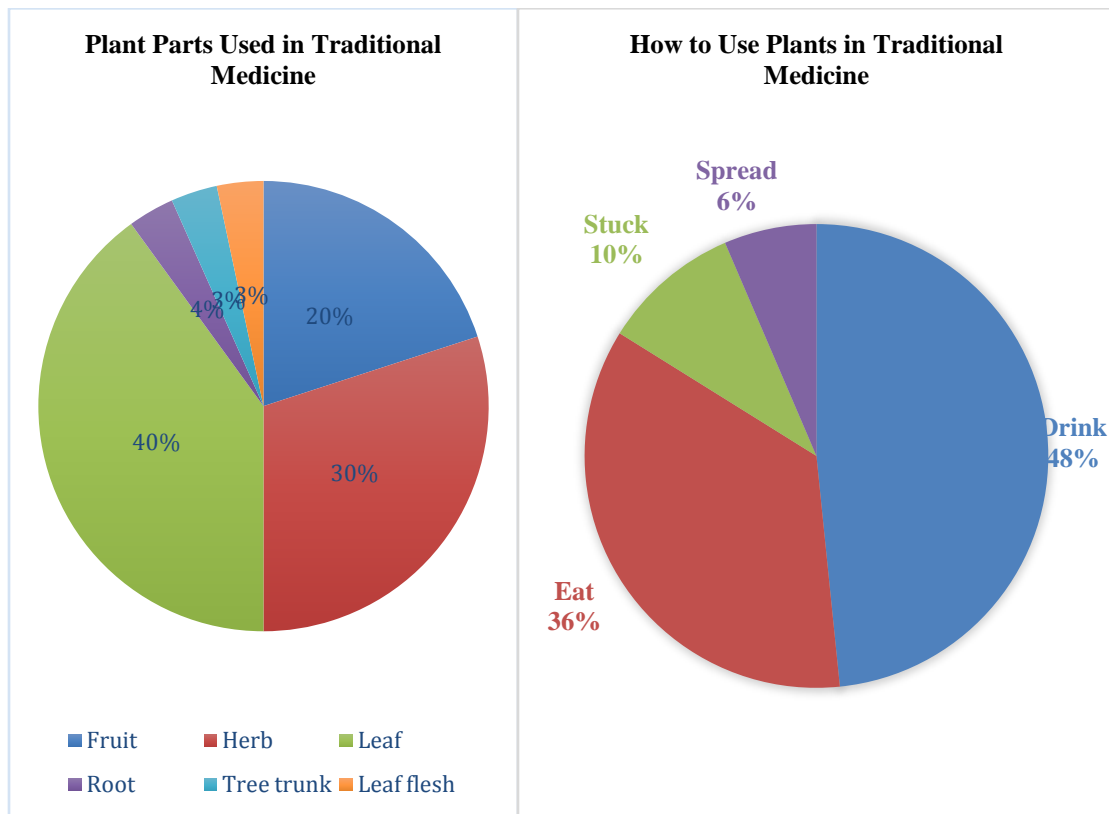
Farming is the primary source of income in Ngadas Village. In addition to its cultural wealth, this community has an abundance of natural resources, including potatoes, cabbage, red onions, and others [16].

The Tengger tribe in Ngadas Village continues to rely on hereditary information for traditional medicine use (92.86%). This result demonstrates that the practice of traditional medicine continues to be popular, and knowledge of traditional medicine in the local village community is primarily derived from family inheritance passed down over generations. Knowledge influences the usage of traditional medicine. In addition to knowledge of plants that can be used as medicinal ingredients, the parts that can be utilized as medicine, processing methods, plant advantages, and understanding of potential dangers are also factors to consider when using herbal medicine. The majority of the community believes that traditional medicine, which comes from nature and has been used for generations in society or families, is safer than contemporary medicine. This is what contributes to the continued high frequency of herbal medicine use in society [15, 17].

The Tengger tribe in Ngadas Village mostly practices three religions: Islam, Hinduism, and Buddhism. Religion is created by society, which defines certain things as sacred and others as profane. This sacred quality is deemed separate from everyday happenings and constitutes the essence of religion. Similarly, in traditional medicine, it is inextricably linked to anything sacred. This is because traditional medicine practiced in rural communities is focused on spiritual aspects of religion. One example of something sacred in medicine is the therapy procedure, which always includes religious or spiritual aspects [17].

Variable	Category	Number of informants	Percentage (%)
Education	Elementary school	21	75
	Junior high school	4	14.29
	Senior high school	3	10.71
Gender	Female	15	53.57
	Male	13	46.43
Age	Adult (19 – 59 years)	21	75
	Elderly (≥ 60 years)	7	25
Profession	Tribal chief	1	3.57
	Midwife	1	3.57

	Farmer	22	78.57
	Driver	1	3.57
	Housewife	1	3.57
	Entrepreneur	2	7.14
Source information of	Hereditary	26	92.86
	Experience	2	7.14
Religion	Islam	16	57.14
	Buddhism	8	28.57
	Hinduism	4	14.29



Type of illness	Botanical name (Local name)	Family	Plant component	Processing technique	Usage method	Number of informants
Cough	Physalis angulata L. (Ciplukan)	Solanaceae	Fruit	Boiled	Drink	1
	Allium porrum L. (Bawang pre)	Liliaceae	Herb	Grilled	Eat	1
	Citrus hystrix DC (Jerukpurut)	Rutaceae	Fruit	Squeezed	Drink	1

	Foeniculum vulgare Miller (Adas)	Apiaceae	Leaf	Boiled	Drink/eat	6
Fever	Foeniculum vulgare Miller (Adas)	Apiaceae	Leaf	Boiled	Drink/eat	28
Sawan (local name)	Acorus calamus L (Dringo)	Acoraceae	Leaf	Refined	Stuck	28
Rheumatism	Borreria laevis Griseb. (Tepungotot)	Rubiaceae	Herb	Refined	Stuck	26
	Bidens pilosa L. (Sempretan)	Asteraceae	Herb	Boiled	Drink	2
	Imperata cylindrica L. (Alang - alang)	Poaceae	Root	Boiled	Drink	1
Diarrhea	Elaeocarpus longifolius Blume (Jambu wer)	Elaeocarpaceae	Leaf, fruit	Cleaned	Eat	27
	Potentilla arguta Pursh (Grunggung)	Rosaceae	Leaf	Cleaned	Eat	2
	Musa sapientum L. (Pisang raja)	Musaceae	Tree trunk	Squeezed, boiled	Drink	2
Hypertension	Cucumis sativus L. (Timun)	Cucurbitaceae	Fruit	Cleaned	Eat	3
	Bidens pilosa L. (Sempretan)	Asteraceae	Herb	Boiled	Drink	2
	Physalis angulata L. (Ciplukan)	Solanaceae	Herb	Boiled	Drink	2
	Anredera cordifolia (Ten.) Steenis (Binahong)	Basellaceae	Leaf	Boiled	Drink	2
	Apium graveolens L. (Seledri)	Apiaceae	Leaf	Cleaned	Eat	1
	Sechium edule (Jacq.) Sw. (Manisah)	Cucurbitaceae	Fruit	Boiled	Eat	1
Hyperuricemia	Borreria laevis Griseb. (Tepungotot)	Rubiaceae	Herb	Refined	Stuck	2
Hypercholesterolemia	Bidens pilosa L. (Sempretan)	Asteraceae	Herb	Boiled	Drink	1
	Cyphomandra betacea (Cav.) Sendtn. (Terongbelanda)	Solanaceae	Fruit	Boiled	Drink	1

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Bloating	Cayratia trifolia (L.) Domin (Tirem)	Vitaceae	Leaf	Boiled	Eat	2
	Foeniculum vulgare Miller (Adas)	Apiaceae	Leaf	Boiled	Drink	1
Stroke	Bidens pilosa L. (Sempretan)	Asteraceae	Herb	Boiled	Drink	1
Breast milk booster	Capsicum chinense Jacq. (Cabai terong)	Solanaceae	Leaf	Boiled	Eat	1
Hair growth	Aloe vera (L.) Burm. f. (Lidahbuaya)	Asphodelaceae	Leaf flesh	Refined	Spread	2
Scratches	Trabasan	Tidak terdokemnt asi	Leaf	Refined	Spread	2
Diabetes mellitus	Smallanthus chinifolia (Daun insulin)	Asteraceae	Leaf	Boiled	Drink	1
	Allium porrum L. (Bawang pre)	Liliaceae	Herb	Cleaned	Eat	1

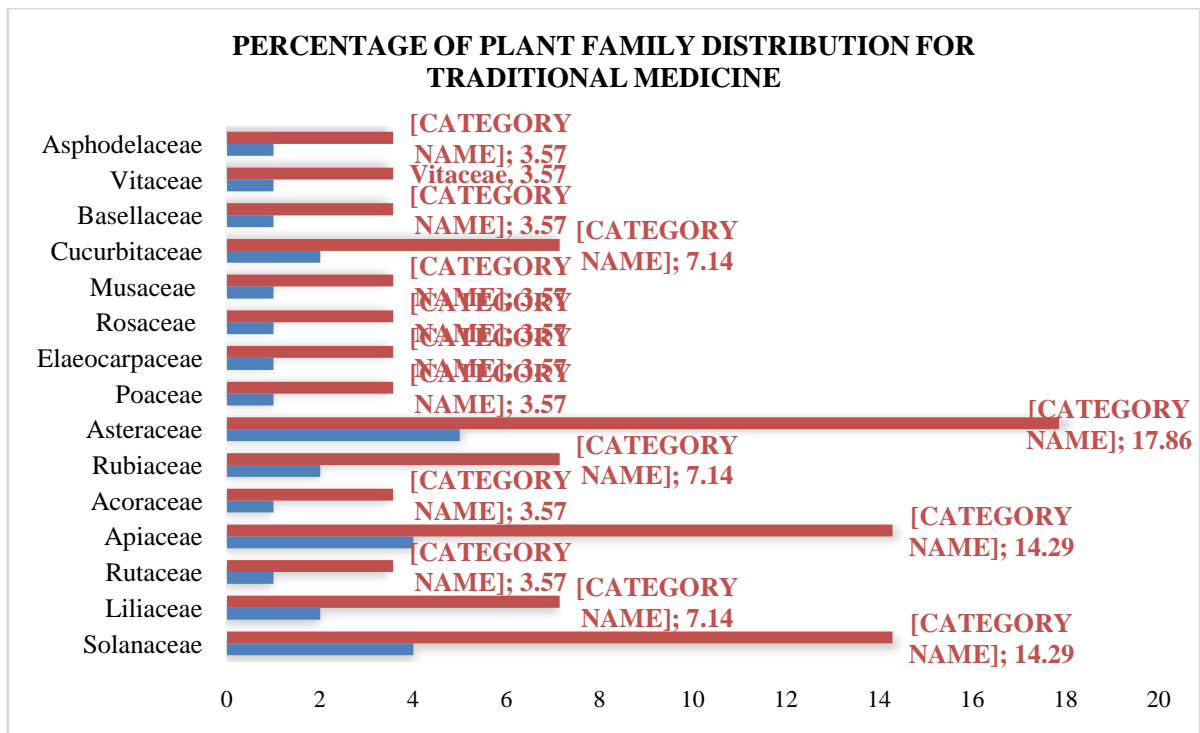


Cyphomandra betacea (Cav.) Sendtn. (Terongbelanda) Elaeocarpus longifolius Blume (Jambu wer)



Acorus calamus L (Dringo)

Foeniculum vulgare Miller (Adas)



This study looks at 29 plants from 15 families that are used to cure 14 different disorders, including cough, fever, asthma, rheumatism, diarrhea, high blood pressure, gout, cholesterol, bloating, stroke, lactation, hair growth, wounds,

and diabetes. Asteraceae is the most widely utilized family in traditional medicine (17.86%).

Medicinal plants can be processed in a variety of ways, including boiling, burning, squeezing, grinding, and simply cleaning before

direct use. However, the boiling process is the most often employed by the inhabitants in that region. Furthermore, the drug is typically administered orally. Although there are various applications, such as eating, applying, and rubbing it on the sore area of the body.

The Tengger Tribe in Ngadas Village can use plant parts for therapeutic purposes, such as leaves, stems, tubers, roots, rhizomes, bark, flowers, fruits, seeds, sap, and even the whole plant. In comparison to other plant components, leaves are the most widely used for medicinal purposes. Leaves are the plant's primary photosynthetic organ and are regarded as a critical component in the creation of bioactive plant components that can be employed as active ingredients in medicines [15]. The plant's leaves are widely utilized in traditional medicine in Indonesia and around the world. In addition to being easier to prepare, the leaf component has a lower impact on the plant's life process when used as traditional medicine than the root or stem sections, preserving medicinal plant sustainability [18].

IV. CONCLUSION

The Tengger tribe population continues to use plants to treat a variety of ailments today. The reported medicinal plant species will serve as a basic reference in phytochemistry for future research into new active chemicals as well as conservation methods. In this sense, it is critical to prioritize the conservation of traditional medicinal plants and indigenous medical knowledge in the Tengger tribal area of Ngadas Village in order to conserve them for future generations.

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