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Phytochemical Study of Traditional Medicinal Plants Used by the Kurulu Village Community, Jayawijaya Regency, Papua

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Abstract

This study explores the use of traditional medicinal plants by the community of Kurulu Village, Jayawijaya Regency, Papua. It aims to identify plant species, utilized plant parts, their phytochemical contents based on literature, and related medicinal uses. A descriptive-analytical method was applied through interviews, direct observation, and literature review. This study identified 38 medicinal plant species from 28 families utilized by the community in Kurulu Village, Papua. Various plant parts are used, with leaves being the most commonly utilized. These plants contain a range of phytochemical compounds such as alkaloids, flavonoids, saponins, tannins, and others that are effective in treating various diseases, from diarrhea to cancer. The methods of preparation include boiling, burning, pounding, steeping, squeezing, and in some cases, the plants are used directly without processing. These findings highlight the rich ethnobotanical knowledge preserved by the Kurulu community and underscore the potential of traditional medicinal plants for further pharmacological research and development.

Keywords: Kurulu Village, Medicinal plants, Phytochemical

1. Introduction

Indonesia is one of the most biodiverse countries in the world, with approximately 25,000 species of flowering plants, of which more than 20,000 species have been reported as medicinal plants, according to data from WHO, IUCN, and WWF. These medicinal plants are distributed across the Indonesian archipelago, with some species being endemic to specific regions.

The island of Papua is particularly rich in plant biodiversity, with an estimated 11,000 to 20,000 species. Its unique physiographic and biogeographic features support highly diverse floristic units. Papua is also home to nearly 250 ethnic groups, each with distinctive cultural practices and traditional knowledge systems, including the use of natural resources for medicinal purposes (Cahyaningsih et al., 2021)

In Jayawijaya Regency, the use of traditional medicine is still widely practiced, particularly among rural communities. Many people prefer traditional herbal remedies over modern pharmaceuticals due to affordability, accessibility, minimal side effects, and effectiveness in treating chronic or hard-to-cure diseases (Budiarti et al., 2020). Despite the increasing popularity of modern medicine, traditional healing methods remain deeply rooted, especially in areas like Kurulu Village, where knowledge of medicinal plant use is passed down from generation to generation.

Medicinal plants contain a wide range of bioactive chemical compounds, known as phytochemicals, which are believed to contribute to their therapeutic effects. Although phytochemical screening is commonly used to identify these compounds through laboratory analysis, in this study, the identification of phytochemical constituents was conducted through a literature-based approach. This method provides insight into the potential active compounds present in the plants traditionally used by the Kurulu Village community (Pradhan et al., 2013).

However, the documentation of medicinal plant use in Jayawijaya remains limited in scientific literature. Therefore, this study aims to contribute to the preservation of traditional knowledge, provide a scientific basis for future research, and support efforts to conserve Indonesia's rich medicinal plant heritage.

2. Literature Review

2.1 Medicinal Plants

According to the Regulation of the Minister of Health of the Republic of Indonesia No. 949/Menkes/Per/VI/2000, medicine is defined as a preparation or combination of substances ready for use to influence or investigate physiological functions or pathological conditions in the context of diagnosis, prevention, treatment, recovery, health improvement, and contraception (jdih.pom.go.id). Medicinal plants refer to all types of plants known to contain compounds that are beneficial and effective in preventing, alleviating, or curing diseases. In ancient times, humans were highly dependent on plants with known medicinal properties to treat various ailments. In Indonesia, our ancestors have long utilized certain plants as traditional remedies for health and healing purposes (Salmeron et al., 2020).

2.2 Phytochemical

Phytochemicals are compounds that are produced by plants ("phyto" means "plant"). They are found in fruits, vegetables, grains, beans, and alternative plants. Phytochemcal is a branch of science concerned with the study of organic compounds synthesized and accumulated by plants, focusing on their chemical structures, biosynthetic pathways, metabolic transformations, natural distribution, and biological activities. In a broader context, phytochemicals also known as phytonutrients refer to a diverse group of bioactive chemical substances derived from plant-based sources, including vegetables, fruits, herbs, and other botanical materials. Phytochemicals include compounds like salicylates, phytosterols, saponins, glucosinolates, polyphenols, proteinase inhibitors, monoterpenes, phytoestrogens, sulphides, terpenes, lectins, and many more (Loki, 2022).

2.3 Biodiversity of Kurulu Village, Jayawijaya Regency

Kurulu Village in Jayawijaya Regency hosts a unique diversity of plant species, partly due to the complex geological formation of Papua and its distinct physiographic features, which support a wide range of vegetation zones from coastal to alpine regions. Its high elevation, abundant rainfall, and cool climate result in moist, fertile soils ideal for plant growth. These conditions make Jayawijaya one of the main producers of fruits and vegetables in Papua, including tomatoes, cabbage, mustard greens, oranges, red fruit, and passion fruit. This region is also one of only three areas in the world that contains a glacier within a tropical zone. The Lorentz National Park, a UNESCO World Heritage Site, spans 2.4 million hectares, making it the largest protected area in Indonesia. It represents a wide range of habitats, from wetlands to high mountain forests. Known for the Baliem Valley, Jayawijaya Regency is part of the vast expanse of Lorentz National Park (Simbala, 2016).

2.4 Medicinal Plants of Papua and Their Therapeutic Uses

Papua is one of the easternmost provinces of Indonesia, covering an area of approximately 421,981 km². It is the largest tropical island with one of the richest biodiversities in the world, much of which remains underutilized and poorly managed. Research conducted in various regions of Papua shows that the use of plants for traditional medicine is widespread, with each area possessing distinct medicinal plant potential. For example, in Supiori Regency, 48 species from 32 families have been recorded, most of which are wild plants that are not cultivated. Of these, 20 species from 18 families have been identified as containing bioactive compounds effective in treating diseases. In Jayapura Regency, 69 medicinal plant species from 42 families have been documented. Below are some examples of medicinal plants found across various regions of Papua.

Table 1: Medicinal Plants in Papua

Family	Species	Local Name	Location	Efficacy
Apocynaceae	*Alstonia scholaris*	Kayu Susu atau Yaren	Supiori, Biak	Cures malaria
Euphorbiaceae	*Homonoia javanensis*	Darmor	Supiori, Biak	Treating headaches and mouth ulcers
Laportea	*Laportea sp.*	Daun Gatal	Tablanusu	Treating stomach ache
Pandanaceae	*Pandanus conoideus*	Buah Merah	Wamena	Natural multivitamin
Rutaceae	*Evodia sauveolene*	Zodia	Wamena	Treat skin problems

(Simbala et al., 2016)

3. Materials and Methods

3.1 Materials

This research was conducted from April to July 2020 in Kurulu Village, Jayawijaya Regency, Papua Province. Kurulu Village was selected as the research site due to its relatively accessible location from the city of Wamena, and because no previous phytochemical studies on medicinal plants have been conducted in this area. The tools used included a spray bottle, plant scissors, camera, and plant press (sasak). The mateials used included label paper, interview sheets or questionnaires, plastic bags, plant samples, adhesive tape, and string.

3.2 Methods

The method used in this research was a descriptive analytic approach. Data were collected through structured interviews, direct observation, and literature review. Structured interviews were conducted with respondents, while semi structured interviews were carried out with several key informants. Direct observation was applied to examine the habitats of medicinal plant species as well as their use in traditional healing practices. The literature review was conducted to obtain secondary data regarding the phytochemical content of medicinal plants traditionally used by the people of Kurulu Village.

3.2.1 Semi Structured Interviews

The interview technique used in this research was semi structured interviews, a questio and answer system conducted with a group of selected informants who represent a portion of the population, using a set of standardized questions. To identify appropriate key informants, recommendations were obtained from local community.

The selection of informants in the interview stage employed the snowball sampling method, where informants were chosen based on recommendations from initial contacts such as village heads, elders, community leaders, or individuals with extensive knowledge of the diversity, use, and management of medicinal plants. Information about the next potential informants was acquired from the previous ones (Hapsari & Kurniawan, 2023)

This interview stage also recorded supporting data, including informants' name, age, occupation, and gender. Interviews were conducted using a pre-prepared interview guide as well as any relevant additional statements. The interview process was informal in nature and focused on questions related to the types of medicinal plants, their uses, and their management.

3.2.2 Structured Interviews

Structured interview is a quantitative research technique in which the questions and answers are well-organized and written in advance. Respondents are selected using simple random sampling, a sampling method where each member of the population has an equal chance of being selected. Data were analyzed using basic statistical analysis.

$$n_t = \frac{N_t.Z^2.P(1-P)}{N_t.d^2 + Z^2.P(1-P)} \quad (1)$$

where:

n_t : Number of samples (respondents)
N_t : Total population
Z : Value of the normal variable (1.96)
P : Estimated proportion of occurrence (0.50
d : Margin of error (0.1)

3.2.3 Literature Study on Phytochemicals

The literature study on the phytochemical components of medicinal plants used by the community of Kurulu Village, Jayawijaya Regency, Papua, was conducted by referring to scientific journals and previous research findings on the phytochemical contents of these plants.

4. Results and Discussion

A study conducted in Kurulu Village, Jayawijaya Regency, identified 38 plant species from 28 families traditionally used by the local community as medicine. This diversity reflects the rich local knowledge of the region's biological resources, particularly in the highlands of Papua. These medicinal plants are used to treat various health problems, most of which are classified as minor ailments, such as external wounds, fever, stomach aches, cough, diarrhea, and headaches. Although considered minor, these illnesses require prompt treatment to prevent further

complications. As a result, the people of Kurulu Village often resort to self-medication using medicinal plants readily available in their surroundings. This pattern illustrates a strong reliance on local natural resources and highlights the important role of ethnobotanical knowledge in rural healthcare practices. In addition to accessibility and convenience, the use of medicinal plants is also based on generations of empirical knowledge.

Table 2: Medicinal plants in Kurulu Village

Local name (Species)	Part Used	Disease	Usage as medicine
Daun gatal (*Laportea decumana*)	Leaf	Body ache	Take 5–10 leaves, crush them, and rub onto the aching body area.
Yawi (*Laportea* sp.)	Leaf	Body ache	Take 5–10 leaves, place on the body, and tap repeatedly on the painful area.
Hipere (*Ipomoeae batatas)*	Tuber	Body ache	Wash clean, roast until half-cooked, then eat
Enkebungka (*Centella asiatica*)	Leaf	Wound	Heat one leaf over fire, then place it on the wound
Anikukukuh (*Barleria prionitois*)	Leaf	Wound	Roll one young leaf by hand and place it on the wound
Haki Tuma/Batang Pisang (*Musa paradisiaca*)	Stem	Wound	. Remove the outer skin, pierce the inner stem to extract the juice, then drink directly
Irugum (*Hemigraphis colorata*)	Leaf	Internal heat	Boil leaves in 2 glasses of water for 25 minutes. Let cool, strain, and drink
Lidah Buaya (*Aloe vera*)	Leaf	Internal heat	Peel several leaves to extract the gel, then consume it twice daily
Bawang Merah (*Allium cepa)*	Tuber	Internal heat	Thinly slice shallots, then rub repeatedly on the back
Saik/buah merah (*Pandanus conoideus*)	Fruit	Heart disease	Boil the fruit, squeeze to extract the juice, then consume directly or mix with food or drinks
Daun Sukun (*Artocarpus altilis*)	Leaf	Heart disease	Boil mature leaf in 5 cups of water until half remains, strain, and drink daily for one week
Tuke/woromo (*Pandanus julianetti*)	Fruit fresh	Indigestion	Separate flesh from seed and eat directly
Jambu/Giawas (*Psidium guajava*)	Leaf	Diarrhea	Boil 5 young leaves in one cup of water, strain, and drink.
Kunyit (*Curcuma longa*)	Rhizome	Diarrhea	Wash and boil in one cup of water until one-third remains. Strain and consume 3 times daily
Gulma (Graminae) (*Ageranthum conyzoides)*	Leaf	Furunkel	Boil until soft, mash, and apply to affected area
Sarang Semut (*Myrmecodia aureospinosa*)	Whole plant	Furunkel	Chop, blend with water, and drink
Podi (*Curcuma longa* L.)	Rhizome	Tinea versicolor	Grate a piece of rhizome and apply directly to the affected area
Siruk (*Imperata cylindrica*)	Root, Shoot	Tinea versicolor	Pound roots and shoots, then apply to the infected skin
Daun Miana (*Coleus benth*)	Leaf	Malaria	Wash several leaves, boil, strain, and drink the decoction
Daun Pepaya (*Carica Papaya)*	Leaf	Malaria	Crush young leaves, add ¾ glass water and a pinch of salt, squeeze, strain, and drink 3 times daily
Itanamuke (*Rhododendron macgregoria)*	Flower	Antibakterial	Rub flowers onto infected skin 3 times daily
Terung (*Solanum melongena*)	Fruit	Vitamin Source	Slice fruit, cook as soup, and mix with other vegetables
Mege (*Mucuna pruriens*)	Seed	Digestive problems	Eat raw or boil before consumption
Helangka/Daun Gedi (*Abelmoschu s manihot)*	Leaf	Childbirth aid	Cook several leaves with kitchen spices
Yagar (*Saccharum officinarum)*	Root, stem, leaf	Energy booster	Pull out whole plant, tie leaves, and place at the house entrance
Nanas (*Ananas comosus*)	Fruit	Energy booster	Peel and eat the fruit
Bayam Merah (*Aerva sanguinolenta*)	Leaf	Anemia	Boil leaves and stems, then eat
Siri Hutan (*Piper betle*)	Leaf	Anemia	Pound leaves and place on the aching tooth

Table 3. Phytochemical Compounds Found in Medicinal Plants from Kurulu Village

Medicinal Plant	Plant Part Used	Phytochemical Compound
Psidium guajava	Leaves, fruit	Alkaloids, flavonoids, saponins, and tannins
Abelmoschu s manihot	Leaves	Alkaloids, flavonoids, phenolics, saponins, and steroids/triterpenoids
Curcuma longa	Rhizome	Alkaloids, flavonoids, and tannins
Musa paradisiacal	Stem, leaves	Alkaloids, flavonoids, tannins, and steroids/triterpenoids
Saccharum officinarum	Root, stem, leaves	Flavonoids, saponins, and tannins
Artocarpus Altilis	Leaves	Alkaloids, flavonoids, phenolics, saponins, and tannins
Imperata cylindrical	Root, shoot	Alkaloids, flavonoids, and steroids/triterpenoids
Myrmecodia aureospinosa	Rhizome	Flavonoids, saponins, and tannins
Ipomoae batatas	Leaves, tuber	Alkaloids, flavonoids, saponins, and tannins
Zingiber officinale	Rhizome	Alkaloids, flavonoids, saponins, and steroids/triterpenoids
Centella asiatica	Leaves	Alkaloids, flavonoids, saponins, tannins, and steroids/triterpenoids
Hemigraphis colorata Hall.	Leaves	Alkaloids, flavonoids, tannins, and steroids/triterpenoids
persea amricana miller	Leaves, fruit	Alkaloids, flavonoids, saponins, tannins, and steroids/triterpenoids
Aerva sanguinolenta	Leaves	Alkaloids, flavonoids, saponins, tannins, and steroids/triterpenoids
Loranthus	Stem	Alkaloids, flavonoids, phenolics, saponins, and tannins
Psophocarpus tetragonolobus	Fruit	Alkaloids, flavonoids, saponins, and steroids/triterpenoids
Pandanus conoideus	Fruit	Alkaloids, flavonoids, tannins, steroids/triterpenoids, and glycosides
P. angulata	Leaves, stem, fruit	Alkaloids, flavonoids, saponins
Laportea Decumana	Leaves	Alkaloids, flavonoids, phenolics, saponins, and tannins
Ficus elastica	Leaves	Alkaloids, flavonoids, saponins, and tannins
Pandanus Julieti	Fruit	Alkaloids, flavonoids, tannins, and steroids/triterpenoids
Passiflora Lingularis	Fruit	Alkaloids and flavonoids
Mucuna Pruriens	Leaves/seeds	Tannins and steroids/triterpenoids
Ananas comosus	Fruit	Alkaloids, flavonoids, tannins, and steroids/triterpenoids
Carica papaya	Leaves	Alkaloids, flavonoids, tannins, and glycosides
Musa acuminata	Fruit	Alkaloids, flavonoids, phenolics, saponins, and tannins
Piper betle	Leaves	Alkaloids, flavonoids, saponins, tannins, and steroids/triterpenoids
Paraserianthes faltacaria	Root	Alkaloids, flavonoids, phenolics, saponins, tannins, and steroids/triterpenoids
Cordyline terminalis	Leaves	Alkaloids, flavonoids, saponins, and steroids/triterpenoids
Lagenaria siceraria	Fruits	Saponins and steroids/triterpenoids
Solanum Nigrum	Fruit, leaves	Alkaloids, flavonoids, and saponins
Apium graveolens	Leaves	Flavonoids, saponins, and tannins
Solanum melongena	Fruit	Alkaloids and flavonoids
Allium copa	Bulb	Flavonoids, saponins, and tannins
Alium sativum	Bulb	Alkaloids, flavonoids, and saponins
Aloe Vera	Leaves	Flavonoids, saponins, and tannins
Swietenia macrophylla	Seeds	Alkaloids, flavonoids, saponins, and steroids/triterpenoids
Coleus benth	Leaves	Saponins

Most of the plant parts used as medicine by the people of Kurulu Village are leaves. This is likely because leaves are more easily accessible, abundantly available, and contain various active compounds such as flavonoids, alkaloids, and tannins that play important roles in the healing process. The study by Indradi et al. (2023) highlights the richness of medicinal plants on Papua Island, which holds significant potential as a source of novel antiplasmodial compounds. The research notes that communities in Papua have long utilized various plant species in traditional medicine, particularly for treating diseases such as malaria. Many of these are endemic plants that contain important bioactive compounds such as alkaloids, flavonoids, and saponins. These findings align with research in Kurulu Village, Jayawijaya Regency, which identified 38 medicinal plant species used by the local community. The dominant use of leaves as the main plant part also reflects a common ethnobotanical pattern in the Papua region, highlighting its considerable potential for further pharmacological exploration.

In terms of preparation, there are six main methods used to process medicinal plants: boiling, burning, pounding, brewing, squeezing, and using them directly without processing. Among these methods, boiling is the most commonly used, applied to 36.7% of the plants. This method is considered practical and effective because boiling helps extract active compounds efficiently and also kills germs or microorganisms that may be present on the plants. This reflects the local knowledge of the community in choosing safe and optimal processing methods for traditional medicine.

Based on the study of medicinal plants used by the community in Kurulu Village, it was found that the most abundant phytochemical compound present is flavonoid, with a percentage of 35%. Flavonoids are known to have various pharmacological benefits such as antioxidant, anti-inflammatory, and antimicrobial properties, which play a significant role in the healing process. Meanwhile, the least found compound is glycoside, with a percentage of 4%. This diversity of compounds highlights the great potential of local plants as natural remedies to support the health of the community.

This finding is consistent with global research that underscores the therapeutic relevance of flavonoids in traditional medicine. According to Kumar & Pandey (2013), flavonoids are among the most studied polyphenolic compounds due to their broad spectrum of biological activities, including anticancer, antiviral, and cardioprotective effects. Moreover, their presence in high concentrations within many medicinal plants used in ethnomedicine demonstrates their vital role in traditional healing systems across different cultures. The relatively low occurrence of glycosides, although less prominent, still holds pharmacological interest, especially in their role in modulating heart function and anti-inflammatory responses (Atanasov et al., 2015). The combination of major and minor phytochemicals in medicinal plants used in Kurulu Village suggests a complex synergy that merits further scientific exploration for potential drug development and integrative health solutions.

5. Conclusion

This study reveals the extensive use of medicinal plants by the local community in Kurulu Village, Jayawijaya Regency, Papua. A total of 38 plant species belonging to 28 different families were identified as being used for traditional medicine. The parts of the plants most commonly utilized include leaves or shoots, stems or bark, roots, seeds, flowers, fruits, sap, herbs, and even the entire plant in some cases. Among these, leaves were the most frequently used due to their accessibility and ease of processing. The phytochemical compounds found in these medicinal plants are highly diverse, including alkaloids, flavonoids, phenolics, saponins, tannins, steroids, triterpenoids, and glycosides. These compounds contribute to the therapeutic properties of the plants, enabling them to be used in the treatment of a wide range of ailments such as diarrhea, skin infections, heart problems, influenza, wounds, internal heat, coughs, mouth ulcers, hypertension, headaches, anemia, body aches, malaria, and various skin diseases. Traditional preparation methods practiced by the community include boiling, burning, pounding, steeping, squeezing, and in some instances, direct application or consumption without any prior processing.

References

Atanasov, A. G., Waltenberger, B., Pferschy-Wenzig, E. M., Linder, T., Wawrosch, C., Uhrin, P., Temml, V., Wang, L., Schwaiger, S., Heis, E.H., Rollinger, J.M., Schuster, D., Breuss, J.M., Bochkov, V., Mihovivolic, M.D., Kopp, B., Bauer, R., Dirsch, V.M., & Stuppner, H. (2015). Discovery and resupply of pharmacologically active plant-derived natural products: A review. *Biotechnology advances*, *33*(8), 1582-1614.

Budiarti, M., Maruzy, A., Mujahid, R., Sari, A. N., Jokopriyambodo, W., Widayat, T., & Wahyono, S. (2020). The use of antimalarial plants as traditional treatment in Papua Island, Indonesia. *Heliyon*, *6*(12)

Cahyaningsih, R., Magos Brehm, J., & Maxted, N. (2021). Setting the priority medicinal plants for conservation in Indonesia. *Genetic resources and crop evolution*, *68*(5), 2019-2050.

Hapsari, L., & Kurniawan, A. (2023). Ethnobotanical documentation and conservation of water yam (Dioscorea alata L.) in East Java, Indonesia. *Biodiversitas Journal of Biological Diversity*, 24(1), 48–55.

Indradi, R. B., Muhaimin, M., Barliana, M. I., & Khatib, A. (2023). Potential plant-based new antiplasmodial agent used in Papua Island, Indonesia. *Plants, 12*(9), 1813

Kumar, S., & Pandey, A. K. (2013). Chemistry and biological activities of flavonoids: An overview. *The Scientific World Journal*, 162750.

Loki J (2022) Phytochemicals Function and There Effects. *J Plant Biochem Physiol*. S2:005

Pradhan, C., M. Mohanty, & A. Rout. 2013. Phytochemical screening and comparative bioefficacy assessment of *Artocarpus altilis* leaf extracts for antimicrobial activity. *Frontiers in Life Science* 6(4): 71-76.

Salmerón-Manzano, E., Garrido-Cardenas, J. A., & Manzano-Agugliaro, F. (2020). *Worldwide research trends on medicinal plants. International Journal of Environmental Research and Public Health*, 17(10), 3376.

Simbala, H. E. (2016). *Identification and utilization of medicinal plants by the Dani ethnic group in Jayawijaya Regency, Papua. Jurnal MIPA*, 5(2), 103–107.