

Ethnobotanical Study of Hindu Society in Tabanan Bali and The Conservation Efforts

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ABSTRACT

Balinese have traditionally preserved plants for the ethnobotany used hereditary, such as the utilization of plants for traditional medicine and Hindu ceremonies. Most of the Tabanan people are still live in the villages traditionally. They have used plants for the traditional purpose for hundreds of years. Unfortunately, this ethnobotany knowledge is increasingly eroded due to the increasing tourism activities. The purpose of this study was to record the most used plants by Balinese in Tabanan Bali in daily life as well as record their ethnobotanical functions. Research Study was conducted in Kediri and Baturiti districts, Tabanan Regency, Bali Province. The selection of respondents was done through purposive techniques, namely by targeted respondents. Identification and checking of scientific names using references in the <http://www.theplantlist.org/>. The survey results in 10 species of plants that were most often used by Balinese people in Tabanan, namely: *Cocos nucifera*, *Plumeria acuminata*, *Musa x paradisiaca*, *Piper betle*, *Centella asiatica*, *Alpinia galanga*, *Erythrina subumbrans*, *Citrus aurantifolia*, *Impatiens balsamina*, and *Curcuma longa*. Almost all of them are used by Hindus in Tabanan Bali for various purposes, such as for food, traditional ceremonials, traditional medicines, and others. Several conservation activities have been traditionally carried out by the Balinese Hindu community in the Tabanan area for generations, such as growing the plants in sacred areas (temples) and cultivating them in the house yard (natah).

Keywords: Balinese, Ethnobotany, Hindu, Tabanan, Traditional.

1. INTRODUCTION

Ethnobotany is derived from the word's ethnology and botany. Ethnology is the study of culture, and botany is the study of plants, so ethnobotany is a field of science that studies the relationship between humans and plants [1] Furthermore, according to Hidayat et al., [2] ethnobotany is a science that examines the direct relationship of humans with plants in traditional utilization. While Iskandar & Iskandar [3] described that the focus of ethnobotany is how plants are used in ritual processes. This study of ethnobotany can be used as the basis for the implementation of culture related to religious rituals. According to Suwardi et al., [4],

Ethnobotany is a term that is categorized into multiple categories of plant utilization in daily life, namely: utilization of plants for food crops (food), utilization of plants for building materials (boards), utilization of plants for medicine, utilization of plants for traditional ceremonies, and utilization of plants for household appliances.

Balinese are one of the ethnic groups in Indonesia who have traditionally preserved plants for ethnobotany hereditary very well, for example, the utilization of plants for traditional medicine and the plant's implementation in Balinese Hindu ceremonies. Upakara plant is a means derived from plants that are commonly used for

ceremonial activities where the part used in the form of fruit, flowers, leaves, and plant tubers. Several types of research on plants to support rituals/ceremonies have been conducted in Bali. There have been recorded more than 300 species of plants that are considered to have benefits as ceremonial plants in Bali [5]. However, the diversity of plant species that are most often used by the community in each sub-district in Bali is different, depending on the availability of ceremonial plants, the local culture, and natural conditions. Ethnobotanical studies on the diversity of ceremonial plants in Bali that have been carried out previously have only made an inventory of the diversity of plant species generally used by the living community in Bali. However, the study did not yet contain information about the diversity of ceremonial plant species that are most used by the community in each regency and sub-district, as well as efforts to maintain the availability of these plants by local communities.

The use of plants as traditional medicine has also been known, carried out, and preserved by the Balinese people. Medicinal plants that have been utilized by Balinese people are usually made as traditional medicinal herbs and this is a cultural heritage of the nation that must be maintained and preserved [6]. Lontar usada is one part of Balinese culture that is knowledge of traditional medicine. Lontar usada contains traditional Balinese knowledge about the diversity of plant species and their use in treating various types of diseases [7]. In addition, Balinese people also use plants as food ingredients, food flavorings, natural dyes, traditional drinks, and others. However, that knowledge is not widely recorded so it will easily disappear with the development of the times. The purpose of this study was to inventory the ethnobotanical information of most plant species that are used traditionally by Balinese in Tabanan Bali in their daily life.

2. MATERIAL AND METHOD

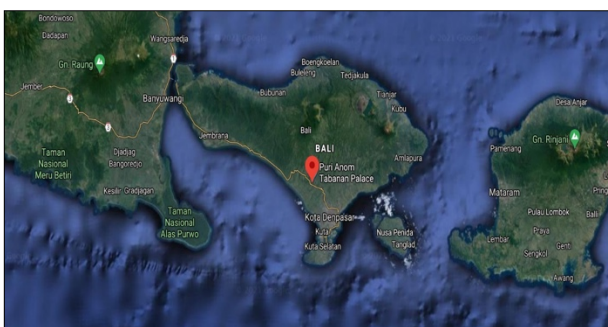


Figure 1. The location of the Ethnobotanical Study of Hindu Society in Tabanan Bali and The Conservation Efforts

Research Study was conducted in Kediri and Baturiti districts, Tabanan Regency, Bali Province. The selection

of respondents was done through purposive techniques, namely by targeted respondents [8]. Some of the informants interviewed in this study were ethnobotanists who work as makers of Traditional Hindu ceremonial equipment. Sampling was conducted in the Kediri and Baturiti sub-districts of Tabanan Regency. Data retrieval was done by conducting interviews with respondents and searching the database on literature studies from a book review or internet searching. Identification and checking of scientific names using references in the <http://www.theplantlist.org/> [9].

3. RESULT AND DISCUSSION

Based on the interview results of respondents, they obtained ten species of plants that are most often used by the people of Tabanan Bali in traditional life as medicinal plants, ceremonial plants, food, and other uses. In detail, the data is shown in Table 1.

3.1. The description of the plant species most commonly used by Balinese people in Tabanan Bali in daily life

3.1.1. *Cocos nucifera* L. (Local name: Nyuh, Kelapa)



Figure 2. *Cocos nucifera* L.

According to Adiputra & Wardi [10] in Bali there are at least 12 types of coconut, namely: *Nyuh bulan* (kelapa bulan), *Nyuh udang* (kelapa udang), *Nyuh gading* (kelapa kuning), *Nyuh gadang* (kelapa hijau), *Nyuh sudamala* (kelapa suda-mala), *Nyuh bojog* (kelapa kera), *Nyuh surya* (kelapa matahari), *Nyuh rangda* (kelapa rangda), *Nyuh be julit* (kelapa ikan julit), *Nyuh bongol* (kelapa tuli), *Nyuh mulung* (kelapa mulung), dan *Nyuh harum* (kelapa harum).

3.1.1.1. Utilization for food:

Based on the interview results, the young coconut fruit (called "Bungkak") is processed into a traditional food that is "Lawar Klungah".

Table 1. Ten species of plants that are most often used by the people of Tabanan Bali in traditional life

No	Scientific Name and Local Name	Usage				Note
		Traditional Medicine	Spiritual or Ceremonial	Food	Uses	
1	<i>Cocos nucifera</i> L. / Nyuh/ Kelapa	√	√	√	√	Young fruit is used for traditional food "Lawar", Stem is used for building materials
2	<i>Plumeria acuminata</i> Ait./ Jepun Bali	√	√	√	√	Ornamental Plants, the flower is used for ceremonial material of "canang sari"
3	<i>Musa x paradisiaca</i> L./ Biu/Pisang	√	√	√	√	As fruit and the ceremonial material of "Banten"
4.	<i>Piper betle</i> L./ Sirih	√	√	-	-	Leaves are used for nosebleeds, itching, minor injuries
5.	<i>Centella asiatica</i> (L.) Urb./Kepiduh	√	-	-	-	Leaves are used as a remedy for wounds, fever, high blood pressure, laryngitis, abdominal pain.
6.	<i>Alpinia galanga</i> Willd/isen	√	-	√	-	Tubers are used for fever medicine, traditional cooking seasonings (lawar)
7.	<i>Erythrina subumbrans</i> Hassk Merr. /Dadap	√	√	-	-	Leaves and barks are used for fever medicine and ceremonial plants
8.	<i>Citrus aurantifolia</i> (Christm.) Swingle/ Jeruk lengis	√	√	-	-	Fruit is used for cough medicine, itchy throat, and ceremonial plants
9.	<i>Impatiens balsamina</i> L./ Kepacah	-	√	-	-	The flower is used for ceremonial plants
10.	<i>Curcuma longa</i> L. /Kunyit	√	√	√		Tubers are used for ulcers, minor wounds, ceremonial plants, and traditional cooking seasonings (lawar)

3.1.1.2. Utilization for ceremonies

According to the Balinese, Nyuh (*Cocos nucifera* is considered very important in Balinese Hindu ritual activities, because almost all parts of the plant can be used in all ceremonies [11] such as: 1) Coconut tree or wood is used as a sacred building material, kukul (kentungan), bedug (drums) which is a musical instrument in carrying out Upakara Yadnya; 2) Klungah (young coconut fruit containing water) is commonly used for self-purification and is also a means for religious ceremonies in Balinese Hindu communities; 3) Old coconut fruit that is brownish color is usually used for ceremonial facilities in the form of Pejati and daksina as the basis in Balinese Hindu religious ceremonies; 4) Danyuh or old coconut leaves are usually used as firewood in helping to light a fire in religious ceremonies; 5) Slean or coconut leaves that are greener used to make Banten or make a means of offerings in religious ceremonies; 6) Busung (Janur) is a young coconut leaf, usually whitish yellow that is usually used to make offerings "Canang sari".

3.1.1.3. Utilization for Ethnomedicine

In addition to being a upakara ingredient, in Bali, coconut plants are also used for traditional medicine [12-13]. Based on the results of the interview, coconut oil is used to treat toothache, hair refiners. While the young coconut water is used as a mixture of "Tutuh" for a headache medicine. Burnt Coconut Shell is used to treating toothache. Meanwhile, according to Pratiwi & Sutara [13], Balinese people use "air bungkak" to treat stomach pain, neutralize toxins in the body, overcome dehydration, lung pain, cough medicine, treat internal heat, dengue fever, and treat low tension.

3.1.2. *Plumeria acuminata* Ait. (Local name: Japanese Bali, Kamboja)

3.1.2.1. Utilization for food

The young leaf of *P. acuminata* can be used as a vegetable mixture 'Urab Don Jepun'. Before cooking, the young leaves of *P. acuminata* are boiled and then thinly

sliced. Slices of *P. acuminata* leaves are then mixed with Kacang Panjang, Toge, Balinese seasoning, and then kneaded until the spice dough is evenly mixed.



Figure 3. *Plumeria acuminata* Ait.

3.1.2.2. Utilization for ceremonies

In addition to being an ornamental plant, *P. acuminata* is used as a traditional medicine material as well as ceremonial materials by the Balinese people. The flower is used in almost all Hindu religious ceremonies in Bali. The flowers are also used as an ingredient for making “Dupa” used in every Hindu's worship.

3.1.2.3. Utilization for Ethnomedicine

Based on the interview results, *P. acuminata* flowers can be used as a tea to prevent rheumatic diseases or uric acid, to treat fever, cough, peeing, dysentery, and constipation. *P. acuminata* flowers can also be used as a mixture of soap fragrance, mosquito repellent, and fragrant oil.

The root of *P. acuminata* can be used as a stone urine destroyer. The trick is to make a decoction of *P. acuminata* root and drink it. The sap of the *P. acuminata* tree can also be used as a remedy to remove the flies and heal wounds. The trick is to drip and apply the sap of *P. acuminata* on the wound or mole.

While the flowers and leaves can be used as a healer of ulcers. The flowers and leaves of *P. acuminata* are mixed and mashed and applied to the ulcers. In addition, the flowers and leaves of *P. acuminata* can also be used to treat itching on the skin, heal wounds on the soles of the feet.

3.1.3. *Musa x paradisiaca* L. (Local name: Biu/Pisang)

3.1.3.1. Utilization for food

Bananas are used as a source of fruits. Balinese use the young banana tree as a vegetable called *Jukut Ares*. Banana weevil is processed into a traditional food called *Tum / Pepes/ Lawar*. The most commonly used variant of banana weevil is *Pisang klutuk* and *Kepok* because both

banana weevils are not too hard when shredded and do not release too much sap. Some traditional snacks made from bananas include “Laklak Pisang” dan “Pisang Rai”. Bananas are also often used by Balinese to eliminate fishy odors in foodstuffs.



Figure 4. *Musa x paradisiaca* L.

3.1.3.2. Utilization for ceremonies

Banana is also a fruit that is often used in various religious ceremonies, such as for offerings (Sesajen) in Upacara Yadnya. Bananas are often used in traditional ceremonies as complementary ingredients Banten, Gebongan, and Kwangen and also as a pillow on the human body to be buried.

3.1.3.3. Utilization for Ethnomedicine

Bananas are used to treat hemorrhoids and smallpox [14]. Based on the results of the interview, cooked flowers are consumed to lower fat levels. While water derived from rotting stems is used to remove dandruff.

3.1.4. *Piper betle* L. (Local name: Base / Sirih)

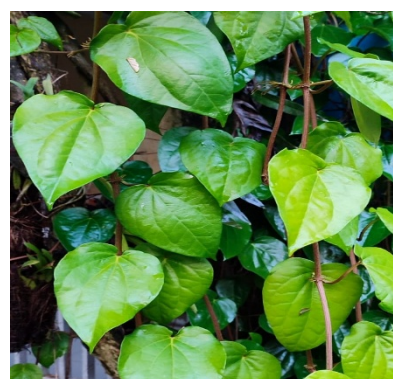


Figure 5. *Piper betle* L.

3.1.4.1. Utilization for ceremonies

Piper betle is a symbol of respect. In Bali, *P. betle* becomes an important element in religious ceremonies and other customary activities. *P. betle* is used as a material to make “canang”. *P. betle* is used as a “Porosan” which is a mixture of *P. betle* leaves, *kapur sirih*, and

pinang (*Areca catechu*) as a symbol of Tri Sakti. Pinang symbolizes Lord Brahma, *P. betle* leaf symbolizes Shiva, and *P. betle* chalk symbolizes Vishnu. In the Balinese Hindu Ceremony, Porosan is used as a complement in arranging offerings.

3.1.4.2. Utilization for Ethnomedicine

P. betle by Balinese is widely used as a traditional medicinal ingredient in the form of a herb known as "Loloh" [15]. Balinese in Tabanan use *P. betle* leaves to treat uric acid, piles, whooping cough, dysentery, heart, whiteness, cold, smooth blood, muscle and joint pain, heat, deep heat, and stroke.

The *P. betle* leaves are also often used as a remedy for nosebleeds, hives, and ulcers. Heyne [16] reported that traditionally *P. betle* leaves are used for anti-inflammatory, antiseptic, antibacterial, bleeding stop, cough reliever, fart straightener, saliva discharge stimulant, redness prevention, itch remover, and sedative.

3.1.5. Centella asiatica (L.) Urban (Local name: Kepinguh/Daun Piduh/ Pegagan)



Figure 6. *Centella asiatica* (L.)

3.1.5.1. Utilization for Ethnomedicine

Based on the results of the interview, the squeeze of *C. asiatica* leaves is used as a mixture of herbs for dysentery. The leaves of *C. asiatica* are also used for hypertensive drugs. The formula: 20 leaves of fresh *C. asiatica* is boiled with 2 glasses of water until it becomes 3/4 cup, filtered, and taken 3 times a day. The leaves of *C. asiatica* are also used to launch urine. The solution formula: A handful of *C. asiatica* leaves are washed, crushed, then attached to the navel. The leaves of *C. asiatica* are also used to increase appetite. How-to: A handful of fresh *C. asiatica* leaves washed, boiled with 2 glasses of water until the water is only glass, then drunk.

3.1.6. Alpinia galanga (L.) Willd. (Local name: Isen/Laos/Lengkuas)

3.1.6.1. Utilization for food

A. galanga for Balinese (Hindu) is one of the spices that must be present in Balinese traditional food.



Figure 7. *Alpinia galanga* (L.) Willd.

3.1.6.2. Utilization for ceremonies

A. galanga is also one of the complements of upakara facilities.

3.1.6.3. Utilization for Ethnomedicine

A. galanga is also used as a complement to traditional herbs. In Lontar Taru Pramana, one of the lontar about the species of plant that uses efficacious medicine outlined so many benefits of *A. galanga*. *A. galanga* tends to be a complementary ingredient in the herbs loaded in Lontar Taru Pramana. *A. galanga* can be processed into traditional medicine in the form of "Loloh", and "Boreh".

3.1.7. Erythrina subumbrans Hassk) Merr. (Local name: Dadap, dadap serep)

3.1.7.1. Utilization for ceremonies

Pohon Dadap (*E. subumbrans*) or known as "Kayu Sakti" is used in almost all types of Balinese Hindu Traditional Ceremonies. The *E. subumbrans* leaves are pounded with rice and turmeric as a fresh flour ingredient that symbolizes the means of cleaning dirt on Sesajen and humans.



Figure 8. *Erythrina subumbrans* Hassk) Merr.

3.1.7.2. Utilization for Ethnomedicine

Based on the results of interviews, *E. subumbrans* is widely used as a traditional treatment for dysentery, fever, asthma, and worms. The bark and its young branches can be used as a fever medicine. Meanwhile, liquid from the bark of the trunk and branches can be used

for eye washing. The leaves are efficacious to reduce menstrual pain, increasing the amount of fresh milk. The young leaves can also be eaten as a Lalapan or to be cooked. Young leaves affixed directly to the body are used for rheumatic drugs.

3.1.8. *Citrus aurantiifolia* (Christm.) Swingle (Local name: Jeruk Nipis, Jeruk lengis)



Figure 9. *Citrus aurantiifolia* (Christm.) Swingle

3.1.8.1. Utilization for food

In their daily life, Balinese in Tabanan use lime juice to give a sour taste to various traditional foods. The leaves can be used as a seasoning of Balinese traditional food or known as "Base Rajang". Lime peel is rare to consume but is widely used as a complement to certain dishes and to eliminate fishy odors in fish.

3.1.8.2. Utilization for Ethnomedicine

The lime fruit is widely used for appetite enhancers, heat lowering, diarrhea medication, cough medicine, phlegm decay, eliminating dandruff, influenza, antipyretic, anti-inflammatory, antiseptic, and acne medications. The lime leaves and flowers can be used for the treatment of hypertension, cough, throat mucus, fever, heat in malaria, acne, and dandruff, fruit peels to treat tonsils [17].

3.1.9. *Impatiens balsamina* L. (Local name: Kepadah)



Figure 10. *Impatiens balsamina* L.

3.1.9.1. Utilization for ceremonies

Bunga pacar air (*I. balsamina*) is a flower that is always present in "Sesajen" or the means of Hindu ceremony in Bali. Canang is a means and infrastructure in carrying out Hindu religious ceremonies. Canang is made from coconut leaves or young banana leaves that are shaped in such a way and decorated with various kinds of flowers, one of which is the red *Bunga pacar air* (*I. balsamina*) and Gemitir flower.

3.1.9.2. Utilization for Ethnomedicine

The leaves of *I. balsamina* are used to treat fever (the leaves are boiled, then drunk), festering infections, and skin pain (the leaves are smoothed and then attached to the sick part). Flower petals of *I. balsamina* can relieve pain due to burns. The trick is quite easy, just by applying a collision of water *I. balsamina* flowers. Stem fluid from *I. balsamina* is a potent remedy to relieve itching due to sap or poison of ivy plant or *Toxicodendron radicans*. *I. balsamina* is also used to improve blood flow, as a pain reliever in newborn mothers, low blood pressure treatment, joint pain, laxatives, a pain reliever in bruising and swelling, an antidote to fish poisoning (fish allergy), rheumatism treatment, antibacterial for external wounds, gastritis, treating broken or damaged nails, cancer, tonics for heavy workers, treating snake bites, launching menstruation, and relieving cough by removing phlegm. Seeds and tea of *I. balsamina* are used traditionally for the treatment of systemic fungal infections.

3.1.10. *Curcuma longa* L. (Local name: Kunyit)



Figure 11. *Curcuma longa* L.

3.1.10.1. Utilization for food

Turmeric is a seasoning ingredient contained in Dharma Caruban, a Lontar that contains information on how to cook traditional Balinese food. Turmeric is referred to as "Base Rajang" is the basic seasoning of Balinese cuisine. In addition, Balinese people use turmeric as a natural food coloring.

3.1.10.2. Utilization for ceremonies

Balinese Hindus generally use turmeric rhizomes to color rice and make yellow rice for traditional ceremonies on Kuningan Day.

3.1.10.3. Utilization for Ethnomedicine

Based on the interview results, Turmeric rhizomes (*C. longa*) are used as a medicine for cough, malaria, stomach ulcers, and minor injuries. The rhizome of *C. longa* is an ingredient of traditional herbal medicines and dietary spices that have been known in many countries around the world. Curcuma contains curcumin as an active compound that has various pharmacological activities that are useful as an anti-inflammatory, antioxidant, chemopreventive, and chemotherapy [18].

3.2. Plant Conservation Efforts to Support Ethnobotany by The Hindu Community in Tabanan Regency Bali

Hindu people in Tabanan Bali have a kind of belief, namely taboo or abstinence to cut down large and old trees, as well as trees located in the temple area. The trees are believed by the community to be a place to stay for “Wong Samar” (supernatural beings). If indeed logging must be done for a specific purpose, then the traditional ceremony must be done. It is a form of community conservation of plants. The plant conservation efforts of Balinese in Tabanan-Bali to support ceremonies carried out by the Hindu community in Tabanan, among others, planting plants in sacred areas (temples) and cultivation of plants in the house yard (natah). Because every Hindu ritual/ceremony in Tabanan always utilizes plants, conservation activities need to continue to be carried out to prevent plants from the risk of extinction.

AUTHORS’ CONTRIBUTIONS

Putri Sri Andila as the main contributor played a role in data analysis, compiling and writing the manuscript and translating it into English, making PPT presentations, and acting as a correspondent author and presenter in seminars. Tri Warseno acted as co-author in charge of collecting and analyzing data and writing the manuscript in Bahasa. I Gede Tirta served as co-author helping in collecting research data. Winda Syafitri as Co-author contributed to adding input to the Introduction discussion.

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REFERENCES

- [1] M.J. Balick, P.A.Cox. Plants, People, and Culture: The Science of Ethnobotany 2nd edition. 2021. CRC Press, Boca Raton, FL, 2021, pp: 1-213.
- [2] S. Hidayat, A. Hikma, W.A.M. Zuhud, Kajian etnobotani masyarakat kampung adat dukuh Kabupaten Garut, Jawa Barat. Media Konservasi 15(3), 2010, pp: 139–151.
- [3] J. Iskandar, B.S. Iskandar, Various Plants of Traditional Rituals: Ethnobotanical Research among The Baduy Community. Biosaintifika, 9(1), 2017, pp: 114-125. DOI: 10.15294/biosaintifika.v9i1.8117
- [4] A.B. Suwardi, Z.I. Navia, T. Harmawan, Syamsuardi, E. Mukhtar, Ethnobotany and conservation of indigenous edible fruit plants in South Aceh, Indonesia. Biodiversitas, 21(5), 2020, pp: 1850-1860. DOI: 10.13057/biodiv/d210511
- [5] I. K. Sardiana, Unit pembibitan tanaman ritual (upakara). *Majalah Aplikasi Ipteks Ngayah*. 1(1) (2010) 13—21.
- [6] N. Wijana, P.I. Rahmawati, Medicinal plants in Ubud Monkey Forest in Bali, Indonesia: Diversity, distribution, traditional use, and tourism attractiveness. Biodiversitas, 21(6), 2020, pp: 2455-2461. DOI: 10.13057/biodiv/d210617.
- [7] I.Y.G.T. Sutrisna, N.L.G. Widyastuti, K.D. Cahyadi, Kajian Pengobatan Tradisional Cacar Menurut Terjemahan Lontar Usada Kacacar. Jurnal Riset Kefarmasian Indonesia 1(1), 2019, pp: 41-55. DOI: <https://doi.org/10.33759/jrki.v1i1.12>
- [8] M. Silalahi, K. Trislani, N. Nisyawati. The Ethnobotany Study of The Foodstuffs by Local Communities in The Bulumario Village, North Sumatera. Biodjati, 6(1), 202, pp: 45-58.
- [9] W. Sujarwo. Bamboo Resources, Cultural Values, and Ex-Situ Conservation in Bali, Indonesia. Reinwardtia 17(1), 2018, pp: 67-75. DOI: 10.14203/reinwardtia.v17i1.3569
- [10] N. Adiputra, I.N. Wardi, Kelapa Dalam Budaya Bali Serta Upaya Pelestariannya *Jurnal Bumi Lestari*. 15(1), 2015, pp: 87 – 91.
- [11] I.K. Sardiana, K.K. Dinata, Studi pemanfaatan tanaman pada kegiatan ritual (upakara) oleh umat Hindu di Bali. *Jurnal Bumi Lestari*. 10(1), 2010, pp: 123—127.
- [12] E. Kriswiyanti, Keanekaragaman karakter tanaman kelapa (*Cocos nucifera* L.) yang digunakan sebagai bahan upacara Padudusan Agung *Jurnal Biologi*. 16(1), 2013, pp: 15—19.

- [13] F.M. Pratiwi, P.K. Sutara, Etnobotani Kelapa (*Cocos nucifera* L.) di Wilayah Denpasar dan Badung. *Jurnal Simbiosis* I (2), 2013, pp: 102- 111.
- [14] R. A. De Philipps, S. L. Maina, J. Crepin, Medicinal plants of the Guianas (Guyana, Surinam, French Guiana). Dept. of Botany, National Museum of Natural History, Smithsonian Institution, Washington, D.C., 2004, pp:1-490.
- [15] I.M. Sumarya, W. Suarda, N.L.G. Sudaryati, Aktivitas Antibakteri Loloh (Obat Tradisional Bali) Air Perasan dan Air Rebusan Daun Sirih terhadap Bakteri *Streptococcus pyogenes* Penyebab Radang Tenggorokan. *Jurnal Kimia Sains dan Aplikasi*, 22(5), 2019, pp: 173-178. <https://doi.org/10.14710/jksa.22.5.173-178>
- [16] K. Heyne, Tumbuhan Berguna Indonesia Jilid II. Badan Litbang Kehutanan, Departemen Kehutanan RI, Bogor. 1987.
- [17] K. Ramadaini, Z. Azizah, Zulharmita, H. Rivai, of Overview of Pharmacology and Product, Development Lime (*Citrus aurantifolia*) Rind. *Journal of Pharmaceutical Sciences and Medicine (IJPSM)*, 5(12), 2020, pp: 35-45. DOI: 10.47760/ijpsm.2020.v05i12.007
- [18] H. Hatcher, R. Planalp, J. Cho, F. M. Torti, and S. V. Torti. Curcumin: From ancient medicine to current clinical trials. *Cell Mol Life Sci.* 65(11), 2008, pp: 1631–1652. doi: 10.1007/s00018-008-7452-4