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Exploration of Medicinal Plants Use for Acne Treatment in Bukian Village, Payangan-Bali

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Artikel Penelitian

Abstract: *Acne is a common dermatological condition affecting up to 85% of the global population, primarily triggered by hormonal fluctuations that increase sebum production and promote the proliferation of Cutibacterium acnes. The management of excessive sebum has become a crucial strategy in acne treatment, alongside conventional therapies such as antibiotics, including minocycline and doxycycline. Historically, prior to the development of synthetic pharmaceuticals, natural remedies played a significant role in acne treatment and continue to be widely used today, particularly in rural communities. Objective: This study aimed to explore the types of medicinal plants traditionally used as anti-acne treatments by the community of Bukian Payangan Village, Bali. Methods: This research employed a quantitative descriptive design. Sampling was conducted using the snowball sampling technique. Data were collected from 100 respondents using a structured checklist. Results: There were 13 types of anti-acne plants including Jackfruit, Fern, Lime, Teki Grass, Aloe Vera, Chinese Betel, Tomato, Moringa, Turmeric, Red Bean, Cucumber, Pepper, and Sandalwood, where Jackfruit (Artocarpus heterophyllus) had a Use Value the highest (0.44) came from the yard of the house (39%). The most widely used parts of the plant are leaves (64.30%) by processing, namely squeezed (54.95%) and used by pasting (87%) on acne-prone facial areas. The most felt benefits related to reducing oily skin. Conclusion: There are as many as 13 plants as anti-acne, with the dominance of use on the leaves and having the main effect of sebum control.*

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Keywords: Ethnopharmacology, Medicinal Plants, Use Value, *Cutibacterium acnes*, Bali

Abstrak: Jerawat merupakan kondisi kulit yang umum terjadi dan mempengaruhi hingga 85% populasi manusia, terutama dipicu oleh perubahan hormonal yang menyebabkan peningkatan produksi sebum serta proliferasi *Cutibacterium acnes*. Pengendalian kelebihan minyak pada kulit menjadi pendekatan penting dalam penatalaksanaan jerawat, selain penggunaan terapi konvensional seperti antibiotik minosiklin dan doksisiklin. Secara turun temurun sebelum ditemukannya obat sintetis, pengobatan menggunakan bahan alam menjadi membantu perbaikan jerawat dan masih digunakan sampai saat ini terutama masyarakat pedesaan. Tujuan: mengeksplorasi jenis dan tumbuhan obat sebagai antijerawat pada masyarakat Desa Bukian Payangan-Bali. Metode: Jenis penelitian ini yaitu deskriptif kuantitatif. Pengambilan sampel dilakukan dengan teknik snowball sampling. Data dikumpulkan melalui daftar cek (checklist) dari 100 responden. Hasil: Terdapat 13 jenis tanaman antijerawat dimana 13 jenis tanaman sebagai antijerawat diantaranya

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Nangka, Pakis, Jeruk Nipis, Rumput Teki, Lidah Buaya, Sirih Cina, Tomat, Kelor, Kunyit, Kacang Merah, Timun, Merica, dan Cendana, dimana Nangka (*Artocarpus heterophyllus*) memiliki nilai *Use Value* tertinggi (0.44) yang berasal dari pekarangan rumah (39%). Bagian tanaman yang paling banyak digunakan adalah daun (64.30%) dengan cara pengolahan yaitu diremas (54.95%) dan digunakan dengan cara ditempel (87%) pada area wajah yang berjerawat. Khasiat yang paling dirasakan terkait mengurangi kulit berminyak. Kesimpulan: Terdapat sebanyak 13 tanaman sebagai antijerawat, dengan dominasi penggunaan pada bagian daun dan memiliki efek utama pengendalian sebum.

Kata kunci: Etnofarmakologi, Tanaman Obat, Nilai Guna, Cutibacterium acnes, Bali

Introduction

Almost eighty-five percent of people between the ages of eleven and thirty have acne problems (1). Acne affects 80-85% of Indonesia's adolescents, with the highest frequency among those aged 15-18 years, 12% of women aged 25-44 years, and 3% of women aged 35-44 years (2). Antibiotics are commonly used to treat the bacteria *Cutibacterium acnes*, which colonizes the skin and causes acne. On the other hand, antibiotic resistance can develop in bacteria when used for a long period of time. Therefore, it is very important to find an anti-acne that is made from natural compounds. Several ethnopharmacological studies in Indonesia and other regions have demonstrated that plants such as *Aloe vera*, *Curcuma longa*, and *Citrus aurantifolia* possess antimicrobial, anti-inflammatory, and sebum-reducing properties relevant to acne therapy (3, 4.5). Moreover, ethnopharmacology emphasizes the holistic use of medicinal plants, which often leads to remedies with fewer side effects and better tolerability, making them more suitable for long-term management of chronic conditions like acne (6). Citrus limon contains terpenes, flavonoids, limonene, vitamin C, carotenoids, polyphenols, linalool, linalylate, limonene, and alpha-pinene, which can reduce oxidative stress, promote skin rejuvenation, and have antibacterial, anti-inflammatory, and sebum-reducing effects (7.8).

Traditional medicine related to a particular culture is the focus of ethnopharmacology. Ethnopharmacology studies local knowledge about medicinal plants, which includes several elements such as botany, pharmacology, phytochemistry, and more (9). Among the 25,000-30,000 plant species found in Indonesia, about 7,000 of them have a long history of traditional medicine use (10). However, records about traditional medicinal plants are still very minimal, so this information is difficult to preserve (11).

The practice of Balinese traditional medicine is documented in the Usadha manuscript. This manuscript classifies diseases based on body temperature, thus allowing for customized treatment plans. Since acne is considered a hot-cold disease, drugs of moderate effectiveness (dumelada) are used to treat it. Scar tissue, in addition to inflammatory and non-inflammatory lesions, is a hallmark of acne. A number of factors contribute to the development of acne, such as changes in follicle keratinization, increased sebum production, colonization of *Cutibacterium acnes* in follicles, and complicated inflammatory processes.

The pathophysiology of acne is very complex and includes not only environmental variables but also genetic and nutritional variables (6). Treatment options for acne range from oral and topical antibiotics to retinoids and hormone treatments, depending on the severity of the condition and the patient's preferences (3). Although *C. acnes* for considered a commensal organism, its overgrowth and interaction with the host's immune system can trigger inflammation through the release of lipases and pro-

inflammatory mediators. Meanwhile, S. aureus and S. epidermidis may also contribute to secondary infections and exacerbate inflammatory lesions. However, increasing resistance among these bacterial species, particularly C. acnes and S. aureus, to commonly used antibiotics such as erythromycin and tetracycline has become a major clinical concern (12). Indonesians are increasingly turning to natural remedies in their quest to cure acne.

Ethnochemical research identified 24 types of plants that can be used as acne remedies, including aloe vera, turmeric, and lime (13). A study in the Paser tribe found 46 species of medicinal plants (14). The use of *the* Use Value (UV) approach in the analysis of ethnopharmaceutical data helps identify and classify the uses of medicinal plants (15).

Bukian Village in Payangan District, Gianyar Regency, Bali, still preserves the use of traditional medicine. The ethnopharmaceutical study in this village provides insight into local knowledge about medicinal plants and traditional medicine practices (16). Based on a preliminary study, jackfruit leaves are one of the plants used as an anti-acne in Bukian Village. A preliminary study was conducted by visiting the research location to familiarize ourselves with the location and approach village officials and the community.

This study explores traditional medicine (Balinese usada) used as an anti-acne in Bukian Village. Research is carried out with *a Use Value* (UV) approach to develop safe and effective traditional medicines. In particular, this study aims to describe anti-acne ethnopharmaceuticals, find out how to formulate, use, rules of use, and duration of acne treatment, as well as assess the efficacy, safety, and comfort of using anti-acne traditional medicines in the community of Bukian Village. The study also identified the types of plants that had the highest benefits. The benefit of this research is to deepen knowledge about anti-acne plants for researchers and provide a basis for further research. Theoretically, this study will document the types of plants that can be used by the Bukian community to treat acne, expand the general public's knowledge about the diversity of anti-acne plants, and assist the Payangan District government in publicizing natural resources that are beneficial for acne treatment.

Methosds

Using a cross-sectional strategy, this study provides quantitative descriptive data. Information is collected from primary sources, such as surveys and questionnaires, as well as secondary sources, such as the researcher's observations at the research site. This study has obtained a research permit from Kepala Dinas Penanaman Modal dan Pelayanan Terpadu Satu Pintu Kabupaten Gianyar with Number 2109/DPMPTSP/IP/2024 and has obtained an ethical clearance from UNBI with Number 02.0382/UNBI/EC/IV/2024. This research procedure began with the completion of informed consent forms and an explanation of the research. The population of this study consisted of 4,103 residents of Bukian Village in Payangan District. Sampling was conducted using the snowball sampling technique with the assistance of key informants. Participants were selected based on specific inclusion criteria, namely: (1) residents of Bukian Village who had previously used natural ingredients or traditional remedies for acne treatment; (2) individuals aged between 18 and 45 years, representing the adolescent and early adult age group commonly affected by acne; (3) residents who had lived in Bukian Village for at least one year to ensure familiarity with local ethnomedicinal practices; and (4) respondents who were willing and able to communicate information about the use of medicinal plants and had provided written informed consent a prerequisite for sampling. The people of Bukian Village who have tried using natural remedies for acne are eligible to participate. In addition, the Use Value (UV) method was used for data analysis in this study.

Formula (17):

$$UVc = \sum \frac{Uis}{ns}$$

Keterangan:

UVc = Overall type use value
Uis = the number of uses obtained from each informant for each number of plants
ns = Total number of informants

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Results and Discussion

The age of respondents ranged from 46 to 55 years old (or 35% of the total respondents), according to the study's findings. Consistent with research showing that people over the age of 35 have a tendency to use the plant as a traditional medicine (18), people aged 46-65 years still use the plant as an anti-acne drug. Seventy percent of those surveyed were women, and 31 percent had just finished high school or its equivalent in terms of education. Working for the company itself is the highest percentage (33%) as presented in Table 1. During data collection, many women stayed at home because they were not working or working part-time, according to similar studies as presented in **Table 1** (19). Work affects a person's level of knowledge as interaction and exchange of information in the workplace adds insight (20). The level of education may influence an individual's access to and understanding of health-related information, including both conventional and traditional medicine. In this study, respondents had varying educational backgrounds ranging from no formal education to college graduates reflecting a diverse capacity in health literacy rather than a linear relationship between education level and treatment choice. A higher level of education generally provides broader access to information sources, but the preference for using ethnomedicinal remedies among respondents may also be influenced by cultural inheritance and local trust rather than formal education alone. Therefore, the relationship between age, gender, occupation, and educational level with the use of ethnobotanical acne treatment reflects a complex interaction of socio-cultural and informational factors, not solely academic attainment.

Table 1. Characteristics Baseline

	Characteristics Responden	Frequency (F) = 100	Percentage (%)
Age	17-25 years	6	6%
	26-35 years	19	19%
	36-45 years	11	11%
	46-55 years	35	35%
	56-65 years	20	20%
	>65 years	9	9%
Gender	Female	70	70%
	Male	30	30%
Last Education	No School	14	14%
	Not Graduated from Elementary School	9	9%
	Graduated from Elementary School / Equivalent	17	17%
	Junior High School Graduate/Equivalent	20	20%
	High School Graduate/Equivalent	31	31%
	Graduated from College	9	9%
Work	Private Employee	33	33%
	Housewife	27	27%
	Farmers	23	23%
	Merchant	13	13%
	Civil Servant	2	2%
	Breeders	1	1%
	TNI retiree	1	1%

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Factors that cause acne

The results of the percentage of acne-causing factor data in respondents were known to be the highest, namely hormonal fluctuations with a percentage of 40.28%. While the least is stress and *C. acne* with a percentage of 1.39%. A surge in adrenal hormones during puberty stimulates the production of sebum, which can clog hair follicles and cause acne as presented in **Table 2** (21).

Table 2. Distribution of Factors Contributing to Acne

Factors Causing Acne in Respondents	Frequency (F) = 144	Percentage (%)
Hormone fluctuations	58	40.28%
Foods/drinks with a high glycemic index	52	36.11%
Inappropriate use of cosmetics	18	12.50%
Lack of hygiene	8	5.56%%
Air Pollution	4	2.78%
Factors Causing Acne in Respondents	**Frequency (F) = 144**	**Percentage (%)**
Stress	2	1.39%
C. acne	2	1.39%

Symptoms of Acne

The results of the percentage of acne symptom data in respondents were known to be the highest, namely papules with a percentage of 60.58%. Papules are acne of moderate severity that appear below the surface of the skin and cause pain as presented in **Table 3** (22).

Table 3. Distribution Symptoms of acne

Acne symptoms in respondents	Frequency (F) = 104	Percentage (%)
Papula	63	60.58%
Pustules	22	21.15%
Blackheads	10	9.62%
Nodules	8	7.69%
Scarring	1	0.96%

Knowledge Sources

Public knowledge about medicinal plants is obtained from hereditary knowledge with a percentage of 89% and knowledge from outside (internet) with a percentage of 11%. Knowledge about the use of the plant as an anti-acne in Bukian Village was mostly obtained from families, in line with research, traditional medicine knowledge is passed down from generation to generation in the family as presented in **Table 4** (23).

Table 4. Distribution of knowledge

Source of knowledge	Frequency (F) = 100	Percentage (%)
Hereditary	89	89%
External knowledge	11	11%

Frequency of Use of Anti-Acne Traditional Medicines

The frequency of use of medicinal plants as anti-acne by the respondents of this study is shown as **table 5** From these results, it can be seen that most respondents often (38%) use traditional anti-acne drugs. Medicinal plants are easy to obtain, affordable, and easy to make, so they are still often used as an alternative treatment as presented in **Table 5** (24).

Table 5. Distribution of Use of Anti-Acne Traditional Medicines

Frequency of Use	Frequency (F) = 100	Percentage (%)
Often	38	38%
Quite often	35	35%
Frequency of Use	**Frequency (F) = 100**	**Percentage (%)**
Sometimes	24	24%
Rare	3	3%

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Overview of Anti-Acne Etnopharmacology

The study identified various medicinal plants used by the community in Bukian Village as anti-acne remedies. **Table 6** summarizes the ethnopharmaceutical profile of these plants, including their local and scientific names, plant families, parts used, and perceived efficacies based on respondent reports. The asterisk (*) indicates the most frequently mentioned perceived efficacy among respondent

Table 6. Overview of anti-acne Ethnopharmacology

Indonesian Name	Local Name	Scientific Names	Familia	Plant Part Used	Efficacy
Nangka	Nangka	*Artocaprus heterophyllus*	Moraceae	Leaves	Reduces oil*, accelerates exfoliation process
Pakis	Paku	*Diplazium esculentum*	Polypodiaceae	Leaf, stem	Reducing oil
Jeruk Nipis	Juuk lengis	*Citrus aurantifolia*	Rutaceae	Fruit pulp	Reduce oil, remove acne scars, accelerate exfoliation process*
Rumput Teki	Padang Teki	*Cyperus rotundus L.*	Cyperaceae	Tubers	Reduces the annoyance of acne, speeds up the exfoliation process*
Lidah Buaya	Lidah buaya	*Aloe Vera L.*	Liliaceae	Leaves	Reduces the annoyance of acne
Sirih Cina	Sirih Cina	*Peperomia pellucida*	Piperaceae	Leaves	Reducing oil
Tomat	Tomat	*Solanum lycopersicum*	Solanaceae	Fruit pulp	Reduces the annoyance of acne
Kelor	Kelor	*Moringa oleifera*	Moringaceae	Leaves	Remove acne scars
Kunyit	Kunyit	*Curcuma domestica*	Zingiberaceae	Rhizome	Oil-reducing, antibacterial
Kacang Merah	Kacang barak	*Vigna Angularis*	Fabaceae	Seeds	Reducing oil
Timun	Timun	*Cucumis sativus L.*	Cucurbitaceae	Fruit pulp	Reduces the annoyance of acne
Merica	Mica	*Piper nigrum*	Piperaceae	Leaves	Speeds up the exfoliation process
Cendana	Cenana	*Santalum album L.*	Santalaceae	Trunk	Reducing oil

Note: The asterisk (*) *indicates the most commonly reported efficacy based on respondent frequency.*

The use of anti-acne ethnopharmaceuticals in the community in Bukian Village, Payangan District is the most widely used jackfruit plant (*Artocarpus heterophyllus*) as much as 44% and the least is the Red Bean plant (*Vigna angularis*), Cucumber (*Cucumis sativus L.*), Pepper (*Piper nigrum*), and Sandalwood (*Santalum album L*) as much as 1%.

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Table 7. Overview of anti-acne Ethnopharmacology

Plant Type	Frequency (F) = 100	Percentage (%)
Jackfruit/Artocarpus *heterophyllus*	44	44%
Fern/Diplazium *esculentum*	17	17%
Lime/Citrus *aurantifolia*	12	12%
Teething grass/Cyperus *rotundus L.*	9	9%
Aloe vera (L.) Burm.f.	6	6%
Chinese betel/Peperomia *pellucida*	2	2%
Tomato/Solanum *lycopersicum*	2	2%
Moringa/Moringa *oleifera*	2	2%
Turmeric/Curcuma *longa Linn*	2	2%
Red Bean/Phaseolus *vulgaris L.*	1	1%
Cucumber/Cucumis *sativus L*	1	1%
Pepper/Piper *nigrum*	1	1%
Sandalwood/Santalum *album L*	1	1%

Jackfruit

Jackfruit is a tropical plant that grows widely in Indonesia and belongs to the moraceae tribe with the scientific name *Artocarpus heterophyllus*. This plant is still often used as a traditional medicine, including as an anti-acne. The people of Bukian Village, Payangan District, have traditionally used jackfruit leaves to reduce oil on the face and speed up the exfoliation process. The way to use it is to squeeze the jackfruit leaves until smooth and then attach them to the acne-prone area of the face. The leaves used are old brown leaves that have fallen off the stalk.

The antibacterial components found in jackfruit leaves—including tannins, flavonoids, and saponins—are responsible for jackfruit's reputation as animal feed as well as its various health benefits. These compounds can damage the cytoplasmic membrane and denature proteins found in bacterial cells (25). The antimicrobial flavonoids and phenols found in jackfruit leaves were found in a study (26). In addition, research found that 96% ethanol extract cream from jackfruit leaves was effective in inhibiting the growth of *Cutibacterium acnes* (27). Jackfruit is one of the plants that can treat acne according to herbal practitioners (13).

Fern

An edible fern is *Diplazium esculentum*, which is locally called a vegetable fern. Athyrium esculentum Copel, Anisogonium esculentum Presl, and Dictyogonium malabaricum Spreng are synonyms. Alkaloids, flavonoids, glycosides, phenolates, tannins, terpenoids, steroids, carbohydrates, lipids, and oils are some of the bioactive components found in fern plants that provide antioxidant, antibacterial, anti-inflammatory, and antidiabetic properties (28). Based on research conducted *Diplazium esculentum* ethanol extract has antibacterial activity against *Pseudomonas aeruginosa* and *Staphylococcus epidermis* (29).

The people of Bukian Village, Payangan District, have been using fern plants as an anti-acne plant for generations. The stems and leaves of the young fern are squeezed until smooth and then attached to the acne-prone area of the face. Fern plants are believed to be able to reduce oil on the face. Research also shows that the fern plant (*Diplazium esculentum*) is used as a traditional medicine to treat tumors, asthma, and acne by the Dayak people in Central Kalimantan (30).

Lime

Lime (*Citrus aurantifolia*) is native to India and Southeast Asia. This plant can be grown at any height and the fruits can be enjoyed all year round. Residents of Bukian Village in Payangan District have long relied on lime as an acne

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remedy. According to them, lime can help reduce oil, remove scars, and speed up the exfoliation process. Lime flesh can be applied to acne-prone areas of the face.

The antioxidants and vitamin C contained in lime help ward off free radicals that accelerate the aging process. In addition, lime can also stop acne-causing germs from multiplying (31). Research also confirms that lime is effective for treating acne (13).

Teething Grass

Cyperus rotundus L., or puzzle grass, known as *pusple nutsedge*, is used as a traditional medicine in various countries such as India and China. Puzzle grass grows in tropical and subtropical regions. The people of Bukian Village, Payangan District, use teki grass as an anti-acne which is believed to be able to reduce discomfort due to acne and accelerate skin peeling. The use of teki grass as an anti-acne is usually combined with rice, where the rice is soaked until soft, then pounded with the teki grass tubers and attached to the acne-prone area.

The antibacterial, antitumor, anticancer, and antiallergic chemicals found in teki grass tubers include alkaloids, sineols, pinen, cyperons, rotunols, cyperenon, tannins, cyperols, and flavonoids. Bacteria can be inhibited or killed when these substances damage the bacterial cell membrane and interfere with the permeability of the bacterial cell. The bacteriostatic KHM of 15% and the bactericidal KBM of 11% from the tuber extract of teki grass make it an effective antibacterial agent against the growth of *S. epidermidis* and *P. acnes* (32).

Aloe Vera

As a medical plant with several beneficial components, aloe vera (*Aloe Vera L.*) is a member of the Liliaceae family. In addition to quinones, saponins, aminoglucosides, lupeols, salicylic acid, tannins, urea nitrogen, cinnamic acid, sulfur, flavonoids, and flavonoids, aloe vera contains twelve different types of anthraquinones, which have antimicrobial and antiviral effects (4).

The people of Bukian Village, Payangan District, have traditionally used aloe vera as an acne medicine. Aloe vera is also used by the people of the Oirata Tribe on Kisar Island as a traditional remedy for acne (33). Aloe vera is believed to reduce discomfort due to acne. The leaves are mashed using a blender or cob and ulk, then attached to the acne area. Research proving that aloe vera gel extract with concentrations of 80%, 90%, and 100% is effective in inhibiting the development of *Propionibacterium acnes* (34).

Chinese Betel

The weed known as the Chinese betel, scientifically known as *Peperomia pellucida*, is rarely grown although it naturally tends to thrive in moist, humid areas. It has been used as an acne medicine by residents of Bukian Village, Payangan District. Research shows that people in South Sinjai District, Sinjai Regency, South Sulawesi, also use Chinese betel as a traditional acne remedy (35). This plant is believed to be able to reduce oil on the face. Chinese betel leaves are mashed using cobek and ulakan, then attached to acne areas.

A number of medicinal properties, including analgesic, antipyretic, hypoglycemic, antifungal, antimicrobial, antioxidant, antidiabetic, and antihypertensive, have been attributed to Chinese betel. Alkaloids, tannins, lipids, calcium oxalate, and essential oils are some of the chemical components found in Chinese betel (36). In addition, Chinese betel contains phenolates, steroids, glycosides, triterpenoids, tannins, saponins, and flavonoids (37). The antibacterial essential oils and flavonoid antioxidants found in Chinese betel work effectively (38). 96% ethanol extract of Chinese betel leaf with a concentration of 15% has antibacterial activity against *Propionobacterium acnes* with an inhibition zone of 12.33 mm (36).

Tomato

The tomato plant, or *Solanum lycopersicum*, is an annual herb of the Solanaceae family. The community in Bukian Village, Payangan District, believes that tomatoes can reduce acne disorders. The tomato fruit is cut, then the flesh is applied to the acne area. Tomatoes are known to brighten the skin, treat acne, and maintain facial pores (39).

The alkaloids solanine, saponins, folic acid, citric acid, riboflavanoids, vitamin C, vitamin A, B1, carotenoids, and tomatin—a compound that

has anti-inflammatory and antibacterial properties—are all contained in tomatoes (40). Research investigating the antibacterial effect of tomato fruit ethanol extract on the growth of *acne-causing Staphylococcus epidermidis* bacteria (41).

Moringa

Moringa oleifera, better known as moringa plant, is a plant native to Indonesia and other tropical regions. Acne scars can be removed by using moringa leaf boiled water, according to residents of Bukian Village in Payangan District. Acne treatment that involves boiling moringa leaves in water and then allowing the mixture to cool until it reaches room temperature is used topically.

Polyphenols, nonflavonoids, tannins, saponins, alkaloids, and triterpenoids are some of the substances found in moringa leaves. Additionally, moringa leaves can help with a variety of health problems, including worms, liver problems, viral infections, and inflammation (42). Research shows that moringa is also used as an anti-acne by people in Pemalang Regency, Central Java (5).

Tumeric

Turmeric (*Curcuma domestica*) is an aromatic spice and culinary coloring that comes from Asia. Due to its antimicrobial and oil-reducing properties, turmeric is used as an acne remedy in Bukian Village, Payangan District. Acne-prone parts of the face are treated with a mixture of crushed turmeric rhizomes.

There are a number of beneficial components found in turmeric, including curcuminoids, which lower blood sugar, inhibit inflammation, fight cancer, eliminate viruses, protect the liver, and prevent malaria (43). Research shows that turmeric rhizome extract is effective as an antibacterial against the growth of *Propionibacterium acnes* (44). In addition, turmeric is one of the plants that can treat acne (13).

Red Bean

Red beans, or *Vigna angularis*, are a type of legume that is used as a food and vegetable ingredient. In Bukian Village, Payangan District, red beans are used as an anti-acne because they are believed to reduce oil. Red bean seeds are soaked with rice until soft, then finely ground and applied to acne-prone areas of the face.

Red bean seeds contain proteins, oligosaccharides, and secondary metabolites such as saponins, phytates, phenolic compounds, flavonoids, and isoflavones (45). Adzuki beans have antioxidant, antibacterial, and anti-inflammatory properties. The polyphenol extracts in kidney bean shells are effective in inhibiting Gram-positive bacteria such as *B. cereus* and *S. aureus* (46).

Cucumber

Cucumber, or *Cucumis sativus L.*, is a horticultural plant that is widely cultivated in Indonesia. In Bukian Village, Payangan District, cucumbers are used as an anti-acne because they are believed to reduce acne disorders. Cucumber fruits are cut and applied to acne-prone skin areas.

Alkaloids, glycosides, steroids, flavonoids, saponins, and tannins are some of the active components found in cucumber fruit extract that help fight microbes (47). Research has found that cucumber fruit ethanol extract has antibacterial properties, preventing *Propionibacterium acnes* bacteria from multiplying (48). Research it also confirms that cucumber is an effective plant for treating acne (13).

Pepper

Aside from its significant monetary value and its widespread use in traditional medicine, the pepper plant (*Piper nigrum L.*) is known as an aromatic spice. Pepper leaves are used as an anti-acne in Bukian Village, Payangan District, because they are believed to accelerate the exfoliation process.

Mashing pepper leaves and then mixing the crushed leaves with water used to wash rice is the way the local community processes pepper leaves. Next, the acne-prone area of the face is applied with the combination. Research shows that ethanol extract from pepper leaves has more effective antimicrobial activity than ethyl acetate extract, especially against *Staphylococcus aureus* and *Escherichia coli bacteria*(49).

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Plant Parts Used

In Bukian Village, Regency, this study found that leaves are the most commonly used part of the plant for acne therapy, accounting for 64.30% of the total amount. Although seeds are the least used part of the plant, which is only 0.89% of the total.

The results showed that the most frequently used part of the plant was the leaf, with a percentage of 64.30%. Plants such as jackfruit (*Artocarpus heterophyllus*), fern (*Diplazium esculentum*), aloe vera (*Aloe vera L.*), Chinese betel (*Peperomia pellucida*), moringa (*Moringa oleifera*), and pepper (*Piper nigrum*) utilize the leaves because of the ease of picking and processing. Leaves are the most practical part of the plant and do not damage other parts of the plant, and can be used sustainably (51).

Sandalwood

Sandalwood plant (*Santalum album L.*) grows naturally in Asia and is known for its oil-reducing properties. The used water from rubbing sandalwood stems, which is obtained by rubbing sandalwood stems on a bucket filled with water until the water is brown, is used to treat acne by applying it to problem areas of the face.

Sandalwood extract has antibacterial activity thanks to the content of alkaloid compounds, terpenoids, flavonoids, phenols, and steroids. Previous studies have demonstrated that methanolic extracts of sandalwood possess significant antibacterial activity against several pathogenic bacteria *Salmonella typhimurium*, *Escherichia coli*, *Klebsiella sp*., dan *Staphylococcus aureus* (50).

Table 8. Parts of the plant used

Plant Parts	Frequency (F) = 112	Percentage (%)
Leaves	72	64%
Fruit pulp	15	13.39%
Trunk	13	11.61%
Tubers	9	8%
Rhizome	2	1.79%
Seeds	1	0.89%

How to Acquire Plants

Most of the people in Bukian Village, Payangan District, get anti-acne plants from their yards, with a percentage of 39% as presented in **Table 9.** People who use plants as traditional medicine often plant them in their yards to facilitate access (52).

Table 9. How the plants were obtained

How to obtain	Frequency (F) = 100	Percentage (%)
Yard	39	39%
Field	32	32%
Buy	17	17%
Riverbank	12	12%

How to Prepare

In Bukian Village, Payangan District, the community still follows the hereditary tradition of concocting plants to overcome acne. The most commonly used method is squeezing plants, with a percentage of 54.95% as presented in **Table 10** Squeezing is the main method in the processing of medicinal plants by the Kluet Indigenous people (53). The people of Bukian Village often concoct medicinal plants by squeezing them because this process is considered easier, practical, and effective.

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Table 10. How to mix traditional anti-acne medicine

How to Compound	Frequency (F) = 111	Percentage (%)
Squeezed	61	54.95%
Without compounding	17	15.32%
Pounded	15	13.51%
Soaked	11	9.91%
Mashed	4	3.60%
Boiled	2	1.80%
Scrubbed	1	0.90%

How to use the medicine

The most common way to use anti-acne traditional medicine by the community in Bukian Village is by pasting 87% and smearing 13% on the acne-prone area of the face as presented in **Table 11.** The pasted method is the most commonly used (54). In traditional medicine, the pasted or smeared method is often used for skin problems such as acne, whether in the form of a plant that has been mashed or not. According to Lontar Usadha Tiwang, the paste method involves smoothing the ingredients which are then applied to the treated area (55).

Table 11. How to use traditional anti-acne medicine

How to use	Frequency (F) = 100	Percentage (%)
Pasted	87	87%
Polished	13	13%

Rules of Use and Duration of Acne Treatment

The rules for using anti-acne traditional medicine in Bukian Village vary depending on the plant type and the part used. The usage patterns are as follows: lime is applied once daily for 5–60 minutes until cured; jackfruit leaves and grass tubers once daily for 10–20 minutes; fern leaves and aloe vera once daily for 10–30 minutes; red beans and cucumber once daily for 15 minutes; Chinese betel leaf, tomato, moringa leaf, and turmeric rhizome once daily for 15–30 minutes; pepper leaves once daily for approximately 6 hours; and sandalwood stem once daily for about 5 hours until cured as presented in **Table 12**.

The time to use traditional medicine varies depending on the type of plant, plant part, compounding method, and how it is used. Kneaded or mashed plants generally require a shorter use time because they are absorbed quickly, while rubbed plants, such as sandalwood stems, take longer.

Table 12. Rules of use and duration of acne treatment

No.	Plant Name	Duration of Use (minutes)
1.	Jackfruit/*Artocarpus heterophyllus*	10-20
2.	Fern/*Diplazium esculentum*	10-30
3.	Lime/*Citrus aurantifolia*	5-60
4.	*Purple nutsedge/Cyperus rotundus L.*	10-20
5.	Aloe Vera/*Aloe Vera L.*	10-30
6.	Chinese betel/*Peperomia pellucida*	15-30
7.	Tomato/*Solanum lycopersicum*	15-30
8.	Moringa/*Moringa oleifera*	15-30
9.	Turmeric/*Curcuma longa Linn*	15-30
10.	Red Bean/*Phaseolus vulgaris L.*	15
11.	Cucumber/*Cucumis sativus L*	15
12.	Pepper/*Piper nigrum*	360
13.	Sandalwood/*Santalum album L*	300

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Efficacy

Based on the results of the study, respondents felt that the main benefit of using traditional anti-acne drugs was the reduction of facial oil, which was felt by 64.81% of respondents as presented in **Table 13.** The use of the plant as an anti-acne is effective in reducing oil, with the effect of a harsh taste after application.

Table 13. Efficacy by use

Efficacy	Plant Type	Frequency (F) = 108	Percentage (%)
Reduced oil (70 = 64.81%)	Jackfruit	44	62.86%
	Fern	17	24.29%
	Lime	4	5.71%
	Chinese Betel	2	2.86%
	Red Bean	1	1.43%
	Sandalwood	1	1.43%
	Turmeric	1	1.43%
Reducing the annoyance of acne (14 = 13%)	Aloe vera	6	42.86%
	Teething Grass	4	28.57%
	Tomatoes	2	14.29%
	Cucumber	1	7.14%
	Chinese Betel	1	7.14%
Removes acne scars (4 = 3.70%)	Lime	2	50%
	Moringa	2	50%
Speeds up the exfoliation process (19 = 17.59%)	Lime	8	42.11%
	Teething Grass	7	36.84%
	Jackfruit	3	15.79%
	Pepper	1	5.26%
Antibacterial (1 = 0.93%)	Turmeric	1	100%

Comfort

Rough texture–related discomfort was commonly reported among respondents, affecting 42.06% of the study population as presented in **Table 13.** This rough texture may be attributed to the plant parts used as well as the compounding methods, such as squeezing. The jackfruit plant, characterized by fallen leaves and a coarse surface, is one example of a factor contributing to this discomfort.

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Table 14. Comfort based on usage

Comfort	Plant Type	Frequency (F) = 107	Percentage (%)
None (8 = 7.48%)	Tomatoes	2	25%
	Chinese Betel	2	25%
	Cucumber	1	12.50%
	Sandalwood	1	12.50%
	Aloe Vera	1	12.50%
	Red Bean	1	12.50%
Pungent smell/aroma (14 = 13.08%)	Teething Grass	9	64.29%
	Fern	2	14.29%
	Chinese Betel	2	14.29%
	Pepper	1	7.14%
Feels hot on the skin (12 = 11.21%)	Lime	12	100%
Sticky texture (21 = 19.63%)	Fern	16	76.19%
	Aloe Vera	5	23.81%
Coarse texture (45 = 42.06%)	Jackfruit	44	97.78%
	Fern	1	2.22%
Difficult to clean (7 = 6.54%)	Aloe Vera	4	57.14%
	Turmeric	2	28.57%
	Fern	1	14.29%

Safety

In terms of safety, 60% of respondents did not experience side effects after using traditional medicine as presented in **Table 15.** Traditional medicine is generally considered safer than modern medicine because of its fewer side effects, with the right selection and usage notes also affecting the minimum of side effects as presented in Table 16.

Table 15. Safety by use

Security	Frequency (F) = 100	Percentage (%)
No Side Effects	60	60%
Side Effects	40	40%

Table 16. Side effect by use

Side effects	Type of plant	Frequency (F) = 40	Percentage (%)
Redness	Jackfruit	24	60%
Hot	Lime	12	30%
Dry	Teething Grass	4	10%

Plants that have the highest usefulness

The level of usefulness of medicinal plants to overcome acne by the people of Bukian Village can be determined based on the results of the Use Value Index (UVi) calculation. The highest UVi value (0.44) was found in jackfruit plants (*Artocarpus heterophyllus*) with the plant parts used were leaves. The jackfruit plant (Artocarpus heterophyllus) is one of the most commonly used as an anti-acne in Bukian Village. Jackfruit leaves, which contain flavonoids, saponins, terpenoids, and tannins, have been shown to be effective in treating acne (54). Jackfruit leaf extract has antibacterial activity against Staphylococcus aureus and Propionibacterium acnes (55-56). The second highest was Fern plants (*Displazium esculentum*) with a UVi value of 0.17. The fern (Diplazium esculentum), found in fields and riverbanks, uses its leaves and stems as an anti-acne. Containing alkaloids, flavonoids, glycosides, phenolics, tannins, terpenoids, and steroids, the fern shows potential as an acne remedy (24). And the third highest was lime plants (*Citrus aurantifolia*) with a UVi value of 0.12. Lime (*Citrus*

aurantifolia) has a Use Value Index value of 0.12, and is usually obtained from the market. The flesh of lime fruits, which contain alkaloids, tannins, flavonoids, and phenols, is effective in inhibiting *Propionibacterium acnes bacteria* (56). Lime juice shows antibacterial potential with an inhibition zone diameter between 6.5 mm to 11.5 mm as presented in **Table 16**.

Table 16. Plants that have the highest usefulness

No	Plant Name	Use Value
1.	Jackfruit/*Artocarpus heterophyllus*	0.44
2.	Fern/*Diplazium esculentum*	0.17
3.	Lime/*Citrus aurantifolia*	0.12
4.	Teething grass/*Cyperus rotundus L.*	0.09
5.	Aloe Vera/*Aloe Vera L.*	0.06
6.	Chinese betel/*Peperomia pellucida*	0.02
7.	Tomato/*Solanum lycopersicum*	0.02
8.	Moringa/*Moringa oleifera*	0.02
9.	Turmeric/*Curcuma longa Linn*	0.02
10.	Red Bean/*Phaseolus vulgaris L.*	0.01
11.	Cucumber/*Cucumis sativus L*	0.01
12.	Pepper/*Piper nigrum*	0.01
13.	Sandalwood/*Santalum album L*	0.01

Conclusion

There are 13 types of plants to treat acne, including Jackfruit, Fern, Lime, and others. The general method of compounding is by squeezing and the most frequent use is by sticking it on the acne-prone area of the face, with the rule of using it once a day until it heals. The main benefit felt is the reduction of oil production on the face, although the rough texture of the preparation is a comfort constraint. and 40% experienced side effects after using natural ingredients as an anti-acne treatment. The plants with the highest benefits based on the Use Value Index value are Jackfruit (0.44), Fern (0.17), and Lime (0.12).

Ucapan Terima Kasih

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Conflict Of Interest

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