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Ethnobotany of Medicinal Plants in the Jalawastu Cultural Village Community, Brebes, Central Java, Indonesia

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THE JALAWASTU Cultural Village Community is located in Brebes Regency, Central Java, Indonesia. They practice local traditions and culture through the use of various plants, including medicinal types. Therefore, this research aims to determine the medicinal plant species used with their benefits, cultural importance, and knowledge transfer through interviews and field surveys. These plants were analyzed descriptively, while the cultural importance index was determined quantitatively by calculating the ICS (Index of Cultural Significance) value. The results showed that there were 74 medicinal plants from 37 families. Zingiberaceae was the most widely used at 15.3%, followed by Euphorbiaceae, Fabaceae, Malvaceae, Myrtaceae, and Poaceae at 5.5%. These species could treat 49 disease, and the ICS analysis ranged from 1.5 to 51, where coconut has the highest value at 51. The source of knowledge is obtained from parents, relatives, or neighbors. The intensity of its benefits in the younger generation tends to be low, which can cause the gradual loss of knowledge. In conclusion, the community in the Jalawastu Cultural Village still traditionally uses plants to treat various diseases and provide health care. Meanwhile, medicinal plants in this area have an essential role in the community's lives. It is necessary to carry out scientific research, preclinical and clinical tests to ensure the content of phytochemical compounds, effectiveness, safety, chronic toxicity, pharmacological studies, standardization, and interactions with medicinal ingredients.

Keywords: Cultural village community, Ethnobotany, Jalawastu, Medicinal plants.

Introduction

Indonesia is known for its high plant diversity, with an estimated 30,000-40,000 plant species (Ministry of National Development Planning, 2016). Medicinal plants are part of this biodiversity richness, and it is difficult to know the exact amount. There are several reports that show the total amount of medicinal plants in Indonesia. Elfahmi et al. (2014) stated that more than 40 million Indonesians use 6,000 medicinal plants. Meanwhile, the latest research by Cahyaningsih et al. (2021) stated that 5,490 species are identified as medicinal plants.

Local communities, especially in rural and remote areas, provide knowledge about the potential of plants as medicines and supplements (Malini et al., 2017). Furthermore, Jalawastu Cultural Village is a special area in Ciseureuh Village, Brebes Regency, Central Java. The area believes in having the same lineage as the Baduy Tribe, West Java (Wijanarto, 2018). The community in the Jalawastu area has a close relationship with nature, especially the customary forest area, whose existence has been officially recognized by the Indonesian government. Therefore, natural resource utilization and conservation are maximized (Pramudya et al., 2022). The Jalawastu customary forest is a source of life used to conduct traditional ceremonies and grow crops. Wild plants deliberately cultivated in customary forests are used for daily consumption as side dishes, seasonings, and medicinal ingredients (Nugroho et al., 2020).

According to the Head of the Customary Stakeholder, herbal medicine was once in great demand by the Jalawastu Cultural

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Village Community. However, the inheritance of knowledge and the intensity of its use are increasingly eroding over time. This could lead to the loss of knowledge in local communities, especially about medicinal plants (Weckmüller et al., 2019). The younger generation who tends to follow modernization in an area promotes the loss of local culture and knowledge, including those inherited from the traditional medicinal plant (Vandebroek & Balick, 2012). Research published in an accessible written form is needed to save this knowledge from extinction (Tripathi, 2019).

The interactions between humans and plants can be scientifically investigated using ethnobotany research methods (Schimdt & Cheng, 2017). These interactions are related to local use, classification, management practices, and conservation of plants (Abebe & Teferi, 2021). The results provided information on the community's knowledge to support biodiversity conservation efforts (Rodrigues et al., 2020; Wang et al., 2021). Ethnobotanical research has the advantage of disclosing information based on the knowledge of certain ethnic or groups and the behavior of their local wisdom in managing and utilizing the natural resources (Batoro, 2015). Morover, ethnobotanical surveys provide benefits for scientists and companies as a reference for further research related to the isolation and identification of the active compounds of medicinal plants, in order to find effective drugs (Behera et al., 2021).

The usage of medicinal plants by indigenous communities can prevent the loss of this knowledge (Rahayu & Andini, 2019). Therefore, this study aims to determine the types of medicinal plants used and their benefits to the community of Jalawastu Cultural Village, the cultural importance index, and the process of passing knowledge using ethnobotany methods. This study is expected to be used for cultural functions and education related to medicinal plants, as well as a source of reference for developing science, especially in the medical field.

Method

Research area and period

This research was conducted from October 2021 to March 2022 in the Jalawastu Cultural Village, a hamlet at the southern tip of Ciseureuh Village. To the north, Ciseureuh Village is directly adjacent to Sindangjaya and Pamedaran Village, east to Jemasih Village and Larangan Regency, south to Jemasih Village, Salem Sub-District, and Bantarkawung Sub-District, west to Pamedaran Village and Salem Sub-District (Ciseureuh Village Government, 2020). Ciseureuh Village is in the Ketanggungan Sub-district with a geographical location between 6^0 49' – 6^0 53' South Latitude and 108^0 53' – 109^0 0' East Longitude. The Ketanggungan Sub-district is part of the Brebes Regency, which is located on the island of Java, to be precise, in Central Java Province, Indonesia (Fig. 1).

Environmental condition

Jalawastu Cultural Village is located on the foot of Mount Kumbang at an altitude of 116 meters above sea level and is dominated by hills. This region has a tropical climate with an average temperature of 28^0C. During the study, November and April marked the beginning of the rainy and dry season in the region. Furthermore, during the dry season, this area feels cool because of the fohn wind from the slopes of Mount Kumbang. The distance from the center of Ciseureuh village administration to the Jalawastu Cultural Village is approximately 2km, passing through residential areas, rice fields, and forest areas. Ciseureuh Village has a state forest area of 1,396 hectares (Himawan, 2016), while the customary forest in the Jalawastu Cultural Village covers ± 64 Ha (Nugroho et al., 2020). The road to the location is quite narrow, with some parts already paved and others still muddy and slippery during the rainy season.

Jalawastu cultural village community

Jalawastu Cultural Village is a hamlet in Ciseureuh Village, along with Salagading, Garogol and Ciseureuh Hamlets. It is a special and limited area with a total population of 270, consisting of 144 men and 126 women (Ciseureuh Village Government, 2020). The majority of community occupancies in the Jalawastu Cultural Village are farmers.

The community still maintains and carries out the customs, traditions, and myths developed in their area. This makes the Jalawastu area and the community more unique and special than the other three. There is a myth that the Jalawastu Cultural Village is Dayeuh Lemah Kaputihan, meaning that the land is believed to be holy. Therefore, the community living in the area should always maintain good without disaster (Sunanang & Luthfi, 2015).

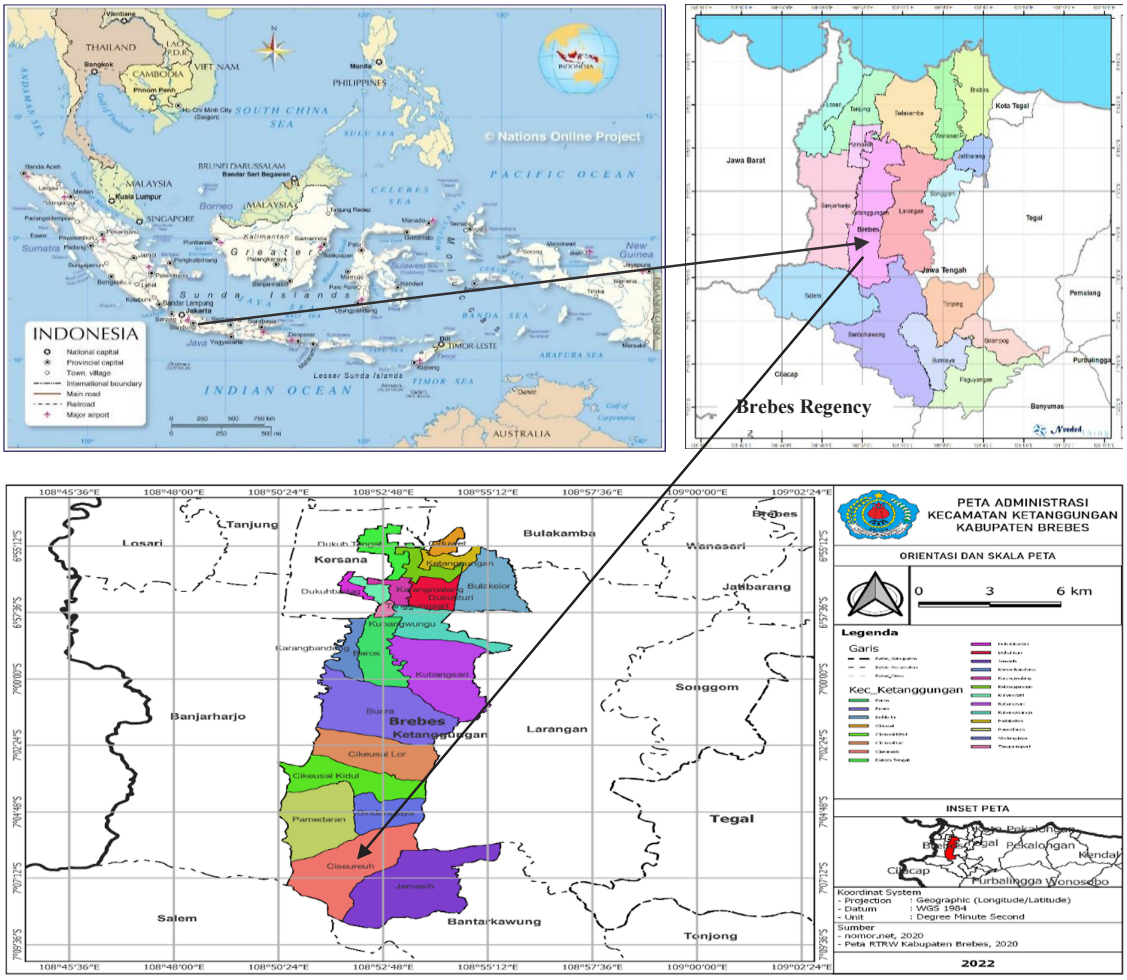

Fig. 1. Map of research locations

Government in the Jalawastu region is carried out by local and customary leaderships. Another uniqueness is that the majority of the communities in the Central Java Province are Javanese with their customs and culture. However, the Jalawastu community are Sundanese who adhere to Pasundan customs and culture from West Java. The community is also believed to be the descendants of the Baduy tribe from West Java.

Key informants and respondents

This research survey was only conducted in the area of the Jalawastu Cultural Village, which is still thick with customs and culture. There are special characteristics in the selection of key informants and respondents. The key informant should be someone living in the Jalawastu area and an official in the customary administration, namely the customary leader, *kokolot* members or elders, and *Jayabaya* members or area security guards. Furthermore, the key informant should be someone who knows and can explain customs, as well as the culture of the Jalawastu community, and understand knowledge related to the use of medicinal plants. There were 10 key informants selected using the snowball sampling method. The respondents are indigenous people consisting of women and men aged 15 to 85. Respondents totaled 69 people, and the number was obtained by calculating the slovin formula with a merge error of 10% (Sarwono, 2011). Respondents were selected using the Proportionate Stratified Random Sampling method and divided into groups A, B, and C of age 15-25, 26-49, and 50-85 years.

Data collection

Data on the use of medicinal plants was collected through interviews and field surveys (Barros et al., 2021). The data collected are local names and benefits of medicinal plants,

parts of the plants used, method of preparation, method of use, doses, sources of knowledge acquisition, and names of most used plants. Furthermore, the data were obtained through semi-structured interviews and questionnaires. They were documented by being recorded and photographed. Identification of plants based on morphological characteristics of medicinal plants was carried out using *Ensiklopedoa Flora* volumes 1-7 (Suhono et al., 2010) and *Ensiklopedia Biologi Dunia Tumbuhan: Ensiklopedia paku* (Suhono, 2012). Meanwhile, the scientific name was checked with The Plant List, 2013.

Data analysis

The data from the medicinal plant identification are descriptively analyzed and presented in tables and figures. Analysis of quantitative data was carried out using the index of cultural significance (ICS) proposed by Turner (1988). An ICS analysis was performed to determine the important value of plant species (Supiandi et al., 2019). The formula for calculating the ICS value is as follows:

$$\text{ICS} = \sum_{i=1}^{n} (q \; x \; i \; x \; e)\text{ui}$$

where:

ICS = Index of Cultural Significance
Q = Quality Value
I = Intensity value
E = Exclusivity value

The assessment results are categorized into certain groups based on the ICS score, according to Turner (1988), as follows:

Value ICS ≥ 100= Very High Significance (VHS)
ICS 50 – 99= High Significance (HS)
ICS 20 – 49= Moderate Significance (MS)
ICS 5 – 19= Low Significance (LS)
ICS 1 – 4= Very Low Significance (VLS)
(ICS 0)[b]= Negligible Significance (NS)

Results and Discussion

Utilization of plants as medicine in the Jalawastu Cultural Village

Based on the data, 74 plants were used for various diseases and health care, as indicated in Table 1. There are two species that have not been identified, namely *honje buut* and *sari santan*. For several reasons, they have not been fully observed in their plant organs. The *honje buut* plant is only known by certain members of the community, the shape of the plant and the location of its growth are kept secret. Meanwhile, *sari santan* is a wild plant that did not produce any flowers until the end of the study. According to informants, the flowering season is uncertain, and it is difficult to identify precisely.

The Jalawastu Cultural Village Community uses 37 plant families. The Zingiberaceae family is the group most commonly used for treatment, with a total of 11 species at 15.3%, followed by the Euphorbiaceae, Fabaceae, Malvaceae, Myrtaceae, and Poaceae at 5.5%, each consisting of 4 plant species, the Asteraceae and Lamiaceae at 4.2% with 3 plant species each, and the Acanthaceae, Apiaceae, Apocynaceae, Arecaceae, Lauraceae, and Piperaceae at 2.8% with 2 medicinal plant species each. The rest consists of 1 plant species with a percentage of 1.4%.

The *Zingiberaceae* family is widely known to be useful in food and medicine (Pitopang et al., 2019). Indonesia is a producer of herbal medicine, commonly referred to by the general population as *Jamu* on an industrial scale and at home (Elfahmi et al., 2014). Herbal medicine made by concocting various medicinal plants has been widely trusted to treat disease (Husain et al., 2021). Herb production is regulated and supervised by the Indonesian Ministry of Health and the Food and Drug Supervisory Agency.

At the end of 2010, there were 1,166 herbal medicine industries had business licenses in Indonesia, both large and small companies. Various herbal medicine products have been produced, ranging from boiling herbs, powders, pills, and capsules, even reaching into beverage products, health food, and functional to beauty products (Musanif et al., 2012). Several plants from the *Zingiberaceae* family are the main ingredients in herbal medicine. Therefore, some plants are cultivated to fulfill the community's needs for manufacturing herbal medicine. Ginger, turmeric, cardamom, galangal, and aromatic ginger (*kencur*) are the most produced medicinal plants in Indonesia compared to others (Salim & Munadi, 2017).

TABLE 1. List of medicinal plants used by the Jalawastu Cultural Village Community

Family	Scientific name	Local name	Medicinal use	Organ	Method of preparation	Method of use	ICS value	ICS category
Acanthaceae	*Clinacanthus nutans* (Burm.f.) Lindau	Kalingsir	Conjunctivitis, headache, and fever	Leaf	Pounded, d*ipeureuh*	Dripped, Smeared	28.5	MS
	Strobilanthes crispa Blume	Keji beling	Kidney ache, kidney stones, dysuria, back pain	Roots and leaf	Boiled	Drink	22.5	MS
Alliaceae	*Allium sativum* L.	Bawang putih	Fever, body pains, and toothache	Tuber	Pounded	Smeared	12	LS
Anacardiaceae	*Mangifera indica* L.	Buah	Toothache	Bark	Pounded	Smeared	1.5	VLS
Annonaceae	*Annona squamosa* L.	Sarikaya	Gout, gastritis, hypertension, and high cholesterol	Leaf	Boiled	Drink	13.5	LS
Apiaceae	*Apium graveolens* L.	Saledri	Hypertension, and gastritis	Leaf	Boiled	Drink	4.5	VLS
	Centella asiatica (L.) Urb.	Antanan	Cough, fever, and typhoid fever	Leaf	Pounded, squeezed, boiled	Drink	22.5	MS
Apocynaceae	*Alstonia scholaris* (L.) R. Br.	Lame	Toothache, body pains	Sap and bark	Used directly and Boiled	Smeared, Drink	18	LS
	Parameria laevigata (Juss.) Moldenke	Cukangkang	Increase stamina, body pains, female organs disorders	Bark	Boiled	Drink	22.5	MS
Arecaceae	*Areca catechu* L.	Jambe	Body pains, back pain, increase stamina	Root	Boiled	Drink	19.5	LS
	Cocos nucifera L.	Kalapa	Poisoning, dehydration, gastritis, lungs, kidney ache, body pains, increase stamina	Fruits and roots	Used directly, boiled	Drink	51	HS
Asteraceae	*Ageratum conyzoides* (L.) L.	Jukut bau	Wounds and body pains	Leaf	Pounded	Smeared	10.5	LS
	Blumea balsamifera (L.) DC.	Sembung	Gastroenteritis, hemorrhoid, diarrhea, gastritis, back pain	Leaf	Boiled	Drink	12	LS
	Chromolaena odorata L.	Lampeyong	Stomach ache, gastritis, wound.	Leaf	Used directly, pounded, and boiled	Eaten, Smeared	34.5	MS
Burseraceae	*Protium javanicum* Burm.f.	Ketos	Loss of appetite, gastritis	Leaf, fruit	Used directly	Eaten	19.5	LS

TABLE 1. Cont.

Family	Scientific name	Local name	Medicinal use	Organ	Method of preparation	Method of use	ICS value	ICS category
Campanulaceae	*lsotoma* longiflora (L.) C.Presl	Cendo	Conjunctivitis	Flower	*Dipeureuh*	Dripped	24	MS
Cannabaceae	*Trema orientalis* (L.) Blume	Kurai	Cough and asthma	Bark	*Dikeueum*	Drink	19.5	LS
Caricaceae	*Carica papaya* L.	Gandul	Constipation, increase stamina, body pains	Fruits and roots	Used directly, boiled	Eaten, Drink	22.5	MS
Commelinaceae	*Commelina benghalensis* L.	Gewor	Constipation, back pain	Leaf	Used directly, boiled	Eaten, Drink	3	VLS
Convolvulaceae	*Ipomoea batatas* (L.) Lam.	Boled	Abscess, gastritis	Leaf bud and tuber	Pounded, steamed, and boiled	Smeared, Eaten	7.5	LS
Crassulaceae	*Bryophyllum pinnatum* (Lam.) Oken	Buntiris	Fever	Leaf	Pounded	Smeared	12	LS
Euphorbiaceae	*Euphorbia hirta* L.	Nanangkaan	Wounds, skin diseases	Leaf	Pounded and kneaded	Smeared	3	VLS
	Euphorbia tithymaloides L.	Kipanas	Fever	Leaf	Pounded	Smeared	18	LS
	Jatropha curcas L.	Jarak kosta	Diarrhea, sprue, toothache, skin disease	Tree sap and leaf	Used directly and kneaded	Drink, Smeared	25.5	MS
	Sauropus androgynus (L.) Merr.	Katuk	Low breast milk secreation	Leaf	Boiled	Eaten, Drink	6	LS
Fabaceae	*Erythrina variegata* L.	Dadap	Conjunctivitis, fever, skin disease	Stems and leaf	*Dipeureuh* twisted and pounded	Smeared. Dripped	16.5	LS
	Leucaena leucocephala (Lam.) de Wit	Peuteuy cina	Stomach ache and wounds	Leaf	Used directly and kneaded	Eaten, Smeared	3	VLS
	Mucuna gigantea (Willd.) DC.	Gongseng	Cough	Branch	*Diteunggak*	Drink	6	LS
	Senna siamea (Lam.) H.S.Irwin & Barneby	Johar	Tinea versicolor and ringworm	Leaf bud	Used directly	Smeared	12	LS
Lauraceae	*Cinnamomum sintoc* Blume	Sintok	Increase stamina, body pains	Bark	Boiled	Drink	10.5	LS
	Persea americana Mill.	Alpukat	Gastroenteritis, hemorrhoid, diarrhea, and gastritis	Leaf	Boiled	Drink	6	LS

TABLE 1. Cont.

Family	Scientific name	Local name	Medicinal use	Organ	Method of preparation	Method of use	ICS value	ICS category
Lamiaceae	*Ocimum gratissimum* L.	Mangsi arab	Fever and headache	Leaf	Pounded	Smeared	10.5	LS
	Orthosiphon aristatus (Blume) Miq.	Kumis kucing	Kidney stones, dysuria, kidney ache and back pain	Flower	Boiled	Drink	6	LS
	Tectona grandis L.f.	Jati	Conjunctivitis	Branch	*Dipeureuh*	Dripped	12	LS
Malvaceae	*Ceiba pentandra* (L.) Gaertn.	Langru	Fever and conjunctivitis	Leaf and roots	Pounded, and *dipeureuh*	Smeared, Dripped	10.5	LS
	Hibiscus rosa-sinensis L.	Bunga wera	Fever, and kidney stones	Flower	Pounded and boiled	Drink, Smeared	7.5	LS
	Pterocymbium tinctorium Merr.	Beurih	Headaches, fever, body pains, and rheumatism	Bark	Pounded and boiled	Drink, Tied up	15	LS
	Sida rhombifolia L.	Sada gori	Toothache, abscess, and wounds	Leaf	Pounded	Smeared	21	MS
Moraceae	*Ficus racemosa* L.	Loa	Scabies, ringworm, chickenpox, body pains, and toothache	Leaves and tree sap	Kneaded, boiled, and used directly	Smeared	15	LS
Moringaceae	*Moringa oleifera* Lam.	Kelor	Headaches, high cholesterol, hypertension, and gastritis	Leaf	Cooked	Eaten	6	LS
Melastomataceae	*Melastoma malabathricum* L.	Harendong	Burns, sprue, gastritis, rheumatism, body pains	Roots and Leaf	Burned and boiled	Drink, Smeared	16.5	LS
Menispermaceae	*Cyclea barbata* Miers	Tawulu	Gastritis and heartburn	Leaf	*Dipeureut*	Drink	19.5	LS
Musaceae	*Musa paradisiaca* L.	Cau saba	Chickenpox, wound, diarrhea, and gastritis	Sap and fruit	Used directly	Eaten, Smeared	6	LS

TABLE 1. Cont.

Family	Scientific name	Local name	Medicinal use	Organ	Method of preparation	Method of use	ICS value	ICS category
Myrtaceae	*Psidium guajava* L.	Jambu biji	Diarrhea	Leaf	Used directly	Eaten	18	LS
	Syzygium aromaticum (L.) Merr. & L.M.Perry	Cengkeh	Cough, diarrhea, toothache, body pains	Leaves and flowers	Used directly, boiled	Eaten, Drink, Smeared	6	LS
	Syzygium cumini (L.) Skeels	Duwet	Colds, diabetes, and diarrhea	Bark and fruit	Boiled and used directly	Drink, Eaten	6	LS
	Syzygium polyanthum (Wight) Walp.	Salam	Gout, gastritis, high cholesterol, and hypertension	Leaf	Boiled	Drink	6	LS
Oleaceae	*Jasminum sambac* (L.) Aiton	Melati	Sprue and sore throat	Flower	Steamed and boiled	Drink, Smeared	7.5	LS
Oxalidaceae	*Biophytum sensitivum* (L.) DC.	Kakalapaan	Kidney stones, body pains	Roots, stems, and leaf	Boiled	Drink	4.5	VLS
Piperaceae	*Piper betle* L.	Seureuh	Nosebleeds, conjunctivitis, vaginal discharge, skin diseases, and cough	Leaf	Twisted, *dipeureuh*, and boiled	Dripped, Drink, washed, inhaled	30	MS
	Piper cubeba L.	Kemungkus	Increase stamina, colds, and coughs	Fruit	Boiled and pounded	Drink	12	LS
Poaceae	*Cymbopogon citratus* (DC.) Stapf	Sereh	Sprains, body pains	Stems and leaf	Pounded and boiled	Drink, Smeared	21	MS
	Cymbopogon nardus (L.) Rendle	Sereh wulung	Body pains	Stems and leaf	Boiled	Drink	12	LS
	Imperata cylindrica (L.) Raeusch.	Eurih	Body pains, and back pain	Root	Boiled	Drink	18	LS
	Saccharum spontaneum L.	Gelagah	Conjunctivitis	stem	*Dipeureuh*	Dripped	9	LS
Polypodiaceae	*Pyrrosia piloselloides* (L.) M.G. Price	Peredah pateuh	Sprains and fracture	Roots, stems, and leaf	Used directly	Tied up	18	LS
Rubiaceae	*Morinda citrifolia* L.	Cangkudu	Hypertension, gastritis, body pains	Fruit	Used directly	Eaten	12	LS
Rutaceae	*Citrus aurantiifolia* (Christm.) Swingle	Jeruk nipis	Cough	Fruit	Squeezed	Drink	18	LS
Sapotaceae	*Manilkara zapota* (L.) P.Royen	Sawo	Diarrhea	Fruit	Used directly	Eaten	18	LS

TABLE 1. Cont.

Family	Scientific name	Local name	Medicinal use	Organ	Method of preparation	Method of use	ICS value	ICS category
Solanaceae	*Physalis angulata* L.	Cecendet	Back pain, body pains, increase stamina, rheumatism, and gastritis	Fruit, leaf, and root	Boiled and used directly	Drink, Eaten	13.5	LS
Verbenaceae	*Lantana camar*a L.	Reba	Tinea versicolor and ringworm	Leaf	Kneaded	Smeared	3	VLS
Zingiberaceae	*Alpinia galanga* (L.) Willd.	Laja	Tinea versicolor and increase stamina	Rhizome	Used directly and boiled	Drink, Smeared	25.5	MS
	Alpinia zerumbet (Pers.) B.L.Burtt & R.M.Sm.	Laja gowah	Body pains, back pain, hemorrhoid	Rhizome	Boiled and pounded	Drink	12	LS
	Amomum compactum Sol. ex Maton	Kapol	Colds, increase stamina, gastritis, and cough	Fruit	roasted, pounded, and used directly	Drink, Eaten	13.5	LS
	Amomum dealbatum Roxb.	Hanggasa	Liver, increase stamina, hemorrhoid, rheumatism	Fruit	Used directly	Eaten	10.5	LS
	Curcuma aeruginosa Roxb.	Koneng hideung	Body pains, rheumatism, and gastritis	Rhizome	Boiled	Drink	12	LS
	Curcuma longa L.	Koneng	Cough and gastritis	Rhizome	Burned, pounded, and boiled	Drink	27	MS
	Curcuma zanthorrhiza Roxb.	Koneng timu	Body pains	Rhizome	Boiled	Drink	9	LS
	Etlingera elatior (Jack) R.M.Sm.	Combrang	Fever, typhoid fever, body pains, and conjunctivitis	Stem	*Dipeureuh*	Drink, Dripped	31.5	MS
	Etlingera megalocheilos (Griff.) A.D.Poulsen	Tepus	Shortness of breath/Asthma, and conjunctivitis	Stem	Cooked, and *Dipeureuh*	Eaten, Dripped	3	VLS
	Kaempferia galanga L.	Cikur	Body pains and sprains	Rhizome	Used directly and pounded	Eaten, Smeared	15	LS
	Zingiber officinale Roscoe	Jahe	Colds, coughs, and rheumatism	Rhizome	Burned and pounded	Drink, Smeared	19.5	LS
Unidentified	Unidentified	Honje buut	Beriberi, liver, swollen body, body pains	Stem	Boiled	Drink	15	LS
Unidentified	Unidentified	Sari santan	Cough, typhoid fever, conjunctivitis	Stem	*Diteunggak, dipeureuh*	Drink, Dripped	9	LS

Notes: ICS Category– HS: High Significance; MS: Moderate Significance; LS: Low Significance; VLS: Very Low Significance.

Jadid et al. (2020) showed that *Zingiberaceae* was the most widely used plant for treatment by the Tengger Tribe in Ngadisari Village. About 14 species were used by the Colo Village Community, Dawe Subdistrict, Kudus, for medicine and treating various diseases (Wahidah et al., 2021). Similarly, Fathir et al. (2021) reported that the *Zingiberaceae* family is West Java's most widely used plant by the Madurese ethnic community to increase stamina.

Most informants from Jalawastu stated that Zingiberaceae species are widely used because they are easy to plant and obtain. However, the species of *Etlingera megalocheilos (Griff.)* A.D. Poulsen or tepus belongs to Zingiberaceae, which is currently quite challenging to obtain, especially during the dry season. *Tepus* is a wild plant found deep in the forest, and local people use it as a medicine for Conjunctivitis and asthma. Furthermore, it contains essential oils such us borneol and camphor with antioxidant activity, cytotoxicity, and antibacterial activity (Vairappan et al., 2012; Nagappan et al., 2017). The content has potential for treatment, but scientific research and testing of *Etlingera megalocheilos (Griff.)* A.D. Poulsen to treat any spesific disease has not been conducted.

Informants stated that there are 49 types of diseases and health-related problems treated using medicinal plants. The community uses medicinal plants, such as *Centella asiatica* (L.) Urb., *Pterocymbium tinctorium* Merr., *Cyclea barbata* Miers, *Syzygium aromaticum* (L.) Merr., *Amomum compactum* Sol. ex Maton, *Ficus racemosa* L., *Chromolaena odorata* L. to treat common illnesses, including coughs, fevers, colds, skin disease, toothaches, and headaches. Meanwhile, some plants are also used in chronic diseases remedies such as kidney disease, hypertension, and gastritis.

Previous research stated that *Syzygium aromaticum (L.) Merr* or cloves were used as a toothache medicine by the Sundanese community in the Bedogol area, West Java (Sihotang, 2011), it also used as fever and asthma medicine by the community in Trunyan, Bali (Sihotang et al., 2018). Research by Kanth et al. (2016) showed that clove oil was the most effective medicine all of plant product against microorganisms causing dental caries. Maciele et al. (2014) showed that the eugenol content in cloves was assessed as having potential as an antiasthmatic. Recent research conducted by Csikós et al. (2022) concluded that eugenol in cloves can be used to treat respiratory disorders associated with inflammation.

Nikmatullah et al. (2018) found that *Chromolaena odorata* L. leaves are also used by Baduy-Dalam Tribe in Banten, West Java, to heal wounds. Amfotis et al. (2022), through wound healing tests on white rats with *Chromolaena odorata* L. leaf extract, found results that the content of flavonoids and tannins can accelerate the wound healing process. Other tests performed by (Murti & Kumar, 2012) showed that the aqueous and ethanol extracts of *Ficus racemosa* L. have good wound-healing properties. This can be influenced by phytoconstituents such as flavonoids, alkaloids, saponins, and tannins.

According to the interviews with informants, gastritis or stomach pain is a type of disease treated by 18 different species of medicinal plants such as *Persea americana* Mill., *Blumea balsamifera* (L.) DC., *Morinda citrifolia* L. and *Curcuma longa* L. Curcumin in *Curcuma longa* L. has the ability as gastroprotection and medicine for gastric pain (Kwiecien et al., 2019). The scopoletin compound in *Morinda citrifolia* L. can treat gastro-oesophageal inflammation (Torres et al., 2017). Tests conducted by Mutmainah et al. (2014) concluded that the combination of *Curcuma longa L., Amomum compactum Sol. ex Maton*, and *Blumea balsamifer*a (L.) DC. can fight aspirin-induced gastric ulcers in rats. Therefore, the combination has a gastroprotective effect.

Body pains is a symptom of some different conditions. The informant stated body pains is caused by the community's profession, especially farming. A very long working time and a heavy workload cause fatigue and pain throughout the body. According to Aremu & Pendota (2021), body pain can indicate inflammation-related diseases, including back pain, rheumatism, and gout. Meanwhile, Min et al. (2016) stated that farming is one of the professions prone to musculoskeletal disorders to describe a variety of conditions that are progressive and associated with pain affecting muscles, cartilage, tendons, ligaments, joints, and other connective tissues (Cavero & Calvo, 2015). Some musculoskeletal disorders include low back pain, neck pain, fractures, rheumatoid arthritis, and osteoarthritis (Cieza et al., 2020).

The informant also stated that body pains is a disease that uses most types of medicinal plants.

This research found 25 plants that used to treat body pain including *Areca catechu* L. and *Cinnamomum sintoc* Blume. Previous research mentioned that several plant species of *Cymbopogon citratus* (DC.) Stapf, *Curcuma aeruginosa* Roxb., *Imperata cylindrica* (L.) Raeusch, and *Strobilanthes crispa* Blume are used to relieve body aches by the community around the Gunung Kidul and Mount Merapi areas, Yogyakarta, Indonesia (Nahdi & Kurniawan, 2019).

In vivo testing conducted by Sumiwi et al. (2015) showed that the essential oil of *sintok* bark or *Cinnamomum sintoc Blume* contains the main compound in the form of eugenol, which can act as an analgesic and anti-inflammatory. Research by Khan et al. (2011) showed that areca nut or *Areca catechu* L. has anti-inflammatory and analgesic effects. The latest test by Meng et al. (2021) stated that the polyphenols in areca nut could treat osteoporosis by being involved in the process of increasing bone mass.

Based on the results, the Jalawastu community uses seed plants (Spermatophyta) and fern species (Pterydophyta) for treatment. *Pyrrosia piloselloides* (L.) M.G. Price, known as *peredah pateuh*, can treat pain from sprains and fractures. It is wrapped on the sprained or fractured part of the body, from two weeks to several months, depending on the severity of the illness. *Peredah pateuh* is not only used in humans but can also be used for sprains and fractures in livestock such as cattle and chickens.

Pyrrosia piloselloides (L.) M.G. Price to treat fractures is also carried out by the community of South Assam district, India (Das, 2007). The Jah Hut community in Malaysia uses this plant to cure body aches (Lin, 2005). Research that specifically tests *Pyrrosia piloselloides* (L.) M.G. Price as a medicine for broken bones or similar benefits has not been conducted. However, recent research found that *Pyrrosia piloselloides* (L.) M.G. Price contains phenolic compounds and flavonoids, which have antioxidant activity (Seno, 2022).

The Jalawastu community obtained knowledge on the use of medicinal plants from their parents and relatives or neighbor. The majority in Groups B and C reported that they witnessed or experienced firsthand treatment in the past when parents cared for sick family members with various natural resources. The community is encouraged to self-diagnose disease and use natural resources for treatment because of the difficulty accessing health facilities. Discussions with neighbors or relatives are held to determine the most effective medicinal plants. *Kokolot* or elders provide additional treatment in the form of water that has been prayed for and rubbed on the face of a sick person. Village healers are not found in the area, hence diagnosis and treatment are carried out personally on a household or family scale.

The intensity of medicinal plant utilization decreased, and group A had the lowest level of knowledge compared to B and C. The level of medicinal plant utilization, which decreases in each generation, causes the inheritance of knowledge not to be carried out optimally due to the lack of experience in direct utilization. Meanwhile, the younger generation is less interested in medicinal plants because they are considered impractical. It takes time and effort to determine and process traditional medicinal ingredients before consumption, and the length of treatment with traditional medicines is also considered uncertain. The younger generation prefers chemical drugs sold in pharmacies or the market because they consider them more practical.

Index value of cultural significance (ICS)

Based on this study, the ICS value of medicinal plants ranged from 1.5 to 51 (Table 1). The values are divided into four different categories, namely Very Low Significance/VLS (ICS 1.5-4.5) with 8 species, Low Significance/LS (ICS 6-19.5) with 51 species, Moderate Significance/MS (ICS 21-34.5) with 14 species, and High Significance/HS with an ICS value of 51, as well as being the highest only for coconut or *Cocos nucifera* L. The coconut with the highest ICS value has the essential status compared to other plants. Additionally, medicinal plants with more benefits have a higher ICS value because they can increase quality, intensity, and exclusivity (Batoro, 2015).

Most informants stated that using coconut for treatment and care has been reliable for a long time. However, consumption has increased since the COVID-19 incident occurred in Indonesia. Consumption of coconut water and oil in Jalawastu Cultural Village has been practiced to improve and maintain body resistance. The potential as an active and effective nutrient for the immune system has been tested in vitro in animals and humans study (Joshi et al., 2020). Research by Angeles-agdeppa

et al. (2021) found that virgin coconut oil can be used as an additional supplement to speed up the healing process in suspected cases of COVID-19 because of its anti-viral and immunomodulatory properties.

The Jalawastu Community also uses coconut to treat ailments such as gastritis, lung and kidney pain. The evaluation results of the phytochemical compounds of sugars extracted from coconut water contain polyphenols, flavonoids, alkaloids, phytic acid, and tannins (Akpro et al., 2019). In a test conducted by Ajeigbe et al. (2017), water and coconut milk demonstrated the ability to protect the gastric mucosa by catalyzing mucosal homeostasis after any disturbance. Meng et al. (2019) showed that coconut oil could potentially treat gastric ulcers because of its antioxidant compound content after being tested. Virgin coconut oil is also a companion supplement that can treat chronic allergic lung inflammation as an asthma symptom (Vasconcelos et al., 2020). Coconut water has promising antipathogenic activity. Consuming coconut water can also treat hypocitraturia by increasing urinary potassium, chloride, and citrate (Patel et al., 2018).

There are 14 plants with ICS values in the Moderate Significance category, including *Chromolaena odorata* L.*,* with a value of 34.5 below the coconut. The plant is used to treat stomach pain, gastritis, and wounds. Other plants with medium ICS value are *Clinacanthus nutans* (Burm.f.) Lindau*, Strobilanthes crispus, Centella asiatica* (L.) Urb., *Parameria laevigata* (Juss.) Moldenke, *lsotoma longiflora* (L.) C.Presl*, Carica papaya* L., *Jatropha curcas* L., *Sida rhombifolia* L., *Cymbopogon citratus* (DC.) Stapf, *Curcuma longa* L., *Alpinia galanga* (L.) Willd. *Etlingera elatior* (Jack) RMSm.*,* and *Piper betle* L. The community believes the plants cure common and often suffered illnesses and symptoms such as healing wounds, skin diseases, coughs, and fever.

Meanwhile, *Mangifera indica* L. (ICS= 1.5), known as mango, which is only used to treat toothache, has the lowest ICS value and is categorized as very low significance. According to the informant, the benefits of mango as medicine are rarely known and not always used. However, based on a review written by Quintana et al. (2021), *Mangifera indica* L. species are known to contain bioactive molecules such as phenolic acids, terpenoids, carotenoids, and fatty acids. Moreover, Afam-Ezeaku et al. (2022) showed that mango tree bark extract could inhibit the growth of pathogens causing toothache in the form of bacteria *Streptococcus mutans* and fungi *Aspergillus niger.* The majority of medicinal plants are included in the low significance category. The low importance value may indicate that traditional knowledge regarding of medicinal plants is gradually eroding (Singh et al., 2022).

Part of the plant used

Figure 2 shows the parts of plants used, including leaves, roots, fruits, stems, bark, rhizome, flower, sap, branch, and tuber. The most frequent parts are leaves, with a percentage of 38,5%. Previous research stated that the leaf is the most widely used plant organ for traditional medicine by various tribes and community groups in various regions (Ammar et al., 2021; Navia et al., 2021). According to Yaseen et al. (2014), it is more widely used because of its abundance and more accessible than other organs such as flowers, roots, and fruit. They play an active role in photosynthesis and producing metabolites with medicinal benefits (Rahmawati et al., 2022). It is considered safer than other organs, such as roots and rhizomes, causing plants to die, and the utilization for treatment is one of the conservation efforts (Mustofa et al., 2020).

Medicinal plant preparation and use method

Figure 3 shows several ways that the Jalawastu Cultural Village community used to process traditional medicinal ingredients. There are 14 methods, including boiled, pounded, used directly, kneaded, burned, steamed, twisted, cooked, squeezed, roasted, *dikeueum* (plants soaked in water until mucus comes out), *diteunggak* (branches/stems of plants are cut, sharpened until the water comes out), *dipeureuh* (branches, stems, and roots cut, sharpened until the water comes out), and *dipeureut* (leaves pounded, squeezed, allowed to stand until thickened, then filtered, separated between leaf juice and water).

According to informants, 34% of drug preparations are made by boiling, which is considered easier and more effective by the local community. Boiling ingredients for traditional medicine is also found in tribes or communities in other areas, as carried out by the community of Jambur Labu Village, East Aceh (Elfrida et al., 2021), and the Malay tribe in South Bangka Sub-district, Indonesia (Henri et al., 2022). The most frequent way of consumption is by drinking the

medicine, with a percentage of 42%, followed by smeared 27%, eaten 17%, dripped 10%, tied up 2%, washed and inhaled each 1%. In the community of Jalawastu Cultural Village, the process of preparing and using herbal medicines can be carried out in more than one way, the materials and processing methods can be combined based on the knowledge of the local community.

Boiling the herbal medicine is considered more flexible by the local community, because the composition of the ingredients can be adjusted to the condition of a sick person. However, boiling has some drawbacks, especially those related to the quality of the medicine (Luo et al., 2012). Heating a mixture of herbal therapeutic substances might alter the constituents of the ingredients. The content of herbal medicinal ingredients may increase or decrease, and new compounds may form during the boiling process. Therefore, the pharmacological activity of certain drugs may change (Wu et al., 2018). The method's effectiveness in processing herbal medicines by boiling several mixtures of ingredients still lacks strong scientific evidence (Kwan et al., 2021). Tests need to be carried out to obtain the right processing method and composition to obtain more effective herbal medicines.

Conclusion

In conclusion, the community in the Jalawastu Cultural Village traditionally uses plants to treat various diseases and provide health care. Belief and culture are one of the factors that support the use of medicinal plants. Even though the use has been proven to be conducted by the community, many plants have not been scientifically tested for their effectiveness. Therefore, it is necessary to screen plant parts and active principles according to the scientific bases of medicinal screening. Laboratory tests should be carried out to ensure the content of phytochemical compounds, effectiveness, safety, chronic toxicity, pharmacological studies, standardization, and interactions with medicinal ingredients. Preparation and implementation of preclinical and clinical trials of traditional medicinal ingredients are according to official organizational policies in each country.

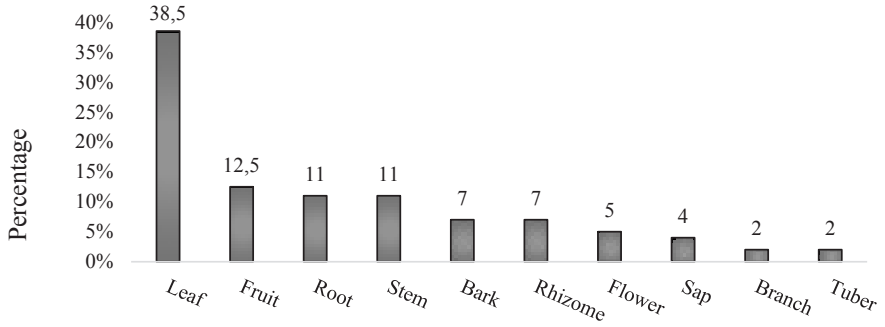

Fig. 2. Percentage of plant organs used

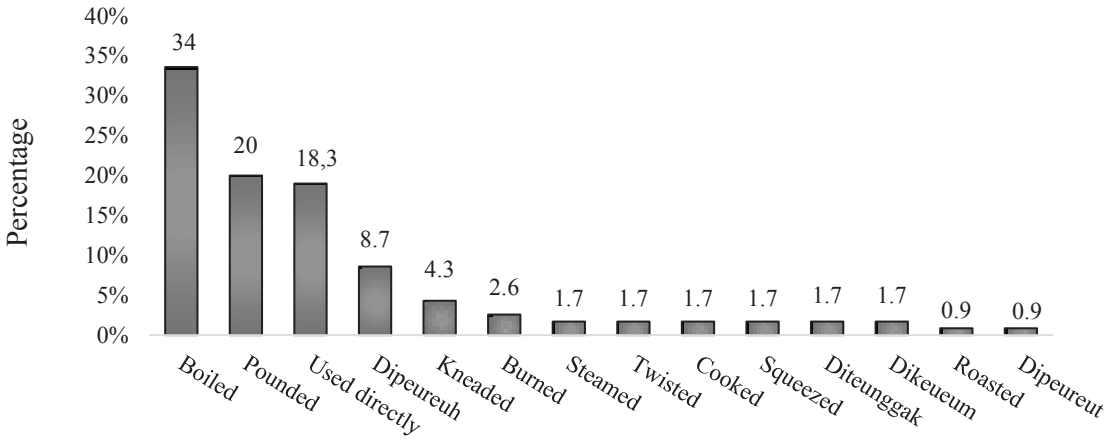

Fig. 3. Medicinal plant preparation

Conflict of interest: There is no conflict of interest in this research.

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