



# Ethnobotanical Study on the Utilization of the Zingiberaceae Family in Kampung Kandang, Duren Seribu, West Java, Indonesia

Tanisha Qistimaila<sup>1\*</sup>, Nurhadiyanta<sup>1</sup>

<sup>1</sup> Study Program of Biology, Faculty of Military Mathematics and Natural Sciences, The Republic of Indonesia Defense University. Komplek Indonesia Peace and Security Center (IPSC) Sentul, Bogor 116810, Indonesia.

\* Correspondence: tanishaqistimailaa@gmail.com

## Abstract

Family medicinal plants occupy an important position in Indonesia's traditional health system, particularly in rural areas that continue to uphold plant-based medicinal practices. The *Zingiberaceae* family is among the most frequently utilized plant groups, valued both as medicine and spice owing to the bioactive compounds contained in its rhizomes. This study aimed to identify the species, patterns of utilization, and level of importance of Zingiberaceae plants in community health practices in Kandang Duren Seribu Village, West Java. Data were collected through semi-structured interviews and field observations involving 20 informants, comprising 15 general informants and 5 key informants, selected using a purposive sampling technique. Quantitative data were analyzed using 3 quantitative ethnobotanical parameters, Frequency of Citation (FC), Relative Frequency of Citation (RFC), and Use Value (UV), commonly employed to assess species importance. The results recorded 10 *Zingiberaceae* species used as traditional medicine, with the rhizome being the plant part most commonly utilized. *Zingiber officinale* obtained the highest RFC and UV values of 0.95, followed by *Curcuma longa* and *Curcuma xanthorrhiza*, each with a value of 0.90. Moderately valued species such as *Kaempferia galanga*, *Alpinia galanga*, and *Zingiber officinale* var. *rubrum* continue to play a role in addressing common complaints such as cough, stomachache, and reduced immunity. Meanwhile, *Zingiber zerumbet* and *Curcuma heyneana* recorded the lowest values, yet the community continues to maintain their use for specific needs such as diarrhea and menstrual regulation. This utilization pattern reflects a fairly strong consensus of local knowledge alongside variation in knowledge mastery among community members. These findings confirm that the *Zingiberaceae* family continues to hold significant cultural and health value and merits preservation through scientific documentation and educational programs, such as those developed at the Taman Herbal Insani (Insani Herbal Garden).

**Keywords:** Ethnobotany; Medicinal Plants; Rhizomes; West Java; Zingiberaceae

## 1. Introduction

The Indonesian people have long utilized plants as a source of treatment in daily life. Family medicinal plants, locally known as TOGA (Tanaman Obat Keluarga), represent a tangible expression of this practice within the household environment. Communities cultivate TOGA in their house yards to address minor ailments such as coughs, fevers, and digestive disorders. This practice has been passed down through generations via direct experience and oral communication between generations. Several studies have shown that household use of medicinal plants helps maintain the health of residents in rural areas (Nahdi et al., 2016; Torimbanu et al., 2024). Scientific documentation of TOGA practices is therefore necessary to prevent the loss of local knowledge over time.

Among the various groups of medicinal plants, the *Zingiberaceae* family holds a prominent position in traditional medicine. This family includes ginger, turmeric, Javanese turmeric, aromatic ginger, and galangal, all of which are widely recognized by the community in daily life. The rhizomes of *Zingiberaceae* plants contain active compounds such as gingerol, shogaol, and curcuminoids (Mao et al., 2019; Rahmat et al., 2021). These compounds confer anti-inflammatory and antioxidant activities that support their use as medicine (Sharifi-Rad et al., 2017; Tian et al., 2025). Communities across various regions of Indonesia utilize this family to maintain stamina and to address digestive disorders (Silalahi et al., 2021; Zumaidar et al., 2024). Its dual value as both medicine and spice has enabled *Zingiberaceae* to remain integral to community life to this day.

Ethnobotany is an approach that examines the relationship between communities and the plants they utilize. This approach investigates plant species, processing methods, and the cultural meanings attached to their use. Through ethnobotany, researchers can explain the reasons a given species is selected, processed, and maintained within a local knowledge system that evolves over time. Ethnobotanical analysis also combines qualitative and quantitative data to assess the level of importance of a plant (Faruque et al., 2018). Quantitative parameters such as FC, RFC, and UV help researchers measure the popularity, consensus of knowledge, and intensity of utilization of each species in a measurable manner. In this way, ethnobotany also supports efforts to conserve traditional knowledge within communities.

Traditional knowledge of medicinal plants faces the threat of extinction amid changing community lifestyles. Younger generations tend to be less familiar with the types and benefits of medicinal plants used by their parents (Vandebroek & Balick, 2012). Modernization, urbanization, and easier access to synthetic medicines have further accelerated the decline in herbal plant use in many rural and urban areas alike. The loss of this knowledge also entails the loss of potential medicinal resources that have not yet been fully studied. Ethnobotanical documentation provides a written record that can be passed down and re-examined scientifically. Such efforts are essential for bridging local knowledge with evidence-based drug development while strengthening community health resilience.

Kandang Duren Seribu Village in West Java is a suitable location for examining the utilization of *Zingiberaceae*. communities in this area continue to use herbal plants as part of daily healthcare practices, both for prevention and for treating minor ailments. The presence of the Taman Herbal Insani in this village strengthens conservation and educational activities related to medicinal plants. This herbal garden functions as a learning center that preserves and disseminates knowledge of medicinal plants. These conditions provide a rich and representative context for documenting local knowledge of the *Zingiberaceae* at the village level. This study also complements the still-limited ethnobotanical data on *Zingiberaceae* for the West Java region (Nahdi et al., 2016).

Research on *Zingiberaceae* in West Java remains scarcer than in Sumatra and Aceh (Pristihayati et al., 2026). This data gap calls for more detailed and systematic documentation at the village level so that local knowledge is not overlooked. This study seeks to address this gap through a measurable, quantitative ethnobotanical approach. The first objective of this study was to identify the species of *Zingiberaceae* utilized by the local community in daily life. The second objective was to analyze the patterns of utilization, processing methods, and plant parts most frequently used by the community. The third objective was to assess the level of importance of each species based on the FC, RFC, and UV parameters

## 2. Materials and Methods

### 2.1. Data Collection

This study was conducted in Kandang Duren Seribu Village, West Java, Indonesia. This area is characterized by a settlement pattern in which house yards are used for the cultivation of TOGA (family medicinal plants). The local community continues to utilize herbal plants as part of daily traditional medicinal practices. The presence of the Taman Herbal Insani in this area further supports the conservation and introduction of medicinal plants, particularly those of the *Zingiberaceae* family. This location was selected based on the ongoing cultivation and utilization activities of herbal plants within the community.

Data were collected through semi-structured interviews and field observations. The interviews employed a flexible question guide to allow informants to elaborate on their knowledge in greater detail. Informants were selected from the 17–60 year age group to obtain a more comprehensive picture of traditional knowledge. This study involved 20 respondents, comprising 15 general informants and 5 key informants. The main criterion for informant selection was individuals with experience in the cultivation and utilization of plants of the *Zingiberaceae* family.

## 2.2. Plant Identification

Plant identification was carried out through direct observation of the morphological characteristics found in the field. Scientific names were determined from the *Zingiberaceae* family collection at Taman Herbal Insani Depok.

## 3. Results

Data collection results show that there are ten species of plants of the *Zingiberaceae* family frequently used by the community of Kandang Duren Seribu Village as traditional medicinal ingredients. These plants are utilized to address complaints such as digestive disorders, cough, inflammation, female reproductive system disorders, reduced stamina, and diminished appetite. The rhizome is the plant part most frequently utilized, as it is easy to process and available throughout the year. The plant species, the parts utilized, and their uses are summarized below (Table 1).

**Table 1.** Zingiberaceae species utilized in Kandang Duren Seribu Village

| Local Name        | Scientific Name                               | Part Used | Use                     |
|-------------------|-----------------------------------------------|-----------|-------------------------|
| Ginger            | <i>Zingiber officinale</i>                    | Rhizome   | Anti-inflammatory       |
| Turmeric          | <i>Curcuma longa</i>                          | Rhizome   | Antioxidant             |
| Javanese turmeric | <i>Curcuma xanthorrhiza</i>                   | Rhizome   | Appetite stimulant      |
| Aromatic ginger   | <i>Kaempferia galanga</i>                     | Rhizome   | Cough remedy            |
| Galangal          | <i>Alpinia galanga</i>                        | Rhizome   | Stomachache remedy      |
| Red ginger        | <i>Zingiber officinale</i> var. <i>rubrum</i> | Rhizome   | Immune booster          |
| White turmeric    | <i>Curcuma zedoaria</i>                       | Rhizome   | Stomachache remedy      |
| Cardamom          | <i>Amomum compactum</i>                       | Fruit     | Cold/flu symptom remedy |
| Zerumbet ginger   | <i>Zingiber zerumbet</i>                      | Rhizome   | Diarrhea remedy         |
| Temu giring       | <i>Curcuma heyneana</i>                       | Rhizome   | Menstrual regulator     |

The quantitative analysis in this study employed three main parameters, namely FC, RFC, and UV. FC indicates the number of informants who mentioned a species in the interviews. RFC describes the popularity of a plant based on the number of informants who mentioned it, whereas UV describes the level of importance of a plant based on the number of use reports. The results of the calculation of these 3 parameters are presented (Table 2). These values help identify the level of popularity and intensity of utilization of each species recorded at the Kandang Duren Seribu Village in West Java.

**Table 2.** Quantitative analysis (FC, RFC, UV) of medicinal plants in Kandang Duren Seribu Village

| No | Local Name        | Scientific Name                               | FC | RFC  | UV   |
|----|-------------------|-----------------------------------------------|----|------|------|
| 1  | Ginger            | <i>Zingiber officinale</i>                    | 19 | 0.95 | 0.95 |
| 2  | Turmeric          | <i>Curcuma longa</i>                          | 18 | 0.90 | 0.90 |
| 3  | Javanese turmeric | <i>Curcuma xanthorrhiza</i>                   | 18 | 0.90 | 0.90 |
| 4  | Aromatic ginger   | <i>Kaempferia galanga</i>                     | 15 | 0.75 | 0.75 |
| 5  | Galangal          | <i>Alpinia galanga</i>                        | 14 | 0.70 | 0.70 |
| 6  | Red ginger        | <i>Zingiber officinale</i> var. <i>rubrum</i> | 14 | 0.70 | 0.70 |
| 7  | White turmeric    | <i>Curcuma zedoaria</i>                       | 13 | 0.65 | 0.65 |
| 8  | Cardamom          | <i>Amomum compactum</i>                       | 12 | 0.60 | 0.60 |
| 9  | Zerumbet ginger   | <i>Zingiber zerumbet</i>                      | 10 | 0.50 | 0.50 |
| 10 | Temu giring       | <i>Curcuma heyneana</i>                       | 9  | 0.45 | 0.45 |

4. Discussion

All *Zingiberaceae* species found in Kandang Duren Seribu Village are utilized by the community as medicinal plants, with the rhizome being the most widely used part. Nine of the ten recorded species utilize the rhizome, while only cardamom (*Amomum compactum*) uses the fruit (Table 1). This pattern indicates that the community places great trust in the rhizome as the primary source of medicinal efficacy. The dominance of the rhizome is consistent with the findings of Pristihayati et al. (2026) on Sabang Island, Aceh, who reported the rhizome as the most frequently utilized part in 12 of 16 *Zingiberaceae* species. Silalahi et al. (2021) likewise confirmed that the rhizome is the main organ utilized in the traditional medicinal use of *Zingiberaceae* in Indonesia. This similarity in patterns across different locations reflects a uniformity of local knowledge in selecting the plant part considered most efficacious.

The data (Table 2) show that ginger obtained the highest FC value of 19, with RFC and UV values of 0.95. This figure indicates that nearly all informants mentioned and used ginger in their daily medicinal practices. Turmeric and Javanese turmeric followed with RFC and UV values of 0.90, placing both among the most widely recognized plants. These high values reflect a strong consensus among informants regarding the importance of these three species. Similar results were reported by Pristihayati et al. (2026), who recorded *Curcuma longa* with a UV of 0.95 and *Zingiber officinale* with a UV of 0.93 as the culturally most important species. The similarity of these results across two geographically distant locations reinforces the view that ginger, turmeric, and Javanese turmeric form the backbone of *Zingiberaceae*-based medicine in Indonesia (Nahdi et al., 2016).

The high FC values recorded for ginger, turmeric, and Javanese turmeric carry a meaning that extends beyond mere popularity. A citation frequency approaching the total number of informants indicates that knowledge of these three species is collective and well established within the community. In ethnobotanical studies, a high level of consensus is often regarded as an indicator of knowledge reliability as well as a signal of genuine efficacy (Faruque et al., 2018). A similar pattern is observed among Javanese communities elsewhere, as reported by Torimbanu et al. (2024) around Mount Merapi National Park, where *Zingiberaceae* holds an important position in traditional medicine. This consistency indicates that the West Java community shares a core body of knowledge with other Javanese communities despite differing cultural landscapes. (Nahdi et al., 2016).

The *Zingiberaceae* family occupies a distinctive position, as it serves simultaneously as food, spice, and medicine. The boundary between culinary and medicinal use among Indonesian communities is often

unclear, such that many species are consumed as part of the daily diet while also maintaining health. Ginger, turmeric, and Javanese turmeric are frequently processed into jamu (herbal tonic) drinks believed by the community to enhance immunity (Rahmat et al., 2021). Pristihayati et al. (2026) similarly classified Zingiberaceae into 4 categories of use: vegetable, beverage, medicine, and spice, underscoring its multifunctional nature. This interconnection between food and medicine is one of the factors sustaining the strong and continued utilization of Zingiberaceae within the community. This also explains the consistently high importance values recorded for the principal species across multiple studies.

The calculations in this study show that the UV values are identical to the RFC values for each species. This occurs because each species was recorded with a single primary use (Table 1), such that the number of use-reports equals the citation frequency. The group of moderately valued species includes aromatic ginger with an RFC of 0.75, followed by galangal and red ginger, each with a value of 0.70. White turmeric and cardamom occupy the next tier, with RFC values of 0.65 and 0.60, respectively. The recorded uses (Table 1) such as cough remedy, stomachache remedy, and immune enhancement, support the continued high intensity of use of these species. Aromatic ginger is widely known across Indonesia as a remedy for coughs and as a body refreshing tonic (Silalahi et al., 2021). Red ginger has received growing attention as the community utilizes it as an immunomodulator in jamu preparations, particularly to maintain immunity (Zumaidar et al., 2024). The diverse range of functions within this group underscores that variation in benefits influences the intensity of a plant's utilization within the community. The distribution of RFC values in this study forms a gradually decreasing gradient from 0.95 to 0.45. This gradient pattern reflects a core, periphery knowledge structure, in which a small number of principal species are recognized by nearly all informants while a number of peripheral species are known only to a subset of individuals. Such structures are commonly found in traditional knowledge systems and reflect a process of cultural selection favoring the most beneficial plants (Faruque et al., 2018). Core species tend to remain stable owing to continued use and transmission, whereas peripheral species are more dynamic and context-dependent. Understanding this distribution pattern is important for setting priorities in knowledge conservation efforts. Peripheral species warrant greater attention given their vulnerability to the loss of collective memory.

Zerumbet ginger and temu giring recorded the lowest RFC values, at 0.50 and 0.45, respectively, indicating that not all informants were familiar with or used these species. Nevertheless, both species retain specific uses, zerumbet ginger as a remedy for diarrhea and temu giring as a menstrual regulator. This difference in citation frequency can be explained through the concept of cultural consensus, which holds that traditional knowledge is not always evenly distributed among community members. Knowledge of more specific species is typically held by only a subset of informants, particularly those who serve as key knowledge holders (Vandebroek & Balick, 2012). A low RFC value therefore does not necessarily indicate lesser importance but rather reflects a more limited scope of use. Species with such a narrow scope of use are, in fact, more vulnerable to disappearing from collective memory and thus require particular attention in documentation and conservation efforts. Knowledge of temu giring as a menstrual regulator, for instance, is generally held by adult women who play a role in family healthcare. This gendered and generational distribution of knowledge indicates that knowledge erosion may occur selectively within particular groups. Should the process of knowledge transmission be interrupted, information on lower-value species risks disappearing more rapidly than that of the widely recognized principal species.

Several species in this study are utilized for women's reproductive health needs, such as temu giring as a menstrual regulator. This category of use was likewise identified in the study by Pristihayati et al. (2026), who recorded reproductive health as one of the disease categories treated with *Zingiberaceae*. This utilization indicates that medicinal plants address not only common complaints but also more specific health needs. Knowledge of this use is generally passed down within the family and tends to be held by particular groups within the community. The relatively low RFC value for species with specialized functions reflects a narrower scope of knowledge rather than lower efficacy. These findings underscore the need for an approach sensitive to the social dimensions of documenting ethnobotanical knowledge.

The processing method for medicinal plants in this study was predominantly boiling of the rhizome, followed by oral consumption. Boiling was favored for being simple, inexpensive, and effective in dissolving water soluble active compounds. Similar processing patterns have been found in studies conducted across

various regions of Indonesia, where boiling is the most common method for preparing Zingiberaceae (Zahara et al., 2018). The consistency of this method indicates that the community possesses a practical processing technique that is easily transmitted across generations. The choice of the oral route is also consistent with the medicinal purposes concerned, most of which relate to digestive disorders and stamina enhancement. The simplicity of this processing technique is one of the factors sustaining the continued use of medicinal plants at the household level.

This study recorded 10 Zingiberaceae species utilized by the community as medicine, with *Zingiber officinale* identified as the species with the highest RFC and UV values, at 0.95. This value is nearly identical to the findings of Pristihayati et al. (2026), who recorded *Curcuma longa* at 0.95 and *Zingiber officinale* at 0.93. Turmeric and Javanese turmeric in this study likewise obtained high values of 0.90, reinforcing the position of the genus *Curcuma* as a principal plant group. Silalahi et al. (2021) and Zahara et al. (2018) are consistent with these findings, as both highlight the dominance of the genera *Curcuma* and *Zingiber*. This consistency in importance values across studies reflects a shared core of knowledge regarding the most efficacious species. This similarity indicates a common body of knowledge held by Indonesian communities regarding the utilization of the Zingiberaceae family. Differences instead emerge among moderately and lowly valued species, which depend on local availability and local cultural preferences (Torimbanu et al., 2024).

The presence of the Taman Herbal Insani in Kandang Duren Seribu Village plays an important role in preserving both the knowledge and the plant resources related to medicinal plants. This garden functions as a means of in situ conservation as well as an educational center for the community and younger generations. Educational activities at the herbal garden can help slow the erosion of traditional knowledge occurring as a result of modernization. Scientific documentation such as that conducted in this study complements these efforts by providing a record that can be re-verified. Integrating local knowledge with scientific validation opens opportunities for broader utilization without severing its cultural roots. This herbal garden model can be replicated in other regions as a community-based conservation strategy that simultaneously raises health awareness. The involvement of younger generations in managing the garden is key to ensuring that knowledge transmission does not stop at a single generation. The herbal garden thus serves a dual role as a space for biodiversity conservation and as a means of public health education.

## 5. Conclusions

This study identified the species, forms of utilization, and level of importance of plants of the Zingiberaceae family in community health practices in Kandang Duren Seribu Village. The results show that the community remains actively engaged in utilizing Zingiberaceae plants as traditional medicine. A total of ten species were identified as being in use, with the rhizome as the most dominantly utilized part. This pattern reflects a consistency in local knowledge regarding the plant part considered most efficacious. Quantitative analysis using FC, RFC, and UV revealed differences in the level of popularity and intensity of use among species. Ginger obtained the highest values, with RFC and UV of 0.95, followed by turmeric and Javanese turmeric at 0.90. These data indicate a strong consensus among informants regarding the importance of these three plants in traditional medicine. Moderately valued plants such as aromatic ginger, galangal, and red ginger continue to play a role in addressing common complaints such as cough, stomachache, and reduced immunity. Meanwhile, zerumbet ginger and temu giring recorded lower values, yet the community continues to maintain their use for specific needs such as diarrhea and menstrual regulation. These findings underscore the importance of documenting and preserving traditional knowledge of Zingiberaceae, particularly through the role of the Taman Herbal Insani as a center for conservation and education.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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