

# Ethnobotanical study of Temurui (*Bergera koenigii*) in Peusangan, Aceh

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**Abstract.** Indonesia is one of the most biodiverse countries in the world, with a rich variety of plant species present. *Bergera koenigii* is a plant with significant ethnobotanical potential. *Bergera koenigii* in Peusangan, Bireuen Regency, Aceh Province, is known as temurui. This study aimed to identify the use of temurui in the daily lives of the Peusangan community. The Peusangan people traditionally use temurui as a culinary ingredient, food flavoring, traditional medicine, and room fragrance. This study was conducted in the Peusangan sub-district of the Bireuen Regency in the Aceh Province. The method used in this research is exploration and observation using the Participatory Rural Appraisal (PRA) technique, which is an assessment oriented towards the process of involvement and participation of the community in the research. Respondents were selected by purposive sampling, and the sample size was 55. The results showed that the local community uses temurui for culinary ingredients (3,63%), food flavoring (100%), traditional medicine (9,09%), and room fragrance (3,63%). The leaf is the plant part most commonly utilized by the community. These findings highlight the cultural importance and practical versatility of temurui (*Bergera koenigii*) in daily life, supporting its role in ethnobotanical conservation.

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## 1 Introduction

Indonesia is one of the most biodiverse countries in the world, with a rich variety of plant species and a highly diverse ethnic population. This diversity fosters a deep connection between local communities and plant life. Ethnobotany is the study of the relationship between humans and plants [1]. It integrates the fields of ethnology and botany, focusing on human interaction with plants for medicinal, nutritional, and cultural purposes. Ethnobotanical studies encompass local knowledge passed down through generations, forming the basis for cultural development and scientific understanding [2]. Indonesia's diverse ethnic groups contribute to a wealth of traditional knowledge regarding plant use.

Traditional plant use remains an essential aspect of daily life in the Peusangan subdistrict of Bireuen Regency, Aceh. One plant with significant ethnobotanical potential is *Bergera koenigii*, locally known as temurui. *Bergera koenigii* is a plant of the Rutaceae family and is also referred to as salam koja or curry leaf. In the local Acehese language, it is known as temurui [3]. Temurui is abundant throughout the Peusangan subdistrict, often growing spontaneously in home gardens, backyards, plantations, vacant land, and even as wild shrubs. The leaves have long been used as culinary spices.

Local communities widely use *temurui* as a key seasoning in traditional Acehese cuisine. It is considered an essential ingredient that imparts a distinctive aroma to dishes [4] such as tumeh eungkot, masam keu'eung, keumamah, gule plik, kari kambing, and sambal ikan/kareng. Beyond its culinary uses, oen *temurui* is also used for medicinal purposes. Previous studies have shown that it contains active phytochemical compounds with antioxidant, antimicrobial, and cytotoxic properties against cancer cells [5]. Additionally, from a processing and economic standpoint, research conducted in Nusa village, Lhoknga subdistrict, revealed that processing temurui leaves into chips can generate significant economic value [3]. These findings highlight the importance of further research on the utilization and traditional knowledge of this plant.

The Peusangan subdistrict in Aceh is rich in culture and traditional knowledge. However, little systematic research has been conducted to document the Peusangan community's knowledge of the daily use of temurui in the Peusangan watershed. The community's knowledge of the use of temurui as a cooking ingredient and medicine is still very limited and has not been documented yet.

Ethnobotanical studies are important for preserving traditional knowledge and as a basis for developing value-added products in the future. The benefits and uses of temurui have only been orally passed down from families and neighbors. Important information about the efficacy and use of temurui plants based on local community knowledge is feared to slowly disappear, causing the loss of knowledge possessed by the community amid current cultural developments. Therefore, it is necessary to conduct ethnobotanical research on temurui (*Bergera koenigii*) in Peusangan, Aceh. This study aimed to explore the traditional knowledge and practices surrounding temurui as a food ingredient and medicinal plant, with the potential to support phytopharmaceutical and economic applications.

## 2 Materials and methods

Data collection was conducted from February to April 2025 in three villages: (1) Kappa, (2) Blang Panjoe, and (3) Pante Lhong located in Peusangan Subdistrict, Bireuen regency, Aceh Province. Tools and materials used: stationery, books, cameras for documentation and questionnaires. This study used an exploratory survey with a semi-structured interview technique. The sample in this study consisted of informants and respondents. The informants included the village heads. Respondents were selected by purposive sampling, consisting of 55 people. Respondents were selected based on the following criteria: (1)

residing in the research area, (2) directly involved in utilizing temurui, and (3) willing to provide information openly. Direct interviews were conducted for data collection. The collected data included the benefits of temurui, how it is processed and used, and the types of diseases it can cure.

Data were analyzed descriptively. The fidelity level is the percentage of informants who mentioned the use of certain types of plants to treat specific diseases. Fidelity level was measured to determine the specific purpose of using certain parts of plants using the formula suggested by Cheikhyyoussef *et al.* 2011 [6].

$$FL (\%) = \left( \frac{n}{N} \right) \times 100$$

Where:

*FL*: Fidelity level

*n* : Number of respondents for a particular use

*N* : Total number of respondents

### 3 Results

Respondents who provided information about the use of temurui (*Bergera koenigii*) totalled 55, consisting of 18 respondents from Kappa, 16 from Blang Panjoe, and 21 from Pante Lhong. The characteristics of the respondents are presented in Table 1.

**Table 1.** Characteristics of gender, age, education, and occupation of respondents

Variable	Category	Number of respondents	Percentase (%)
Gender	Female	36	65.45
	Male	19	34.54
Age	15 – 30 years (Young)	20	36.36
	31 – 60 years (Adult)	23	41.81
	61 years > (Old)	12	21.81
Education level	Elementary (1 – 6)	8	14.54
	Secondary (7 – 9)	16	29.09
	Tertiary (10 – 12)	20	36.36
	University	10	18.18
Occupation	Farmer	10	18.18
	Teacher	7	12.72
	Student	8	14.54
	Housewife	11	20.00
	Merchant	5	9.09
	Employees	6	10.90
	Others	8	14.54

The results of the interviews show that the use of temurui was more widely known by women than by men. Respondents in the adult category provided much information on temurui. Respondents with a senior high school education level had higher knowledge of temurui than those with junior high school and elementary school levels. Respondents who were housewives had higher knowledge than those with other occupations.

The Peusangan people use temurui (*Bergera koenigii*) in their daily lives for culinary ingredients (3.63%), food flavoring (100%), traditional medicine 9.09% and room fragrance (3.63%). The methods of processing and types of diseases treated are shown in Table 2.

Table 2 shows that the respondents knew that temurui was used as a food flavoring. Food flavoring is an additive used to impart a particular taste or aroma to foods. The respondents' knowledge of the use of temurui as a culinary ingredient was the same as its use as a room fragrance, which was 3.63%. Culinary ingredients are used in cooking to prepare food. Respondents' knowledge of temurui as a traditional medicine was 9.09%

lower than its use as a food flavoring. The Peusangan community uses temurui leaves in several processing methods, including frying (3.63%), cooking (100%, boiled 5,45%, blended 1.81%, and mixing with other ingredients (5.45%). The processing method of temurui for food flavoring by cooking is the highest at 100%. The method of processing temurui by blending is at least 1.81%.

**Table 2.** Respondents' knowledge (in percentage) on the use and processing method of temurui (*Bergera koenigii*)

Use	Number of respondent	Fidelity level (%)	Processing method	Number of responden	Fidelity level (%)
Culinary ingredients			Fried	2	3.63
Chips	2	3.63			
Food flavouring (Culinary name/ local name)	55	100	Cooked	55	100
Kuah plik	15	27.27	Cooked	15	27.27
Gule plik	30	54.55	Cooked	30	54.55
Masam keueng	2	3.63	Cooked	2	3.63
Crah/tumeh	52	94.54	Cooked	52	94.54
Sie kambing	20	36.36	Cooked	20	36.36
Sie masak mirah	37	67.27	Cooked	37	67.27
Manok masak mirah	49	89.09	Cooked	49	89.09
Kuah itek	32	58.18	Cooked	32	58.18
Tumeh udeung	27	49.09	Cooked	27	49.09
traditional medicine	5	9.09			
Type of disease					
Anemia	1	1.81	blended	1	1.81
Digestive	1	1.81	boiled	1	1.81
Cholesterol	2	3.63	boiled	2	3.63
Hair loss	1	1.81	mixed with other ingredients	1	1.81
Room fragrance	2	3.63	mixed with other ingredients	2	3.63

## 4 Discussion

*Bergera koenigii* has dark brown stems and root bark, at the margin of leaflets with oil glands, smaller petals (4–7 mm long), red or purplish-black globular to ellipsoid fruits, and membranous and glabrous testa [7]. The species is a shrub or small tree, and the leaves are pinnate, with individual leaflets having wavy margins and emitting a distinctive aroma [8]. The Peusangan community only utilizes the leaf organ of the temurui plant; the other parts are not used.

Respondents' knowledge of the use of temurui as a food flavoring was the highest. The Pusangan people mostly use temurui as a food flavoring or aroma additive. In daily life, most of the dishes processed by the community use temurui leaves to add aroma and flavour to dishes such as kuah plik, gule plik, masam keueng, crah/ tumeh, sie kameng, sie masak mirah, manok masak mirah, kuah itek, and others. They are usually added to dishes to give a distinctive aroma, so that the dish will taste better and more delicious. Curry leaves contain volatile essential oils that impart a distinctive aroma to food [4]. Curry leaves are safe to consume either raw or processed and are often used in various types of food [9].

Peusangan people's knowledge about the benefits of temurui leaves as traditional medicine was second highest at 9.00%, with 5 respondents. They use temurui to treat a range of conditions, including anemia, digestive disorders, cholesterol, and hair loss. Plants have traditionally been a major part of maintaining health and curing diseases. Various medicines that exist in the modern era are derived from the concept of herbal medicine, which contains important substances for treatment [10]. Lack of hemoglobin (HB) is often referred to as anemia, which can be caused by several factors, including iron, vitamin B12, or folate deficiency and chronic bleeding that interferes with red blood cell production. Curry leaves are rich in iron and folic acid, which help overcome anemia [11].

Respondents used temurui leaves to treat hair loss. Temurui can be used to prevent hair problems, such as gray hair, dandruff, and hair loss. This is in accordance with the results of a previous study [12]. Temurui is also used as a natural remedy to reduce cholesterol levels and overcome indigestion. The bioactive compounds in these leaves, such as flavonoids, polyphenols, and various antioxidants, have been shown to have positive effects in lowering bad cholesterol (LDL) levels and increasing good cholesterol (HDL). The compounds in temurui can help stimulate digestive enzymes, relieve indigestion, such as constipation and bloating, and protect the stomach. Raw curry leaves are used to treat nausea, vomiting, and stomach pain [13].

In addition to their medicinal uses, temurui leaves are prized for their aromatic qualities. The Peusangan people also use temurui as a room fragrance. The leaves emit a distinctive and refreshing scent that can be used as a natural air freshener to neutralize odors and foster a calming atmosphere. Empirical studies suggest that its aroma may contribute to stress reduction through olfactory stimulation.

These findings underscore the multifunctional nature of *Bergera koenigii* leaves in the daily lives of the Peusangan people, especially as a bridge between traditional knowledge and practical health maintenance, which deserves attention in ethnobotanical documentation and future potential.

The processing method of temurui is mostly done by cooking or putting it directly into cooking ingredients or by stir-frying 100%, creating aroma and taste when consumed. The method of processing temurui by mixing it with other ingredients was 5.45% for room fragrances and hair fertilizers. The processing of temurui leaves involves picking and drying them in the room, then mixing them with kaffir lime, cinnamon, yellow cempaka flowers, and dried pandanus leaves, and placing the mixture in a container in the room. To nourish the hair, temurui leaves are washed, mixed with coconut or olive oil, and smeared evenly onto the hair and scalp.

The processing method of temurui by boiling is used for medicinal use, the processing is temurui leaves are washed clean then boiled, the boiled water is drunk, the community uses temurui by blended is 1,82% to be used as medicine, the temurui leaves are washed clean then blended by adding water, then filtered, the filtered water is drunk to be used as medicine, while the use of temurui as food is by fried them into chips is 3,63%, the temurui are washed clean, added with rice flour, salt and several other ingredients then fried.

Traditional knowledge about the benefits and harmful effects of plant-based foods is passed down from generation to generation. Their food and customs have been developed based on experience and survival over generations [14]. People's knowledge of the use and processing method of temurui is obtained from generations, family, neighbors, and the surrounding environment. Some people gained knowledge about the use of temurui from television and the internet (social media). Community knowledge serves as a form of cultural heritage and can contribute to conserving such resources. Local knowledge is strongly influenced by the availability of biological resources and the environmental carrying capacity [15].

## 5 Conclusion

People in the Peusangan sub-district use *Bergera koenigii* as a culinary ingredient, food flavoring, medicine, and room fragrance. They use curry leaves with several processing methods, including as a food ingredient by cooking/frying, food flavoring by adding directly in the dish, boiled, blended, and mixed with other ingredients. The community's knowledge of the use and processing of curry leaves was obtained from generations, family, neighbors, and the environment. Some people gained knowledge about the use of curry from television and the internet (social media).

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