



(MUDIMA)



## Identification of Natural Dye Plants for Sasak Woven Fabrics at the Fetung Bayan Weaving Studio in Bayan District, North Lombok

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### ABSTRACT

Natural dyes have long been used by Indonesians in traditional textile production because they are considered environmentally friendly, safe, and produce distinctive colors that are difficult to obtain with synthetic dyes. However, with the development of the modern textile industry, the use of natural dyes has begun to decline. Lombok, as a region with a strong weaving tradition, especially among the Sasak community at the Fetung Bayan Weaving Studio, still maintains the practice of natural dyeing that has been passed down from generation to generation. This study aims to identify the types of natural dye plants used and analyze the parts of the plants and the colors they produce. The research method used was qualitative descriptive method through field observation and interviews with weavers at Sanggar Fetung Bayan. Primary data was obtained from interviews and documentation, while secondary data was obtained from relevant literature sources. Plant specimens were collected, made into herbariums, and then identified based on morphological characteristics. The results showed that there were four types of plants used as natural dyes, namely tarum (*Indigofera spicata*), which produces a dark green color from its leaves; turmeric (*Curcuma longa*), which produces a yellow color from its rhizomes; lontar (*Lannea coromandelica*), which produces a pink to dark red color from its bark; and teak (*Tectona grandis*), which produces pink color from its leaf tips. Knowledge about natural dyes, which has been passed down from generation to generation without formal training, reflects the strength of local wisdom in preserving the Sasak weaving culture

## INTRODUCTION

Natural dyes have long been known and used by Indonesians to color various products such as textiles, food, cosmetics, and handicrafts. Natural dyes are in demand because they produce unique colors with high aesthetic value that cannot be obtained from synthetic dyes. These natural dyes can be obtained from various parts of plants such as roots, wood, leaves, seeds, and flowers, and have been widely used in traditional dyeing processes such as batik and woven fabrics in various regions in Indonesia (Widagdo, 2017; Ariyanti, 2022).

Although it has high artistic and cultural value, the natural dyeing process takes a long time because it is highly dependent on the availability of natural materials, environmental conditions, and the season. The extraction process can be carried out using hot or cold methods, and for some types of materials, fermentation is carried out to produce optimal color pigments (Widagdo, 2017). However, with the emergence of synthetic dyes that are easier to obtain, cheaper, and offer a wide variety of colors, the use of natural dyes has declined (Agustina & Amir, 2012). The use of synthetic dyes is known to have a negative impact on human health and the environment because they are toxic and difficult to break down naturally. Increased awareness of environmental issues has encouraged efforts to reuse natural dyes as an environmentally friendly alternative. Waste from the synthetic dye-based textile industry is known to be one of the main sources of water pollution (De Mejia et al., 2020). Therefore, the exploration and development of natural dye sources from renewable biological materials are very important to support a sustainable textile industry and reduce dependence on imported chemicals (Neves et al., 2019).

Various studies show that natural dyes can be derived not only from leaves and flowers, but also from other parts of plants such as bark, sap, and seeds. For example, teak leaves (*Tectona grandis*) are known to contain tannin compounds that can produce natural red colors (Sukemi et al., 2020), while jackfruit sap (*Artocarpus heterophyllus*) produces stable yellow pigments (Kumar et al., 2018).

Indonesia, with its abundant biodiversity, has great potential as a source of sustainable natural dyes (Bahri et al., 2018). However, research on the types of natural dye plants on the island of Lombok is still limited. Therefore, this study aims to identify the types of plants used as natural dyes in traditional Sasak woven fabrics at the Fetung Bayan Weaving Studio, North Lombok Regency. The results of this study are expected to contribute to efforts to preserve local ecological knowledge and the cultural wisdom of the Sasak people in the practice of natural dyeing of traditional woven fabrics.

## METHODS

This research was conducted in July–August 2025 at the Fetung Bayan Weaving Studio, Bayan District, North Lombok Regency, West Nusa Tenggara Province. This weaving studio is where the Bayan villagers' weaving group weaves Sasak fabrics. The tools and materials used in this study were stationery, scissors, cameras, laptops, smartphones, natural dye plants, and members of the Fetung Bayan weaving studio. A qualitative descriptive method was used. The qualitative approach here refers to data expressed in the form of words, sentences or expressions, narratives, and images. (Rusandi & Rusli, 2021). This research is descriptive in nature, explaining and describing the plants used as natural dyes in Sasak woven fabrics and how natural dye plants are extracted into woven threads.

### Data collection

#### 1. Observation

Observation is a method of gathering information that not only assesses respondents' attitudes through interviews and questionnaires, but can also be used to record various ongoing phenomena, such as situations and conditions. This method is applied when research aims to understand human behavior, work processes, and natural phenomena, and is conducted with a limited number of respondents (Kristiyanti, 2023). In this study, the researcher conducted direct observation of weavers in Sanggat Fetung Bayan.

## 1. Interview

An interview is a conversation between two people to exchange ideas and information through questions and answers, so that meaning can be constructed on a particular topic (Fiantika, 2022). In this study, the researcher compiled questions in a questionnaire to obtain information related to plants used as natural dyes in the manufacture of woven fabrics at the Fetung Bayan Studio.

## 2. Study Literature

This research is a qualitative research with a literature study approach (library research), which is research carried out by studying, reviewing, and analyzing various literature sources that are relevant to the topic being studied. Literature studies aim to collect secondary data from various literature sources such as books, scientific journals, articles, research reports, and other official documents. (Sugilar *et al*, 2019)

### **Sample Determination**

#### 1. Determination of the research location

Teknik penentuan lokasi penelitian adalah *Purposive sampling* adalah teknik penentuan sampel dengan pertimbangan tertentu (Saleh, 2017). Penentuan lokasi pada penelitian ini menggunakan *Purposive sampling* dengan memilih kecamatan Bayan, Lombok Utara karena kecamatan ini memiliki kelompok pengrajin tenun yang berada di sanggar tenun Fetung Bayan Kabupaten Lombok Utara

#### 2. Sample determination

In this study, purposive sampling was used to determine the members of the Fetung Bayan weaving studio who would be interviewed using key informants, namely the head of the Fetung Bayan weaving studio and members who understand the natural dyes used in Sasak woven fabrics. Key informants are individuals who play an important role and possess the main information needed in the study, namely those who have a deep understanding of the issues that are the focus of the study. They are usually found in government agencies and community leaders (Fitrianita *et al.*, 2018).

### **Data Analysis**

Data reduction is the process of selecting and focusing, simplifying, abstracting, and transforming raw data from field notes, an ongoing process. Data reduction includes data summarization, coding, theme exploration, and grouping. Data presentation is the process of organizing a collection of information to enable conclusions and actions to be drawn. Qualitative data presentation can take the form of narrative text, data tables, graphs, networks, or diagrams. The process of drawing conclusions or verifying data is carried out continuously by researchers throughout the field. From the beginning of data collection, researchers begin to look for meaning in objects, note patterns of regularity (in theoretical notes), provide explanations, consider various possible configurations, and note cause-and-effect relationships and suggestions.

### **RESULTS AND DISCUSSION**

#### **Location Overview**

The Fetung Bayan Weaving Studio is located on Jalan Raya Karang Bajo, Karang Bajo Village, Bayan District, North Lombok Regency, West Nusa Tenggara (NTB). Geographically, the studio is located in front of the Bayan Ancient Mosque, which is one of *the important historical landmarks* for the local community. Its strategic location right in front of the mosque gives a deep impression, connecting Islamic culture and local culture in Karang Bajo Village. The Bayan Ancient Mosque, which is hundreds of years old, is a silent witness to the historical journey of the Bayan people, while the Fetung Bayan Weaving Studio presents arts and crafts that are also deeply rooted in the local traditions of the community.

In terms of the main job, the members of the group have varied backgrounds. Most of them work as farmers or planters as many as 6 people, which shows that weaving activities are a side business that is carried out in their spare time or outside the planting season. In addition, there are members who work as housewives, self-employed, freelance day laborers, and private employees. In fact, there are also students or students who join as an effort to learn and preserve culture from an early age. This diversity

of backgrounds shows that weaving activities are able to reach various groups and become an alternative to a flexible household economy with high cultural value.

Based on interviews with artisans at the Fetung Bayan Weaving Studio, it was found that

natural dyes are used. This indicates that traditional knowledge of natural dyeing is still well preserved. This knowledge has been passed down from previous generations, demonstrating a strong cultural continuity among the people of Bayan Village.

#### Varieties of Natural Dye Plants

Table 1. Plant Organs Used and the Resulting Color

No	local	Name Common	ilmiah	Family	Organs used	Colors produced
1	Tarum	Tarum	<i>Indigofera tinctoria</i>	<i>Fabaceae</i>	Daun	Dark green
2	Kunyit	Kunyit	<i>Curcuma longa</i>	<i>Zingiberaceae</i>	Rimpang	yellow
3	Banten Round	São Paulo	<i>Lannea coromandelica</i>	<i>Anacardiaceae</i>	Tree trunk bark	Pink to dark red
4	Jati	Jati	<i>Tectona grandis</i>	<i>Lamiaceae</i>	Leaf shoots	Pink

Source: Primary Data

Based on the data in the table above, body organs such as rhizomes, leaves, and tree bark are plant organs that are used as natural dyes. It is said that the weaving of fetung bayan still preserves the 4 natural dye plants above as the basic material for dyeing sasak woven fabrics. Tarum leaves are used by people to grow in gardens or yards. Tarum (*Indigofera tinctoria*) is a shrub or terna with a height of up to one meter, green and dense leaves. The genus *Indigofera* includes shrubs, small shrubs and terna (which are then woody at the base of the stem), varying in height from 1-3 m, growing from 0-1650 masl.

Turmeric (*Curcuma longa*) is used as a natural dye for woven fabrics. Turmeric produces a yellow color due to its main pigment curcuminoid (Husain, H., *et al.* 2020). This plant has physical characteristics in the form of pseudo-stemmed terna with yellow rhizomes. Weaving craftsmen take turmeric rhizomes from gardens or yards.

*Lannea coromandelica*, known locally as banten or bantenan, grows as a hardwood tree and is often planted as a living hedge. In traditional weaving practices, the bark of the stem is extracted and used as a natural dyes. The process begins with

separating the skin from the wood, then boiling or pounding to obtain a reddish-brown to maroon pigment extract (Rahayu *et al.*, 2021). The weaving yarn is dipped in the extract solution until it reaches the desired color intensity. Dyeing using Banten's natural pigments provides a distinctive aesthetic value and contains the content of local wisdom in textile products (Paramudita *et al.*, 2017)

*Tectona grandis*, known as the teak tree, has leaves rich in anthocyanin **pigments**, which are capable of producing a natural red color. In traditional coloring practices, the leaves are collected, dried, and then pounded manually until they form a fine powder. The yarn or fabric is then dipped in the solution and then squeezed and squeezed until it reaches the desired color intensity. Dyeing with teak leaves not only provides distinctive aesthetic value but also highlights aspects of sustainability and local wisdom in textile products (Kurniawidi *et al.*, 2024)

#### Plant Classification

The following is a classification and description of the types of plants used in the natural dyeing process of sasak woven fabrics at the Fetung Bayan weaving studio

Table 2. Plant Classification

no	Local name	Common name	klasifikasi						
			kingdom	Divided	Class	Ordo	family	Genus	Species
1	tarum	Nila	plantae	Magnoliophyta	Magnoliopsida	Fabales	fabaceae	Indigofera	<i>I.tinctoria</i> Linnaeus
2	kunyit	kunyit	plantae	Magnoliophyta	Liliopsida	zingiberales	Zingiberaceae	turmeric	<i>C.longa</i> linnaeus
3	Banten Round	São Paulo	plantae	Magnoliophyta	Magnoliopsida	Sapindales	Anarcardiaceae	Lannea	<i>L.coromandelica</i> (houtt).merr
4	jati	jati	plantae	Magnoliophyta	Magnoliopsida	Llamas	Lamiaceae	Tectona	<i>T.grandis</i> linneus filius

*Indigofera tinctoria* (tarum) is an upright shrub (shrub), which can be annual, biennial, or perennial, reaching an average height of 1 to 2 meters, with a woody stem at the base and covered with fine hairs (indumentum). The leaves are arranged alternately, oddly pinnate compounds, consisting of 5 to 11 ovate-shaped to *obovate* to obovate. The flowers are arranged in bunches in the leaf armpits, with a distinctive butterfly-shaped crown (*papilionaceous*) and pink to purple-violet in color. The fruit is a slender legume pod, narrowly cylindrical, straight or slightly curved at the tip, brown when ripe, and contains small, dense cylindrical seeds. This part of the leaf is mainly used as a source of natural blue pigment, namely indigotin.

Turmeric (*C. longa*) is an annual herbaceous plant that grows upright with a height of 60–100 cm. The roots are in the form of fibers that form elongated rounded rhizomes with yellowish-brown skin and bright orange flesh. The stem is pseudo-stalked, formed from tight, upright, round, and soft leaf fronds. The leaves are single, fronded, elongated oval-shaped, the tips and bases tapered, the edges flat, with pinnate leaf bones. The flowers are compound in the form of grains, tightly arranged, hairy and scaly, with white to yellowish crowns. The rhizome is widely used as a spice, traditional medicine, and natural dye (Dalmatia *et al.*, 2017).

*Banten (L. coromandelica)*, which is known by its local name **Babak**, is a medium to large tree with a height of 20-30 meters and is rounded wide. The roots are strong and branched, so they are able to penetrate dry and rocky soils. The stem is erect, cylindrical with a diameter of 40–80 cm, brownish-

gray skin, somewhat rough, and easily peeling; This stem also contains clear to yellowish-white sap. The leaves are oddly pinnate compound (*imparipinnatus*), arranged alternately, consisting of 3–5 pairs of oval-shaped leaflets, with pointed tips, rounded bases, flat edges, and glossy green surfaces. The flowers are arranged in terminal or axillary panicles, small in size, yellowish-green, unisexual, and fine-haired. The fruit is a small drupa with a diameter of about 8–10 mm, green when young and turns bright red when ripe, thin-fleshed with a single seed in it

*Teak (T. grandis)* is a large, long-lived tree with a height of 30–40 meters and a trunk diameter of up to 1 meter or more. The stature is in the form of an upright tree with cylindrical trunks, straight, grayish-brown to dark brown bark, rough, and easily peel off in small fragments. The taproots are large and strong with wide side roots. The leaves are large, single, face-to-face, elliptical to broadly oval, the base rounded, the tip tapered, the upper surface is dark green, while the underside is whitish. The flowers are compound panicle-shaped, small, yellowish-white, and multi-sexed. The fruit is small round 1.5–2.5 cm in diameter, light green in color and becomes yellowish-brown when ripe, containing a single hard seed. Teak wood is known to be very strong, termite-resistant, distinctively scented, and widely used for building materials and furniture.

### Color Extraction Process

The dyeing process on Sasak woven fabric at the Fetung Bayan Weaving Studio, Bayan District, North Lombok Regency, West Nusa Tenggara, utilizes various parts of plants according to the type

of color to be produced. For green dye, fresh tarum leaves are used that are ground until smooth, then given a little salt so that the resulting green color can adhere well to the weaving thread. Meanwhile, to obtain a yellow color, fresh turmeric rhizomes are used which are ground until smooth, then a little water and salt are added. The addition of salt functions as a natural fixator so that the resulting yellow color is more durable. As for producing red, banten/bantenan round bark is used which is boiled for several hours to produce colored juice. After the stew is complete, the thread is dipped repeatedly in the decoction solution until the desired intensity of red color is obtained.

#### A. The process of dyeing yarn green

Tools and materials:

1. Fresh tarum leaves
2. Salt
3. Woven yarn

Extraction process:

1. Pound the tarum leaves until smooth using a traditional pestle that is 50 cm high and 20 cm in diameter.
2. Mix the crushed leaves with salt, then pound again so that the salt is evenly distributed.
3. Transfer the pounded leaves to an empty bucket for the dyeing process.
4. Place the yarn in the bucket containing the pounded tarum leaves, squeeze and press the yarn in the bucket to produce a green color on the yarn.
5. Remove the yarn and dry it in a shaded area with good air circulation so that the color lasts longer and does not fade due to direct sunlight.

#### B. The process of dyeing yarn yellow

Tools and materials:

1. Fresh turmeric
2. Salt
3. Water
4. Weaving yarn

Extraction process:

1. The turmeric is ground until smooth using a traditional mortar and pestle measuring 50 cm high and 20 cm in diameter.

2. Mix the ground turmeric with salt, then pound again to mix the salt evenly.
3. Pound the turmeric again and transfer the pounded turmeric to an empty bucket to carry out the dyeing process.
4. Put the yarn in the bucket containing the pounded turmeric. Knead and squeeze the yarn in the bucket, then add a little water to produce a yellow color on the yarn.
5. The thread is removed and dried in a shaded area with good air circulation to ensure the color lasts longer and does not fade due to direct sunlight.

#### C. The process of dyeing yarn from pink to dark red.

Tools and materials:

1. Banten tree bark
2. Water
3. Woven yarn

Extraction process:

1. Banten tree bark is selected from trees that are old enough to contain more concentrated red pigments.
2. The bark is cleaned of dirt and cut into small pieces for easy extraction.
3. The pieces of bark are then boiled in a large container of clean water for several hours ( $\pm 3-4$  hours) until the solution turns into a dark red concentrate.
4. After boiling, the solution is filtered to separate the bark residue from the dye.
5. The yarn to be dyed is repeatedly dipped into the bark solution. The dipping process can be done 2-8 times or more, until the desired red color (light to dark) is achieved.
6. After the dipping process is complete, the thread is removed and dried in a shaded area with good air circulation so that the color is more durable and does not fade due to direct sunlight.

#### D. The process of dyeing yarn pink

Tools and materials:

1. Teak leaves
2. Salt
3. Woven yarn

Extraction process:

1. Collect teak leaves
2. Pound the teak leaves until smooth using a mortar or traditional pestle to extract the color pigment.
3. The crushed leaves are then mixed with a little water to form a paste or natural dye solution.
4. The yarn to be dyed is placed in the teak leaf solution and soaked for a while. This process can be repeated several times to produce a stronger reddish-brown color.
5. The threads are removed, gently squeezed, then dried in a shaded area to ensure the color is more durable and does not fade easily.

The yarn dyeing process at the Fetung Bayan Weaving studio, North Lombok, highlights the strength of local wisdom in natural dyeing practices. Without formal training from external parties, weavers rely on knowledge that has been passed down from generation to generation, from the selection of raw materials, processing, to application techniques. This approach directly reflects cultural values that value the sustainability of tradition and the preservation of identity through the use of natural dye materials. This is in line with research conducted by Darma & Priyadi (2015) in Sukarara Village, Central Lombok, which identified at least eight types of dye plants used in the weaving crafts of the Sasak tribe. The study confirms that knowledge about plant dyes such as leaf parts, stem bark, and seeds is preserved thanks to local practices passed down from generation to generation.

In addition to the technical aspect, the inheritance of weaving skills also plays a crucial role in the sustainability of traditions. A study of the inheritance system in Pringgasela Village, East Lombok, shows that the transfer of weaving knowledge, including dyeing techniques, generally

occurs informally. This pattern usually runs through central figures in the family, such as mothers, grandmothers, or aunts, to the younger generation. This pattern of informal inheritance serves as the main medium to ensure the continuity of local knowledge (Fahmi *et al*, 2025). This integrated learning process in everyday life reinforces cultural identity and symbols, while ensuring that these valuable skills are not lost, going beyond the need for formal education.

The similarities in the use of natural dyes are not only limited to the Lombok area. In-depth research on Amarasi ikat weaving in Kupang, for example, found that plants such as turmeric rhizome (*Curcuma longa*), tarum leaves (*Indigofera tinctoria*), noni root bark (*Morinda citrifolia*), and young teak leaves (*Tectona grandis*) are also used as sources of dye. The processing process is similar, namely through traditional methods such as clumping, soaking, and boiling to produce specific colors such as red, blue, purple, and yellow (Nitti *et al.*, 2022). This pattern indicates the similarities between botanicals and natural dyeing techniques commonly found in various weaving traditions throughout the archipelago, including in Lombok, reflecting Indonesia's rich cultural heritage

#### CONCLUSION

Based on the results of the research on the identification of dye plants in the Sasak Cafe in the Fetung Bayan District, Bayan District, North Lombok, it can be drawn:

1. Plants used as natural dyes for woven fabrics are obtained 4 types in the Fetung Bayan weaving fencing namely: tarum (*I. spicata*), turmeric (*C. longa*), babak banten or banten (*L. Coromandelica*) and Teak (*T. grandis*). The parts of plants that are used as natural colors are leaves, bark and rhizomes.
2. Extraction process on natural dye plants, tarum leaves (*I. Spicata*), Turmeric (*C. longa*) and Teak (*tectona grandis*). It is mashed until smooth then given a little salt, the thread is put in a container and then squeezed and squeezed. For banten (*L. coromandelica*) the bark is boiled until the boiled

water produces a red color, then the thread is dipped in boiling water repeatedly to produce the desired color.

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