



# Natural or Synthetic Coloring; Voices of Micro Entrepreneurs of Batik Tulis Lasem Rembang

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**Abstract.** The art of *Batik Tulis* was designated by UNESCO in 2009 as an intangible culture of human heritage. One of the famous *Batik Tulis* in the North Island of Java is Batik Tulis Lasem. Batik Tulis Lasem is one of the leading products in Rembang Regency. Batik Tulis Lasem is a local artwork that reflects the acculturation of the people in Lasem, where Batik Tulis Lasem is influenced by Chinese and Javanese culture. The development of Batik Tulis Lasem is increasing, both in terms of motifs and the use of coloring techniques. The objectives of this study are; 1) to find out the coloring process of Batik Tulis Lasem; and 2) to find out the perceptions and experiences of Batik Tulis Lasem micro-entrepreneurs about the coloring of natural and synthetic materials in the industrial world. The research method used is descriptive qualitative. The instruments used were interviews observations, and questionnaires. The results showed that; 1) the process of coloring batik tulis lasem consists of two techniques, namely synthesis and natural wood waste; the stages of coloring Batik Tulis Lasem using synthetic materials begin with the mordanting process, the designing and *nyanting* process, the coloring process, the *nglorodh* process, and the drying process. While the stages of natural coloring using mahogany wood waste are as many 6 stages, starting from the mordanting process, the process of extracting natural substances, the dyeing process, the *nglorodh* process, and finally the drying process; 2) the perception of micro-entrepreneurs about batik coloring is; a) batik coloring using synthetics is faster, practical, does not fade easily, cheap, but pollutes the environment; b) batik coloring using natural materials the process takes a long time, the price of the product becomes very expensive but environmentally friendly. Their perception prefers the use of natural dyes with a percentage of 58.1%.

**Keywords:** Batik Tulis Lasem, Synthetic, and Natural Coloring Techniques, Indonesian Cultural Heritage.

## 1 Introduction

A well-known example of Indonesian cultural heritage is batik. Traditional batik cloth is created manually using a wax-resist dyeing method. Batik is a traditional and highly

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regarded form of textile art in Indonesia. It is a technique of decorating cloth using wax and dye, resulting in intricate and colorful patterns. Batik holds deep cultural and historical significance in Indonesia, and it is considered a national treasure[1]. The batik fabric industry is seen by consumers as a very desirable product. Batik fabric is no longer only useful for clothing; it can also be used to create aesthetically beautiful and highly functional products, which gives the community a new way of life and promotes appreciation for and use of locally produced goods. Modernization and innovation have the potential to raise the batik industry's economic added value [2].

One of the best regional products in the Rembang district of Central Java is the Lasem written batik. It is said that batik makers from all over the world find it extremely difficult to replicate the unique pattern found in Lasem's handmade batik, which features the red color of chicken blood. The motifs on Lasem's hand-written batik are also what makes it unique; they combine elements of Chinese culture, the indigenous way of life on Central Java's north coast, and the customs of the Solo and Yogyakarta palaces[3]. The characteristic of Lasem batik is the red color that resembles the color of blood. The distinctive red color of Lasem batik is called *abang getih pithik* (chicken blood red). The color *abang getih pithik* is produced from natural dyes, namely from the color of the roots of the *mengkudu* (pace) tree [4].

Indonesia's growing demand for batik prompted a flurry of factory and domestic batik production. Synthetic dye is one of the most recent technological innovations in the batik industry. The majority of the batik artisans in Java, according to reports from the batik industry, prefer to utilize synthetic dyes. Because synthetic dyes are more cost-effective, artisans choose to employ them to create batik. Synthetic dyes can be used to produce batiks in huge quantities quickly and affordably. Producing batik fabric using synthetic dyes has a comparatively cheap cost. The low cost of batik made with synthetic dye, in the opinion of artisans, will stimulate demand for batik clothing [5]. Nevertheless, synthetic dyes have negative environmental effects because they contain heavy metal contaminants, prolonged usage of synthetic dyes will affect environmental degradation and human health [6]. The intangible cultural heritage of Indonesia, batik, boosts the nation's economy but also pollutes the environment. Natural dyes are thought to be more environmentally friendly than synthetic ones, and it is advised to substitute them since synthetic dyes are thought to contribute to pollution [7, 8].

One of the districts that focuses on the Batik Tulis industry is Lasem with its branding, Batik Tulis Lasem. Based on the results of preliminary observations with micro Batik entrepreneurs there, namely Mr. AF, several small and medium entrepreneurs use synthetic dyeing and natural dyeing. This article will focus on examining the coloring process of Lasem batik using synthetic and natural materials. In addition, this article will also examine the perceptions of batik business actors about the two coloring techniques.

## 2 Research Methods

This paper used qualitative research. It is a research method that focuses on exploring and understanding the complexities of human behavior, experiences, and social phenomena. It is primarily used in the social sciences, but it can be applied in various fields where a deep understanding of context and meaning is needed [9]. This research tries to describe in detail the coloring process used in Batik Tulis Lasem. This study will also reveal the perceptions, experiences, and knowledge of batik business actors about synthetic coloring techniques and using natural materials.

Data collection in this study used interviews, observation, and questionnaires. Interviews were used to find out the coloring process of lasem batik tulis. Observation is used to obtain data on how the coloring process of Lasem batik using synthetic and natural materials is carried out by small and medium enterprises in Lasem. Questionnaires were used to find out the perceptions of business actors about the two batik coloring techniques. This questionnaire focuses on 4 indicators of Batik coloring, namely coloring materials, coloring techniques, waste, and effectiveness. This questionnaire uses a Likert scale of 1-5 with statements, strongly disagree, disagree, neutral, agree, and strongly agree. A Likert scale is a type of psychometric measure where respondents can select from a variety of categories to express their opinions, attitudes, or feelings regarding a specific topic [10]. Sampling in this study used a purposive sampling technique. Respondents to conducting interview were two Batik business owners, namely Real Asto Batik and Safila Batik, and 2 employees who work in this business. The number of respondents for filled out the questionnaire was 13 employees. The selection of respondents in this study was on the advice of the Head of the UMKM Department of Rembang Regency. The two batik entrepreneurs who have used two dyeing techniques, namely synthetic and natural materials.

## 3 Finding and Discussion

To obtain data on the process and stages of batik coloring using synthetic and natural materials, the research team conducted interviews and observations with two micro-entrepreneurs named Mr. AF and Mrs. SF. The results are summarized as follows;

### 3.1 Synthetic and Natural Coloring of Batik Tulis Lasem

**Stage one is a mordanting process.** This stage begins with soaking the mori cloth with warm water and mixing it with Turkish Red Oil (TRO) and also starch. The soaking time is about 15 minutes, then dried in the sun and aerated so that it is not too wet. This mordanting process aims to remove the oil in the mori fabric and open the fabric fibers to make it easier for the coloring and motif process. Based on Ahmad (2018), the mordanting process is a fixation that serves to strengthen the color and change the natural dye according to the type of metal that binds it and locks the dye that has entered the fiber [11].

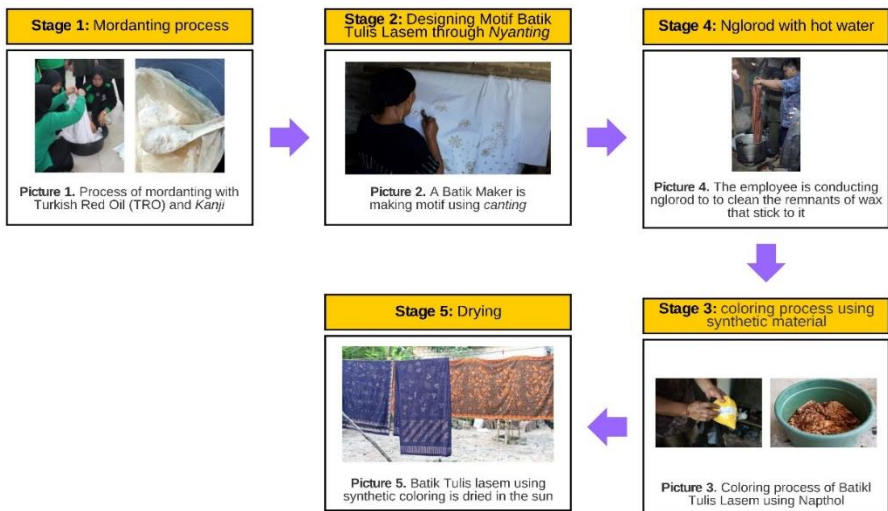
**Stage two is designing motifs and nyanting.** After the mori cloth is dried in the sun, the batik maker then creates the Lasem Batik Tulis design using canting. Canting is a tool to create isen-isen or motifs on the cloth using wax heated through a small electric stove. Based on the observations that have been made, some of the motifs owned by Lasem Batik entrepreneurs are designed first, but some motifs are directly made using canting by batik makers without any patterns first. Batik is a cloth painted using canting and liquid wax to form paintings of high artistic value on mori cloth. Batik refers to an intricate dot-painting technique [12].

**Stage three is coloring using synthetic material.** Coloring is done using naphthol powder with a dipping technique. The typical color of Batik Tulis Lasem is bright and strong so that the dyeing done by the batik can be done many times depending on the need.

**Stage four is nglorodh.** After the coloring process, so that the color is locked perfectly, the nglorodh process is carried out to remove the remnants of wax that are still attached. This activity is carried out using hot water so that the remaining wax can be lifted to the maximum. In this process, it is recommended to boil water in a state of boiling and add  $\pm 10$  grams of soda powder to 1 liter of water to maximize the loss of wax from the fabric [13].

**Stage five is drying.** After the coloring is complete, the colored Batik Tulis Lasem is dried in the sun and then the finished product.

The following is a stage chart of Lasem hand-dyed batik using synthetic dyes:



**Fig. 1.** Stages of Batik coloring process using synthetic material

Next is the process of coloring Batik Tulis Lasem using natural coloring. There are some processes;

**Stage one is the mordanting process.** This process is similar to the synthesis coloring technique. It is done by preparing TRO and Kanji and warm water for soaking the more cloth. This process gives a charge of metal salts to the white cloth to clean fat, oil, and starch on a cotton cloth so that when the cloth is coated with natural dyes it will not fade easily and not easily fade. This is following what Lestari said that this mordanting process is a fixation that serves to strengthen the color and change the natural dye according to the type of metal that binds it and locks the dye that has entered the fiber. that has entered the fiber [14]. The mordanting process is used in a natural process. Mordanting is typically done to boost how well coloring agents interact with textiles [15].

**Stage two is an extraction process.** This process aims to obtain natural colors from natural materials which in this case is mahogany skin waste. The results of observations made by the research team, there are several stages in the extraction process; 1) cutting/cutting wood waste into small and dry parts (previous drying process is carried out); 2) Dipping the material into a pot of water in the amount of 10 liters / 1 kg; 3) Boiling the material with a temperature of 100 degrees Celsius and until the volume of water becomes 4-5 liters; 4) Filtering the natural substance liquid from the dregs after cooling. It is similar to Alamsyah said that the natural coloring implemented in batik products in Jepara was made of mahogany, teak, papaya leaves, teak leaves, tegeran (*Cudrania Javanensis*), sapodilla leaves, mango leaves, indigo, etc [16–19].

**Stage three is the batik process.** The next process is batik. They, the batik makers in Lasem, make isen-isen on the fabric that has been designed as well as the blank one by using canting filled with wax with the help of an electric stove. In addition, based on the observations that have been made, batik makers also create motifs using the splatter technique, namely by using a canting tool and then freely and irregularly applying wax to the mori cloth by splashing.

**Stage four is coloring using natural material.** This process is the process of dyeing mori cloth that has been dried in the sun with natural colors from mahogany wood waste. The batik makers use three additional ingredients in the dyeing process. First, the natural color is mixed with alum and produces a light color. Second, the natural color is mixed with lime and produces a deeper and brighter color. The third is the result of natural color mixed with arbor to produce a deep color. Alum or tunjung are examples of metal salts that can be used for fixation. Depending on the kind of metal salt used to bind them, metal salts can alter the direction of natural colors in addition to strengthening connections. Alum had a concentration of 70 g/liter and Tunjung had a concentration of 20 g/liter for metal salts according to the fixation method [20].

Previous research also stated that the type of solution commonly used for fixation is a solution of clean lime water (already precipitated lime), arbor, and alum[21].

The batik makers make Batik Lasem using natural colors with the results of these three colors. Here are the results:



Fig. 2. Coloring results using natural materials

**Stage five is nglorodh.** After the coloring process and fixation of the desired color, then proceed with the *nglorod* process, which is the boiling of the colored fabric to remove the wax that is still attached to the fabric. This process uses hot water that continues to burn while cleaning the fabric. As stated by Yulianti (2022) that to facilitate the process of nglorod, an auxiliary drug is added to the hot water, namely waterglass or soda ash. waterglass or soda ash[22].

**Stage six is drying.** The final process is drying. Fabrics that have been dyed with natural mahogany wood waste and have been color-fixed are then dried in the sun.

The following is a diagram of the stages of coloring Lasem batik with mahogany wood waste:

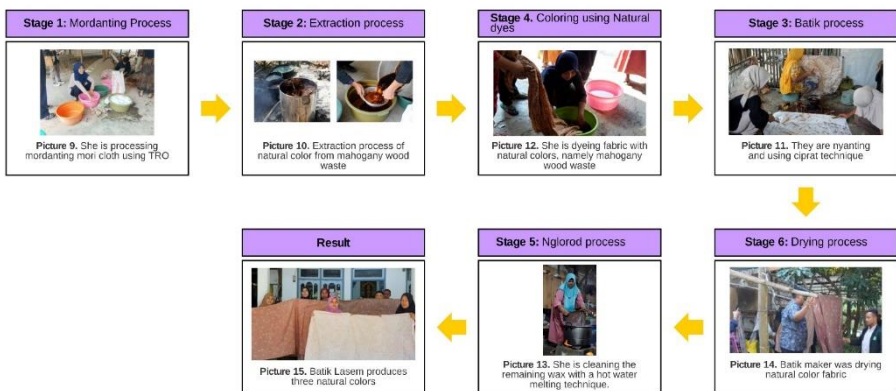


Fig. 3. Stages of Batik coloring process using natural material

From these two coloring techniques, it can be concluded that there are different stages between coloring using synthetic materials and natural materials. The main differences are in the extraction techniques of natural materials and the color categorization of natural and synthetic materials.

Next is the perception of micro-entrepreneurs of Batik Tulis Lasem about the coloring of Batik Tulis Lasem both with synthetic materials and with natural materials. Respondents totaled 13 people, including owners and employees. The following are the results

### 3.2 Artisan Perceptions of Coloring Using Both Synthetic and Natural Materials.

The results of Lasem batik makers' perceptions of dyeing using synthetic and natural materials are classified according to the indicators, namely 1) availability of dye materials; 2) dyeing results; 3) waste process and; 4) effective and efficient. Here are the results:

**Table 1.** Availability of Materials

No.	Item	Real Score	Ideal Score	Item Score Percentage	Category
1.	Synthetic dyes are easier to find in stores or markets	52	70	74%	Medium
2.	Natural dyes can be found in the surrounding environment and can be grown by ourselves.	53	70	76%	High
<b>Total</b>		105	140		
<b>Average</b>		<b>75%</b>			<b>Medium</b>

Based on the table above, it showed that the research indicator of the availability of materials on the variable perception of batik makers about Batik Tulis Lasem coloring techniques using synthetic materials and natural materials is in the medium category or equivalent to a value of 75% by looking at the 2 closed statement items used in the study. As for the explanation, the two closed statement items submitted to respondents are in the medium and high categories respectively with a percentage value of 74% and 76%.

**Table 2.** Coloring Result

No.	Item	Real Score	Ideal Score	Item Score Percentage	Category
1.	Synthetic Dye yield is brighter	54	70	77%	High
2.	Results Synthetic dyes are more diverse.	57	70	81%	High
3.	Results Synthetic dyes have a wider color range	57	70	81%	High
4.	Results Natural dyes tend to be soft	61	70	87%	Very High
5.	Results Natural dyes tend to match	58	70	83%	High

No.	Item	Real Score	Ideal Score	Item Score Percentage	Category
6.	Results in Natural dyes such as pastel colors	62	70	89%	Very High
<b>Total</b>		349	420		
<b>Average</b>		<b>83%</b>			<b>High</b>

Based on the table above, it shows that the research indicators of the coloring results on the variable perception of batik makers about the coloring techniques of Batik Tulis Lasem using synthetic and natural materials are in the high category (83%) by looking at the 6 closed statement items used in the study. Furthermore, related to the range of percentage values on the 6 closed statement items submitted to respondents is 77% - 89%.

**Table 3.** Waste Process

No.	Item	Real Score	Ideal Score	Item Score Percentage	Category
1.	Synthetic dye waste can cause environmental pollution	61	70	87%	Very High
2.	Synthetic dye waste is a hazardous material	61	70	87%	Very High
3.	Natural dyes are a non-toxic, renewable alternative to colorants.	54	70	77%	High
4.	Natural dye waste is easily degradable and environmentally friendly	56	70	80%	High
5.	Natural dye waste is biodegradable and non-polluting	59	70	84%	High
<b>Total</b>		<b>291</b>	<b>350</b>		
<b>Average</b>		<b>83%</b>			<b>High</b>

Based on the table above, it shows that the research indicators of the waste process on the variable of batik makers' perceptions of Lasem Batik Tulis coloring techniques using synthetic and natural materials are in the high category (83%) by looking at the 5 closed statement items used in the study. The percentage of the minimum and maximum values respectively from the five closed statement items submitted to respondents is 77% and 87%. Processing of synthetic dyes can also pollute water and air if not regulated properly. Energy conservation, which involves reducing raw materials and energy consumption to ensure the sustainability of raw materials and energy supply for future generations, is the fundamental problem in the green industry. To become a green industry, a business must focus on three things: reducing energy use, improving energy efficiency, and minimizing toxic waste generated during production[23]

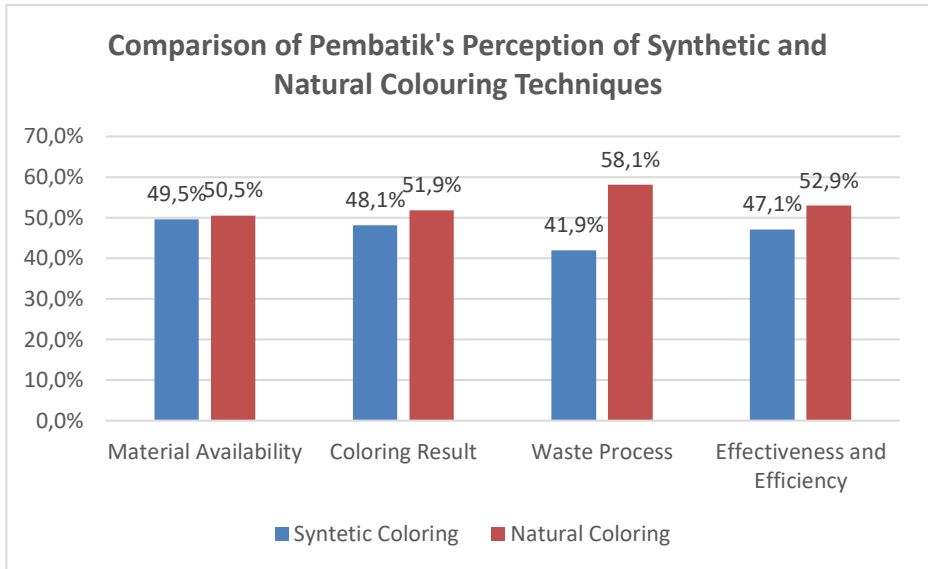


**Table 4.** Effectiveness and Efficiency

No.	Item	Real Score	Ideal Score	Item Score Percentage	Category
1.	The price of synthetic dye fabrics is more economical	52	70	74%	Medium
2.	Fabrics using natural dyes are higher in value	59	70	84%	High
3.	The batik coloring process with synthetics is more effective	53	70	76%	High
4.	The natural batik coloring process tends to take longer	58	70	83%	High
5.	Tools and materials used for synthetic dye batik are more plentiful	56	70	80%	High
6.	Tools and materials used for natural dye batik are more plentiful	64	70	91%	Very High
<b>Total</b>		<b>342</b>	<b>420</b>		
<b>Average</b>		<b>81%</b>			<b>High</b>

Based on the table above, it shows that the research indicators of effectiveness and efficiency in the variable perception of batik makers about the Lasem Batik Tulis coloring technique using synthetic and natural materials are in the high category (81%) by looking at the 6 closed statement items used in the study. Furthermore, related to the percentage range of values of the 6 closed statement items submitted by researchers to respondents is 74% - 91%. Previous research findings indicate that the expediency and practicality of using synthetic dyes for batik cloth coloring is the rationale behind this choice. Furthermore, coloring batik with synthetic dyes is less expensive and less likely to fade. It is also more durable and less prone to fading [24].

From the data presentation of the four indicators above, it can be concluded that the comparative tendency of the small and medium entrepreneurs of Batik Tulis Lasem between the use of synthetic and natural colors is more inclined to natural colors with the highest percentage of 58.1%. Here is the diagram:



**Fig. 4.** The results of the comparison of the perceptions of small business owners of Batik Tulis Lasem between synthetic dyes and natural dyes

## 4 Conclusion

Batik Tulis Lasem is one of the leading fashion products that has been recognized by UNESCO. Small and medium entrepreneurs of Batik Tulis Lasem are also increasingly developing their productivity and innovation in the use of Batik coloring. The results of this study are; 1) the stages of coloring Batik Tulis Lasem using synthetic materials begin with the mordanting process, the designing and nyanting process, the coloring process, the nglorodh process, and the drying process. While the stages of natural coloring using mahogany wood waste are as many 6 stages, starting from the mordanting process, the process of extracting natural substances, the dyeing process, the nglorodh process, and finally the drying process. 2) The results of batik makers' perceptions of both dyeing processes from four indicators, namely material availability, dyeing process, waste, effectiveness, and efficiency show the results of more than 50% of respondents are more likely to choose dyeing using natural materials. Finally, It is hoped that the batik industry can become one that, during its production process, makes efforts to utilize resources efficiently and effectively in a sustainable manner to be able to harmonize industrial development with the preservation of environmental functions by implementing green industry principles in response to the Minister of Industry Decree Number 39 Year 2019 concerning Green Industry Standards (GIS) for the batik industry.

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