



The utilization of local plants as natural dye Ciwaringin Batik, Cirebon, Indonesia

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Abstract

Ciwaringin batik is one of Cirebon batik that produced in Ciwaringin sub-district. Beside the interesting motif of Ciwaringin batik, the batik from Ciwaringin use natural dye from some local plants in that area. The using of natural dye from several plants is considered more environmentally friendly than use synthetic dye. The aims of this study is to investigate the kind of local plants that used as natural dye in Ciwaringin Batik including metabolite content and the color that resulted from each plants. The research was conducted at Ciwaringin, Cirebon from March until Desember 2019. The method that used in this experiment was a descriptive qualitative method. Data were collected through direct observation, in-depth interview, discussion with batik artisans, documentation, and study literature. The result showed that The using of natural dye in Ciwaringin batik, Cirebon has many advantages. Beside it increase the selling price, natural dye more environmentally friendly. Plants that are used for natural dye materials come from local plants that are easily found in Ciwaringin like mango, mangosteen, rambutan, and mahogany. In addition, there is no waste of natural dye materials because it can be reused.

Keywords: batik, natural dye, local plant, local culture

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INTRODUCTION

Batik is one of Indonesian cultural heritage. There are many kinds of Batik that found in Indonesia and the different or similarity batik motif based on the origin places. The similarity of batik motifs from one place to another is likely caused by the places is inspired or innovated from batik from other places (Situngkir, 2009). Nowadays batik become a formal and popular fashions in Indonesia. Therefore, batik industry has a strength that batik has a high art that cannot substitute by textile that produced by factory machine (Nurainun et al, 2008).

Cirebon is one of district in north east West Java that become one of central batik in Indonesia. Cirebon has a unique motif that is well known even to foreign countries such as "Mega Mendung" motif. However, there are many Cirebon batik motifs that is known widely by the public. Cirebon batik motifs was influenced by internal and external factors. The internal factors like an influence of acculturation of two cultures in Cirebon, keraton culture, and coastal community culture, while the external factor come from Arab, India, and China because Cirebon is port city (Tambrin, 2002). Ciwaringin batik is one of Cirebon batik that produced in Ciwaringin sub-district. Beside the interesting motif of Ciwaringin batik, the batik from Ciwaringin use natural dye from

some local plants in that area. The color that resulted from natural dye is more faded than synthetic dye so that it looks old (Putri et al, 2019).

The making of hand-written batik in Ciwaringin village, Cirebon, uses natural dyes derived from parts of color-producing plants (bark, leaves, and fruit skins). The natural dyes used as dyes for batik have been used from generation to generation by the Ciwaringin community until now, with traditional motifs in the form of flora which have symbolic meanings for each design. In the coloring process, the Ciwaringin batik craftsmen already know with certainty the color produced from each type of plant, the effect of the ingredients and the concentration of fixators such as alum, lime and tunjung, and the duration of the boiling process of natural ingredients which affects the color sharpness. There are several advantages of using this natural dye, that it is easy to obtain, because it comes from several local plants around the house, does not require a lot of money to get it, is environmentally friendly, is not toxic to the

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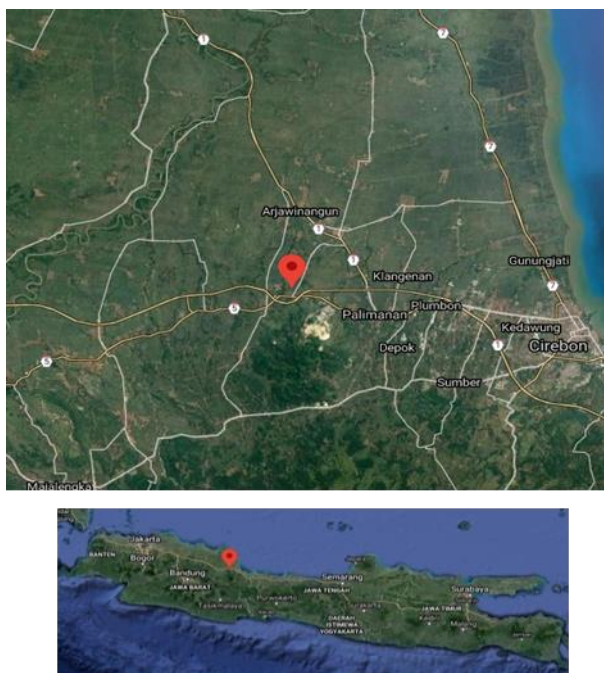


Fig. 1. Map of Research Location: Ciwaringin Village (Google Earth)

skin, so the use of natural dyes as batik dyes it is more environmentally friendly than synthetic dyes.

The research was conducted by (Fitriani, 2015) showed that green process innovation that using raw materials from nature and have a minimal impact on the environment can increase the product competitiveness. The negative effect of using synthetic dye for batik can caused water or soil pollution. For example, liquid waste from Batik Trusmi Cirebon that used synthetic dye decrease the quality water of Condong river (Supenah et al, 2015). This is what supports Ciwaringin written batik as an exclusive product that is in great demand.

The use of natural dyes has long been known before the discovery of synthetic dyes (Tresnawati, 2018) which are more commonly found in the market. Most of the batik industry in Java uses synthetic dyes to produce their batik (Fauziah et al, 2015). According to the results of research conducted (Nomleni et al, 2019) that the large number of synthetic dyes used has reduced the knowledge of the younger generation about the use of plants as natural dyes. In addition, people rarely use batik with natural dyes, due to information related to plant species Natural dyes and their use, as well as their advantages for environmental conservation are minimal and not yet documented. Thus, apart from being environmentally friendly, the use of several natural materials as batik dyes in Ciwaringin village is also easy to find in Cirebon, so the culture of the Ciwaringin community must be preserved as local wisdom. The purpose of this study was to determine the types of local plants used as natural dyes in Ciwaringin Batik, the plant parts that used for natural dyes, including secondary

metabolite content and the color produced from each plant, as well as the extraction process from local plants until they are ready to be used as natural dyes that produce color variations. So that this research is expected that the community, especially the younger generation, will know about the Ciwaringin batik culture which uses several local plants as natural dyes, which are environmentally friendly as well as an ancestral cultural heritage that we must preserve.

RESEARCH METHOD

Research Time and Location

This research was conducted from March to Desember 2019, in Ciwaringin village, Cirebon district, Jawa Barat Province, Indonesia. The area is 194,10 Ha. Geographical location 6°41'19.7" south latitude and 108°22'44.2" minute east longitude. North boundary : Galagamba – Gintung village, South: Cupang – Walahar village, West : Kedungbunder – Palimanan Barat, East : Babakan village. The research location can be seen on the following map (Fig. 1).

Work Procedures

The method used in this research is descriptive qualitative method. Data collection was carried out through direct observation, in-depth interviews, discussions with batik craftsmen, documentation and literature study. The procedures include:

1. Observation Stage

Conducting observations at the research location in Ciwaringin village to obtain general description information about the research location

2. Preparation Stage

The preparations made are preparing several questions on the interview sheet, observation sheet, and preparing other tools for use in research.

3. Implementation Stage

- a. Conducted interviews with several informants to obtain information about types of natural dye plants
- b. Respondents interviewed were Ciwaringin Written Batik craftsmen, Ciwaringin community leaders, and Ciwaringin Batik Cooperative Manager.
- c. Conducting direct observations about several types of plants used as natural dyes by the Ciwaringin community.
- d. Observe the technique of processing plant parts to produce the desired color
- e. Carrying out a literature study to determine the content of secondary metabolites contained in several local plants used by Ciwaringin batik craftsmen
- f. Conducting phytochemical tests in the laboratory to determine the content of secondary metabolites in several natural

materials used by the Ciwaringin community as natural batik dyes.

4. Data collection stage

This stage is carried out by recording all types of plants used as natural dyes in Ciwaringin village, technical procedures for processing plant parts into the resulting colors, and identifying the typical motifs of Batik Ciwaringin. Apart from taking notes, they also record through video and audio the results of these observations and interviews.

Data Analysis

The data obtained from the results of observations and interviews are the types of local plants that can be used as natural dyes, as well as the body parts used and processing techniques until they become the resulting colqors. Then analyzed and identified, that is phytochemical tests were carried out on some of these natural materials, to determine the content of secondary metabolites found in several types of these plants.

as the bark, stems / wood, and fruit skins. Processing some parts of this plant is done simply to produce color. The types of plants used as natural dyes, and the identification results of their secondary metabolite content through literature studies in this study can be seen in **Table 1**.

After conducting interviews and direct observations regarding some of the natural ingredients used, the next step is to identify the content of secondary metabolites in some of these local plants through phytochemical tests. The following are the results of the phytochemical analysis test conducted at the Chemical Laboratory of Semarang State University which can be seen in **Table 2**.

The results of this phytochemical test showed that several samples of natural dyes tested such as: mangosteen rind, rambutan rind, mango bark, mahogany stems, tegeran stems, and tingi stems contained secondary metabolites of the phenolic type which could be marked with a blue indicator on the phenolic test. Phenolic is one of the phytochemical groups found in nature, has physiological and morphological functions for plants, one of which affects plant pigmentation (Naczka, 2006). According to Yoshihara (2006), the main groups of polyphenols include flavonoids, phenolic acids, and tannins. There are 8000 types of polyphenols which are widely spread on the leaves, logs, seeds, and flowers (Heim 2002).

RESULT AND DISCUSSION

Local Plants as Natural Dyes

Based on the results of interviews from several respondents in Ciwaringin village, it is known that until now the community is still using local plants that function as natural dyes and still preserve the knowledge that comes from their ancestors. The plants used as natural dyes are obtained from several parts of the plant, such

Table 1. Name of Local Plants, Parts of Plants, Secondary Metabolite Content and Color produced





Local Plant Name / Scientific Name	Parts of plants that are used as natural dyes	The resulting color and content of secondary metabolites	Result of Color Test on Batik cloth
<i>Mangifera indica</i> / (Mango)	Tree bark 	<ul style="list-style-type: none"> • Yellow-light brown • Flavonoids and tannins (Prabhu, 2012) 	
<i>Nephelium lappaceum</i> (Rambutan)	Rind 	<ul style="list-style-type: none"> • Light brown (depending on the fixation used: alum and arbor) • Anthocyanins (Siahaan, 2014) 	

Table 1 (continued). Name of Local Plants, Parts of Plants, Secondary Metabolite Content and Color produced

Local Plant Name / Scientific Name	Parts of plants that are used as natural dyes	The resulting color and content of secondary metabolites	Result of Color Test on Batik cloth
<i>Garcinia mangostana</i> (Mangosteen)	<p style="text-align: center;">Rind</p> 	<ul style="list-style-type: none"> • Lightbrown (beige) • Anthocyanins (Chairat, 2007) 	
<i>Cudrania javanensis</i> (Tegeran)	<p style="text-align: center;">Stems wood</p> 	<ul style="list-style-type: none"> • Solid yellow • Flavonoids and tannins (Atika, 2017) 	
<i>Ceriops tagal</i> (Tingi)	<p style="text-align: center;">Tree bark</p> 	<ul style="list-style-type: none"> • Brown • Tannin (Handayani, 2013) 	
<i>Swietenia macrophylla</i> (Mahogany)	<p style="text-align: center;">Stems wood</p> 	<ul style="list-style-type: none"> • Brown • Flavonoid and Tannin (Hartini, 2014) 	

Table 2. Phytochemical Test Results of Several Natural Dyes

No	Sample	Alkaloid		Steroid	Terpenoid	Flavonoid	Phenolic	Saponin
		Mayer	Dragendorff					
1	SA Mangosteen skin	+	+	+ (Green)	-	-	+ (Blue)	+
2	SB Rambutan skin	-	+	-	+ (Red)	-	+ (Blue)	+++
3	SC Mango Stems	-	-	-	+ (Red)	+	+ (Blue)	-
4	SD Mahogany Stems	-	-	-	-	-	+ (Blue)	+
5	SE Tegeran Stems	-	+	-	+ (Red)	+++	+ (Blue)	-
6	SF Tingi Stems	-	+	-	-	-	+ (Blue)	+

**Fig. 2.** The Process of Extraction on Natural Dyes (source: private)

According to Tsao et al (2003) that flavonoids are grouped into anthocyanins, flavones, isoflavones, flavanones, and flavanols. So it can be proven that some of these natural ingredients contain secondary metabolite compounds such as tannins, anthocyanins, and flavonoids which are part of phenolics which can be used as natural dyes in batik fabrics.

The natural dyes used by the Ciwaringin batik craftsmen are produced through an extraction process. The extraction process is a process to produce color pigments with the fermentation part of the plant material soaked in water, then boil the material and filter it (Hidayat et al, 2014). This is following previous research (Sudarmin, 2020) that the craftsmen of "Batik Zie" in processing several natural ingredients as natural dyes use an extraction process by boiling them. The extraction process of several local plants as natural dyes, according to the results of interviews with several craftsmen, consists of several stages, such as (Fig. 2): (1) the drying process, some of these local natural

ingredients are dried in the sun for about three days; (2) the soaking process, after some of these natural ingredients are dried in the sun and then soaked in water for approximately 24 hours or one day, this step aims to maximize the dye released by these plants; (3) the boiling process, carried out for 8-10 hours or until the cooking water is reduced by half of the boiling amount; (4) the process of filtering the material, after being boiled, the material is filtered and ready to use.

The resulting color variations in the batik cloth depend on the type of fixation material, the concentration of the fixation and the modified mixture of one material with another during the coloring process on batik (Fig. 4). This fixation process aims to lock in natural dyes and strengthen the color, as well as provide variations in the resulting color (Sudarmin et al, 2019). According to Trismawati et al (2006), the higher concentration of the fixator used, the darker the resulting color. The results of the research by Anzani et al (2016) stated that the use of alum and lime fixators with high

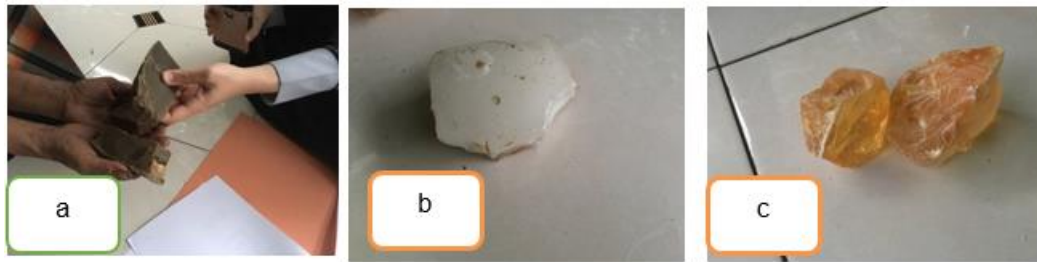


Fig. 3. Fixation Materials (a) Arbor, (b) Alum, (c) Lime (source: private)

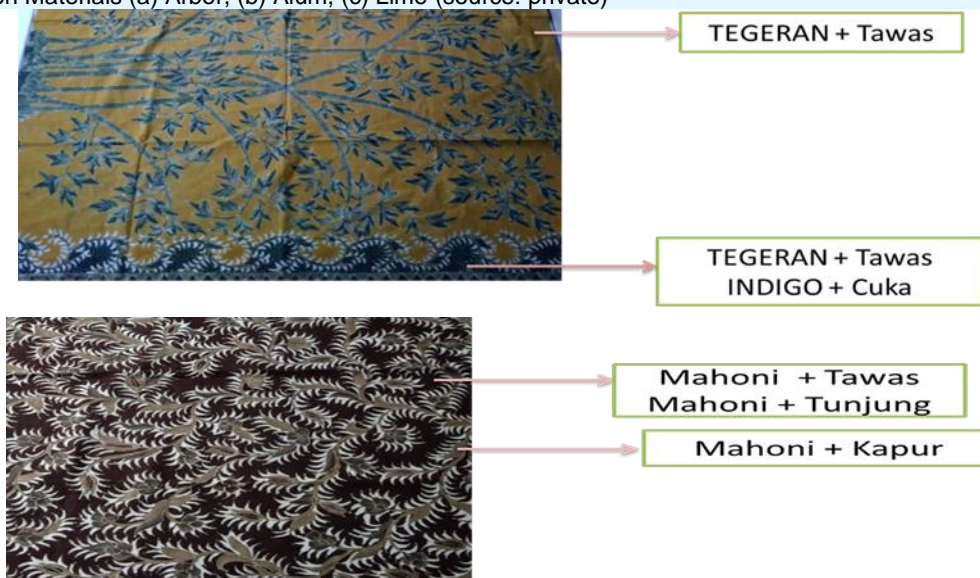


Fig. 4. Examples of Natural Batik Staining Results with Different Fixation Materials (source: private)

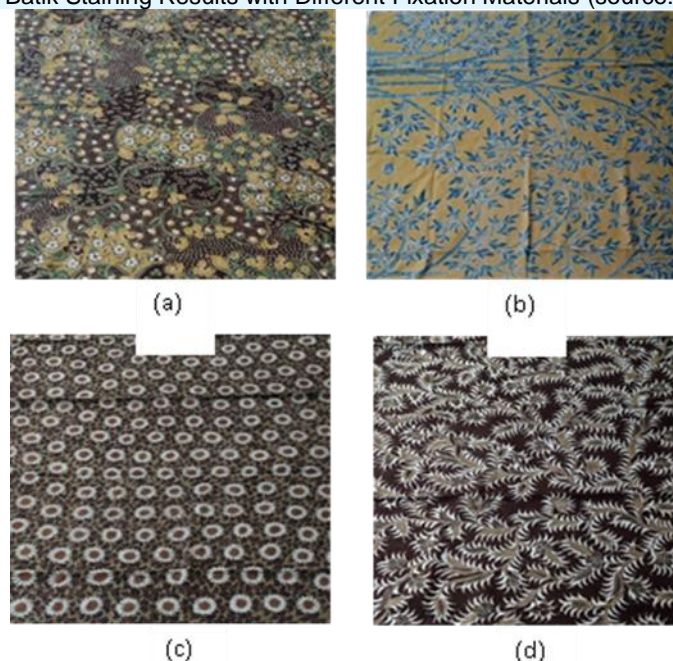


Fig. 5. Some of Ciwaringin batik motifs (a) Yusufan (b) Pring sedapur (c) mataharian (d) pecutan (source: private)

concentrations in soursop plants results in darker colors from lower fixator concentrations. There are three fixation materials that are used to lock the color on some of these natural materials (**Fig. 3**), such as: alum, lime, and arbor.

The resulting color also depends on several things, such as the length of the drying process, this process aims to reduce the moisture content, because low water content greatly affects the effectiveness of the extraction process (Siahaan, 2014), the natural quality of the fabric

fibers used (Hidayat et al. 2014), then the color produced also depends on the mordanting method and the type of mordanting. The use of mordanting causes sharper and longer lasting colors (Kwartiningsih et al, 2009), the temperature of each boiling also greatly affects the sharpness of the resulting color (Lydia et al, 2001).

There are no waste in the process of making natural dye. The part of plants that had been extracted can be used like as firewood to the next boiling process. Batik artisans can reuse the remaining extraction liquid or mix it with new extraction. Therefore, the using of natural dye for batik colorance is considered more environmentally friendly. The original knowledge of the people of Ciwaringin village, Cirebon district in utilizing several local plants as a basic material for batik dyes is a very unique local wisdom to maintain environmental balance (Tresnawati et al, 2020).

Ciwaringin Batik Motifs

Ciwaringin batik motifs is divided into geometric (Limaran, Kawung), pangkaan or pangkal (Pring sedapur, pecutan), byur (Yusufan), ceplok-ceplok (Lampadan), laseman (Seribu daun), and combination pattern. There are leaves and flower motif that often appear in Ciwaringin batik. For example, "Ucengan" is gnetum flower and wuni fruit is a local fruit from Ciwaringin. Gnetum is also many found in Ciwaringin. These motifs showed that batik artists were inspired from their environment (Casta, 2015).

Those motifs is giving attraction to the consumers. In addition, the using of natural dye from local plants that are easily found in this village also increase the selling of batik (Borshalina, 2015). Each of this motif has its own meaning. For example, pring sedapur has a meaning of togetherness. Symbolic meaning of Ciwaringin batik is nature conservation because their ancestors thought about the utilization of indigenous plant and togetherness (Casta, 2015). Some of Ciwaringin batik can be seen at **Fig. 5**.

CONCLUSIONS

The using of natural dye in Ciwaringin batik, Cirebon has many advantages. Beside it increase the selling price, natural dye more environmentally friendly. Plants that are used for natural dye materials come from local plants that are easily found in Ciwaringin like mango, mangosteen, rambutan, and mahogany. In addition, there is no waste of natural dye materials because it can be reused.

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