Color Scheme Test of Color Mapping in Batang Batik Design

Tyar Ratuannisa[1], Chandra Tresnadi[2], Annisaa Nurfitriyana[3], Kahfiati Kahdar[4], Annisa Nurul Pratiwi[5]
Fakultas Seni Rupa dan Desain, Institut Teknologi Bandung
Jl. Ganesa 10, Bandung 40193
*E-mail: t*yar@itb.ac.id

ABSTRAK

Penggunaan pewarna alami untuk batik beberapa tahun belakangan ini selain menjadi tren juga sebagai salah satu alternatif solusi atas isu lingkungan yang sedang terjadi. Untuk komunitas perajin tertentu, pewarna alami bisa jadi merupakan suatu tantangan yang memunculkan kendala baru. Kendala tersebut karena khususnya perlakuan yang diperlukan dalam mengolah pewarna alami berbeda dengan pewarna sintetis yang lebih mudah. Kekhawatiran yang muncul juga adalah hilangnya karakter kedaerahan yang dimiliki batik suatu daerah. Penelitian ini mencoba menjembatani tantangan tersebut dengan mengambil studi kasus daerah pembatikan Batang. Pemetaan warna khas kedaerahan batik Batang sudah dilakukan pada tahun 2017 dengan objek batik tulis di Kalipucang, Denasri, dan Proyonanggan. Pemetaan tersebut menghasilkan skema khas warna kedaerahan tiga warna tersebut dan bagaimana ekivalensinya terhadap warna alami. Untuk memperlihatkan posibilitas penggunaan pewarna alami tanpa menghilangkan karakter daerah khas, maka pemetaan warna tersebut dilanjutkan dengan uji skema warna alaminya.
Temuan penelitian ini menghasilkan penggunaan warna alam yang intensitas kepekatannya cenderung tereduksi dibanding pewarna sintetis, sehingga warnanya cenderung lebih redup dan lembut. Dengan demikian, kain-kain batik yang diberi pewarnaan alami telah memberikan diversifikasi baru untuk perajin, selain juga menambah skill baru bagi perajinnya.

Kata kunci: *batik tulis, kabupaten Batang, pemetaan warna, warna alami, uji skema warna*

ABSTRACT

The use of natural dyes for batik in recent years, apart from being a trend, has also become an alternative solution to the ongoing environmental issues. For specific crafter communities, natural dyes can be a challenge that raises new obstacles due to their special treatment compared to the easier synthetic dyes. Another concern is losing the distinct character of a region's batik. This research tries to mediate these challenges by retrieving the 2017 research on color mapping of three centers of batik tulis in Batang district. The mapping resulted in a distinct color scheme and how it is equivalent to natural colors. To show the possibility of using natural dyes without losing the distinct regional character, the color mapping was followed by a color schemes test. The findings of this research result in the use of natural colors whose intensity tends to be reduced compared to synthetic dyes, so the colors tend to be fainter and softer. Thus, batik with natural dyes has provided new diversification for the batik and added new skills for the crafters.

Keywords: batik tulis, color mapping, color scheme test, Batang district, natural dyes

INTRODUCTION

Indonesia is rich in the diversity of its traditional textiles. Textiles mean fabrics obtained or produced from weaving, spinning, knitting, weaving obtained from a variety of fibers, both natural fibers (cotton, bark, leaves, and animals such as wool and silk) and artificial (nylon, polyester, plastic, and so on) (Saragi, 2015 in Saragi, 2018). One of the textile traditions in Indonesia is batik. Batik is one of intangible national heritages that has existed for centuries in Indonesia. Today, the batik industry has undergone changes in the coloring process. In the 12th century, the discovery of *soga* color as an alternative coloring made the art of batik take another step forward (Kartika et al., 2020). However, nowadays, synthetic dyes that are much cheaper, faster, and easier to use with a wide variety of colors are more widely used despite their disadvantages, such as producing toxic waste that pollutes the environment.

Research Background

The awareness of environmental issues has been largely widespread. Environmental issues are being discussed theoretically and practically by academics, governments, corporations, and enthusiasts worldwide. The government also gets its hands on this issue by creating sustainable development programs, referring to the United Nations' 17 Sustainable Development Goals. One of the goals is 'responsible consumption and production'. Meanwhile, the production process in the clothing and textile industry is one of the most polluting industries globally. As mentioned by Ninimaki et al., one of the most polluting industries is textiles and clothing; its detrimental ecological footprint is caused by high energy, water, and chemical use, the generation of textile waste and microfibre shedding into the environment during laundering (Ninimaki et.al., 2020 in Filho, 2022).

Apart from its role as a pollutant in the textile production process, color plays an important role in shaping various world cultures because color can be an identity of the nation and society. Cultural identity can be characterized as membership in a cultural group such as a nation, religion, political group, generation, or family (Machdalena et al., 2023). In Indonesia, color elements play a role in influencing the aesthetics of an artifact or object. The richness of colors in traditional artifacts is diverse and can represent the character of ethnic groups and cultures. One of the traditional objects considered to represent the richness of regional color characters is traditional textiles. In the process of making traditional textiles, some color elements have a dominant aesthetic role with the use of various coloring techniques and dye sources. The color owned by traditional textiles is the identity of a region, which can represent the natural wealth, natural conditions, and other demographic characteristics of a region (Kahdar et al., 2018).

Batik motifs structurally consist of *babonan* (central) motifs, *isen-isen* (additional) motifs, and *cecekan* (dots), but batik makers have creativity in developing designs, techniques, and colors (Karsam, 2024). Research related to batik color mapping began with a case study of batik in Batang district

conducted by Kahdar, et al. (2017). The focus was on three batik areas, namely Kalipucang, Denasri, and Proyonanggan. The mapping resulted in a batik color map: 1) *Rifaiyahan* style; 2) *Batangan* style (which is composed of classic sogan-biron style and anyaran style); 3) *Pesisiran* style (which is composed of *lawasan* & natural style). The findings of these colors are then processed manually to obtain data on the colors that appear most often in Batang batik (Kahdar et al., 2018). This research also focused on resulting in an equivalency scheme of natural dye recommendation.

Based on the scheme that has been obtained, a test should be carried out by applying the colors to the batik cloth. This activity aims to prove that the Batang batik natural color scheme that has been produced in the previous year's research can be simulated, successfully made, finished, and made into guidelines for making batik with natural dyes. The color scheme test involved collaboration with batik partners from the Special Region of Yogyakarta since Batang district did not have a certain basic skill of natural dyes. While Yogyakarta is regarded as a well-established center for batik with natural dyes. This condition encourages research such as the application of the concept of eco-efficiency to the Yogyakarta batik process, conducting eco-mapping, and using fishbone diagrams as a tool to analyze the causes of environmental pollution problems, especially in batik production conducted by Hartini and Yulianto (2023).

Research Objectives

This research has an output of color scheme test results on batik cloth and natural color equivalence from the natural color mapping that has been carried out. The scheme test results are clear evidence that gradually trying to use natural dyes is possible. The formulations should be easy to follow by batik communities, especially for batik communities that have never used natural dyes before.

Hendriyana et al. (2021) states that:

> The creative cultural process of craft and design is inseparable from ideas related to the dynamics of community groups, whether personal or communal, which form particular responses to realize actions that lead to artifacts, products, or works produced from the creativity of the community (Hendriyana, et al., 2021).

This research process has a good purpose in providing alternative solutions to the batik process in Batang district and alternative product diversification that can be developed independently by the batik community. However, as mentioned, product diversification and innovation must be supported by the mastery and renewal of various skills, equipment, materials, and work methods (Sudana & Mohamad, 2021), so it is crucial to consider the existing condition of the community when it comes to formulate the recommendations.

Through the scheme test, recommendations for regional colors that are equivalent to natural dyes are also obtained, so that the uniqueness of Batang batik is not lost entirely but alternative works are produced. Through

the results of this natural color scheme test, Batang batik also gets an upgrade by following the development of sustainability trends that are taking place today, since the global paradigm within the industry practice has shifted towards a more sustainable one. To have newness is important for Batang batik; it could be the alternate innovation because competitive advantage and product innovation are the keys to the successful marketing performance of batik in Indonesia, especially at the micro, small, and medium scale (Nuryakin in Prajogi et al., 2023).

THEORETICAL FOUNDATION

To strengthen this research, several important references related to research keywords are included. The foundation divides into the description of Sustainable Development Goals as the main issue nowadays, which also leads to trend changes. It is also important to understand about the batik trend in Indonesia contextually and the distinct characteristics of Batang batik.

The Sustainable Development Goals Issues

The sustainability discourse has evolved since its emergence. Initially, the discourse around sustainable development was recognized globally in 1972 by the United Nations Conference on Human Environment in Stockholm. It was the first conference discussing the environment as a major global issue, linking economic growth, air, water, ocean pollution, and human well-being.

Fast forward to 2015, the United Nations released another agenda as a follow-up regarding the issue of sustainable development, named 'The 2030 Agenda for Sustainable Development' at the United Nations Sustainable Development Summit. The agenda contains 17 Sustainable Development Goals as a list of actions to be done worldwide (Bonnedahl et al., 2022). Therefore, Indonesia, as a member of the United Nations, also adopted this agenda, regulated by the Ministry of National Development Planning/National Development Planning Agency (*Kementerian Perencanaan Pembangunan Nasional/Badan Perencanaan Pembangunan Nasional, PPN/ Bappenas).*

One of the problems that have been identified and chosen which can be intervened inside the scientific scope of craft and design is the one related to colors. This provides a strategic intervention amid the situation because the dyeing process mostly produces the waste. As mentioned before, approximately only 5% of the dyes were absorbed into the fabric and most of the dyes ended up as liquid waste (Diyah et al., 2023). Therefore, the action chosen to be the first step towards sustainable production is to change the synthetic dyes to natural dyes to reduce waste significantly and is aligned with the first step of sustainability: get free of known culprits.

2010s to 2020s Batik Trend in Indonesia

The years 2010s to 2020s marked many changes in trends in Indonesia but in principle emphasized the characteristics of Indonesia. For example, widespread awareness of the public about batik was marked by UNESCO's recognition of batik cloth as the Representative List of the Intangible Cultural Heritage of Humanity in 2009, which also started the

commemoration of the National Batik Day on October 2 each year. In the same period, batik was revived again with the emergence of the trend of sustainable design (Ratuannisa, 2016).

Therefore, one characteristic of the fashion style that emerged in this period was a style with ethnic, crafty, traditional, and raised locality. It also includes explorations related to sustainability concepts, such as the use of local materials such as natural fibers and dyes, as well as traditional textile processing techniques. In this theme, not only the traditional look emerged but also the modification of many traditional clothes, such as kebaya, sarong, and accessories as well. Changes in the function of batik cloth in Indonesian fashion style also represent changes in clothing needs for Indonesian women (Ratuannisa, 2021).

As mentioned in Ratuannisa, 2021:

> Changes in batik clothing styles in women's clothing in Indonesia also indicate the development of the batik industry and the fashion industry, which is now part of the creative industry that receives special attention from the government (Ratuannisa et al., 2021).

The batik industry, which was initially a raw material provider for the tailoring process, is now moving in two directions, namely raw material providers and apparel providers. Batik is not only a traditional commodity but also a part of fashion trends. The innovation of batik acculturation into fashion trends is one of the breakthroughs that have potential opportunities to be implemented and can strengthen the nation's national identity (Yulianingrum et al., 2022).

The Color Characteristic of Batang Batik

Batik (as a verb) means applying a particular technique of resist dye onto fabric using a wax mixture within a tool named *canting* or a metal stamp to create patterns. The uniqueness of the batik technique lies in exploiting the contour lines (*outline*) *of the* field with white or brighter colors than the color of the field or background (in design terms it is called diapositive) to the failed effects produced during the batik making process such as the impression of crumbling, *blobor*, overlapping colors, or scribble details that give the impression of space/volume dimensions (Tresnadi & Ratuannisa, 2023). The development of the batik industry has been in Indonesia since at least the 1930s, the classic era (Raffles in Abdullah & Wardoyo, 2020).

Batik as a wax resist dye technique is known to have two different kinds of dyes: natural and synthetic ones. Before synthetic dyes were found and used worldwide like it is now, the batik industry relied entirely on natural dyes. Natural dyes used in batik then become a cultural identity, unique to its native, so that every region has its own characteristics (Kahdar et al., 2018). Each province in Indonesia has its own workshop (Tresnadi et al., 2015). The region may have different kinds of natural resources, nuances, inspirations, and any other conditions that make batik different from one another.

Batang batik is one of the batik made outside the palace area and is known as *keratonan* style. The style outside the palace is usually called the coastal batik or *batik pesisiran*, which generally develops and grows

in the north coast area of Java, such as in Indramayu, Cirebon, Pekalongan, Batang, Lasem, and Madura (Tresnadi & Ratuannisa, 2023). The color of batik Batang itself varies; however, the use of natural dyes is rare, and there are almost none at the moment. Batang batik, to be specific in Kalipucang Wetan has Rifaiyah or Rifa'iyah community, Rifa'iyah batik is strongly influenced by Islamic law. This batik is classified as classic because the motifs are made the same from generation to generation (Mustika, 2018).

As mentioned by Hartanti et al (2022):

> Due to its historical background and location close to the center of coastal batik, Pekalongan, Batang has unique batik motifs. Based on the design, Batang batik can be divided into two types: Batang *Keratonan* Batik and Batang *Pesisiran* Batik, which consists of ordinary Batang *Pesisiran* Batik and *Rifa'iyah* Batik.

This research was not limited to the object by Batang batik types because the object was initially selected in the pilot research in 2017. The difference is that in this research, *klowongan* batik from Batang was used and colored with natural dyes. *Klowong* technique is drawing the fabric with a pencil, which for later the drawing is overwritten with hot wax or what is called the *canting* technique. For Rifa'iyah in Batang residents, the *klowong* technique outlines the image pattern, either with a pencil or with *canting* and hot wax (Prizilla & Sachari, 2019).

METHODS

This natural dyeing scheme test is a continuation of the research entitled Mapping Trends in Natural Textile Colors in Indonesia - A Case Study: Batik making in the North Coast of Central Java, with specialization in three batik centers in Batang district, namely Kalipucang, Denasri, and Proyonanggan. The previous research began with collecting visual data in the form of colors that exist, are commonly used, and become the distinct identity of batik colors directly (by conducting field observatory) in three batik craft centers in Batang Regency by collecting the cloth, photographing the cloth, photographing the environment, making observations, and preliminary interviews with batik actors.

Research in the early stages produced data on identifying detailed colors (not shades) from Kalipucang, Denasri, and Proyonanggan. The first treatment was recording using digital camera devices and mobile phone cameras or mobile phones so that the resulting data was produced in the form of color photos**.** Then**,** with the help of a color scan/color generator on a digital application, data was obtained based on the colors of each cloth.

The continuation process was carried out using the same method, qualitative research, using a practice-based research approach. This approach of purposively utilizing creative practice to conduct research demonstrates the rigor and general criteria of objectivity, reliability, and validity that research entails. This approach encourages the inclusion of the researcher's creative practice (Nimkulrat, 2012). Similar to the previous research, the qualitative method is chosen for this research.

Qualitative data analysis activities are integrated with data collection activities, data reduction, data presentation, and conclusion of research results (Rijali, 2018).

Color matching is the stage of seeking the data objectivity. This stage was followed by prototype coloring experiments, which were divided into two production processes, namely:

1. The production process of the natural dye scheme using plain *primissima* cotton fabric as an experiment of color matching. This process involved collaboration with the Batik Gama Indigo workshop, Yogyakarta Special Region.
2. The production process of Batang batik cloth with natural dyeing according to the scheme. The cloth was first drawn or *klowong* by Kalipucang craftsmen with two characteristics: 1) Rifaiyahan *halusan* style; and 2) Pesisiran *non-halusan* style.

Moving on to the next stage, the obtained data would be processed into reliable data. To ensure this, the researcher collaborated with experts who could apply color to fabric professionally. This stage accidentally forms a collaborative design process since it comes in many shapes and forms. The process might be a structured process aimed at creating science communication products — tools, materials, or events — by involving diverse actors, each contributing their distinct perspectives and expertise to the design process (Enzingmüller and Marzavan, 2024). Batik Bixa, Batik Akasia, and Gama Indigo Batik were chosen collaborators located in the Yogyakarta Special Region, where natural dyes are commonplace, not only in the past but also in the present.

Contribution of Research

The preliminary research underlying this research is color mapping on batik cloth. The technique used is a complete digital inventory to first obtain preliminary data on the color of Batang batik. The findings of color mapping are not only digital but printed on good-quality paper to be evaluated by the crafters for accuracy. At this point, the direct benefits for crafters have yet to be concrete, while the initial goal is how natural coloring is offered as an alternative coloring for people in the Batang district who do not have natural dye batik.

Color scheme test creates the color scheme on the fabric and serves to show the range of colors that can be achieved when using natural dyes. Crafters can use the test results in this catalog as a reference for coloring and a formula if they want to make batik with natural dyes. Furthermore, suppose the batik maker is willing to learn more about natural dyeing skills. In that case, the batik maker will be able to diversify their products to align with the current sustainability trend.

RESULT AND DISCUSSIONS

Based on the preliminary stage that had already been passed in the previous year, the observation in Batang district was no longer carried out. The research focus is on the following process: selecting distinct color schemes to be applied to the fabric, working out the color schemes on the fabric, producing Batang batik fabrics with natural

dyes, and finally, requesting feedback from the community.

Selection of Distinct Color Scheme.

The color mapping in the previous research has been published in the article by Kahdar et al. (2018), which is the basis for the color scheme test produces a batik color map: 1) *Rifaiyahan* style; 2) *batangan* style (which is composed of classic *sogan-biron* style and *anyaran* style); 3) *pesisiran* style (which is composed of *lawasan* & natural style). The findings of these colors are then processed manually to obtain data on the colors that appear most often in Batang batik). For the next stage, based on the schemes that obtained, testing was done by applying the colors to batik cloth.

To effectively change the synthetic dyes used in producing batik to natural dyes, one must identify the color schemes used by the maker to retain its original image. This step plays a vital role in isolating the problem solely by replacing the dyes and not creating another issue around it. For example, suppose the replacement dye had a very different color scheme because of the lack of reference to the original one. In that case, this can give the brand a very different image, therefore compromising the already established target market. Although replacing the dyes will also have unavoidable consequences, for example, on how to obtain and regulate it, the impact of changing a variable is kept to a minimum to achieve the desirable result effectively. An effective color replacement is to convince the batik makers that a more sustainable practice is possible.

The validation process is undertaken with the scheme test, at this stage the experimental method is applied. Previously a color matching scheme was made first between the colors in the Batang batik color scheme and natural dyes that have been carried out by previous studies to obtain the color range and the type of dye to be tested. Subsequent to the color matching stage, the prototype coloring experiment was divided into two production processes, namely the production process of the natural dyes scheme and the production process of Batang batik cloth with natural dyeing according to the scheme.

The production process of the natural dye scheme

This scheme uses plain *primissima* cotton fabric as an experiment in color matching. The reference of the scheme is in Figure 1.

The colors obtained are a simplification of the actual mapping, consisting of more than hundreds of colors. The color simplification is chosen based on the indication of frequent colors. In creating a natural color scheme, it was initially intended to refer only to these colors. However, the collaborator provided a more comprehensive range of color options to show the infinite possibilities of mixing the colors obtained.

Table 1-10 describes the results of the natural dyes experiment produced by Gama Indigo Batik, a special region of Yogyakarta. Based on the color and its colorant mixture, the representative results were identified in several groups.

The experimental results in Tables 1-10 provide a large and varied range of colors, sufficient to catalog the variety of natural

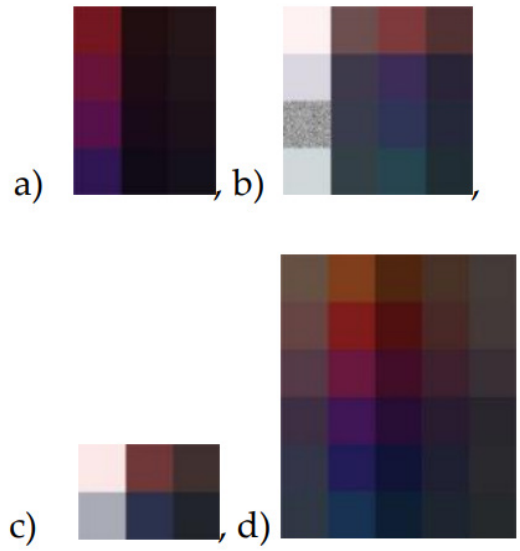


Figure 1. The reference scheme of the distinct color of Batang regency is divided into four characters. Figure 1 shows the results of the research Mapping Trends in Natural Textile Colors in Indonesia, Case Study: batik in the North Coast of Central Java, one of which is a batik color scheme in three batik crafters' centers in Batang Regency: a) rifaiyahan batik, b) batik batangan, c) pesisiran batik, d) batang batik.

Table 1. The Result of Natural Dyes Experiment: Blue Shades

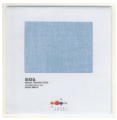
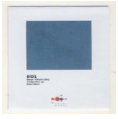
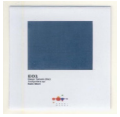
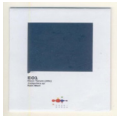
Color result & RGB Code	Color dyes formula
 Pallete 1 R: 163 G: 189 B: 210 # : a3bdd2	Tarum leaves (1x) *Indigofera sp.* Mori cloth
 Pallete 2 R: 77 G: 108 B: 138 # : 4d6c8a	Tarum leaves (3x) *Indigofera sp.* Mori cloth
 Pallete 3 R: 43 G: 75 B: 99 #: 2b4b63	Tarum leaves (4x) *Indigofera sp.* Mori cloth
 Pallete 4 R: 61 G: 88 B: 115 #: 3d5873	Tarum leaves (5x) *Indigofera sp.* Mori cloth
 Pallete 6 R: 43 G: 78 B: 107 #: 2b4e6b	Tarum leaves (8x) *Indigofera sp.* Mori cloth
 Pallete 7 R: 47 G: 75 B: 97 #: 2f4b61	Tarum leaves (10x) *Indigofera sp.* *Mori* cloth

Table 2. The Result of Natural Dyes Experiment: Yellow Shades

Color result & RGB Code	Color dyes formula
 Pallete 9 R: 166 G: 120 B: 42 #: a6782a	Tegeran bark (3x) | Alum (1x) *Cudrania javanensis Trecul* | Al2(SO4)3 Mori cloth

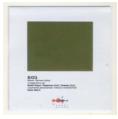
 Pallete 10 R: 169 G: 118 B: 31 #: a9761f	Tegeran bark (3x) CaCO3 (1x) *Cidrania javanesis Trecul* | $Ca(OH)_2$ Mori cloth

Table 3. The Result of Natural Dyes Experiment: Brownish Red Shades

Color result & RGB Code	Color dyes formula
 Pallete 15 R: 125 G: 95 B: 55 #: 7d5f37	Merbau bark (3x) | Alum (1x) *Intsia bijuga* | Al2(SO4)3 Mori cloth
 Pallete 16 R: 145 G: 105 B: 60 #: 91693c	Merbau bark (3x) | CaCO3 (1x) *Intsia bijuga* | $Ca(OH)_2$ Mori cloth
 Pallete 17 R: 116 G: 80 B: 49 #: 745031	Merbau bark (4x) | CaCO3 (1x) *Intsia bijuga* | $Ca(OH)_2$ Mori cloth
 Pallete 18 R: 111 G: 79 B: 52 #: 6f4f34	Merbau bark (9x) | CaCO3 (1x) *Intsia bijuga* | $Ca(OH)_2$ Mori cloth

 Pallete 19 R: 95 G: 84 B: 65 #: 5f5441	Merbau bark (9x) | Tunjung (1x) *Intsia bijuga* | FeSO4 Mori cloth

Table 4. The Result of Natural Dyes Experiment: Mix of Blue Shades

Color result & RGB Code	Color dyes formula
 Pallete 20 R: 82 G: 88 B: 49 #: 525831	Tarum leaves (5x) *Indigofera sp.* Tegeran bark (4x) Alum (1x) *Cudrania javanesis Trecul* | Al2(SO4)3 Mori cloth
 Pallete 21 R: 74 G: 90 B: 73 #: 4a5a49	Tarum leaves (5x) *Indigofera sp.* Kulit Kayu Jelawe (4x) Alum (1x) *Terminalia bellerica* | Al2(SO4)3 Mori cloth
 Pallete 22 R: 76 G: 79 B: 62 #: 4c4f3e	Tarum leaves (5x) *Indigofera sp.* Tingi bark (5x) CaCO3 (1x) *Ceriops candolleana* | $Ca(OH)_2$ Mori cloth

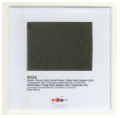
 Pallete 24 R: 67 G: 69 B: 55 #: 434537	Tarum leaves (5x) Tingi bark (4x) CaCO3 (1x) *Indigofera sp.* | *Ceriops candolleana* | $Ca(OH)_2$ Tingi bark (4x) CaCO3 (1x) Tunjung (1x) *Ceriops candolleana* | $Ca(OH)_2$ | FeSO4 Mori cloth

Table 5. The Result of Natural Dyes Experiment: Mix of Red Shades

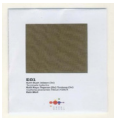
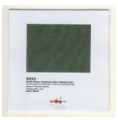
Color result & RGB Code	Color dyes formula
 Pallete 25 R: 127 G: 78 B: 43 #: 7f4e2b	Jelawe fruit peel (6x) Alum (1x) *Terminalia bellerica* | Al2(SO4)3 Tingi bark (2x) CaCO3 (1x) *Ceriops candolleana* | $Ca(OH)_2$ Mori cloth
 Pallete 27 R: 108 G: 99 B: 75 #: 6c634b	Jelawe fruit peel (1x) *Terminalia bellerica* Tegeran bark (2x) Tunjung (1x) *Cudrania javanensis Trecul* | FeSO4 Mori cloth

Table 6. The Result of Natural Dyes Experiment: Mix of Red and Green Shades

Color result & RGB Code	Color dyes formula
 Pallete 28 R: 109 G: 68 B: 44 #: 6d442c	Tegeran bark (3x) CaCO3 (1x) *Cudrania javanensis Trecul* | $Ca(OH)_2$ Tingi bark (3x) CaCO3 (1x) Cerios candolleana | $Ca(OH)_2$ Mori cloth
 Pallete 30 R: 73 G: 84 B: 67 #: 495443	Tegeran bark (3x) Alum (1x) *Cudrania javanensis Trecul* | Al2(SO4)3 Tarum leaves (3x) *Indigofera sp.* Mori cloth

dyes. However, traced back to the reference color scheme of Batang batik in previous studies, there is a color whose range has yet to be shown: purple. Purple is a shade that results from mixing blue and red. This experiment was not carried out specifically in this study, but it was slightly shown.

The next stage of the experiment is producing Batang batik using natural dyes. Evaluating the first experiment, it was decided to conduct the stage with another collaborator. The collaborator is the one who is familiar with dyeing plain cloth and batik cloth. The owner of the Batik Bixa workshop, Mr. Hendri is the

expert in using natural dyes in batik. Thus, it will be easier to conduct the experiment that involves not only one-time dyeing but repeatedly based on the objective scheme. The batik dyeing process requires a longer time as there will be more than one step since the cloth is *klowongan*.

The production process of Batang batik cloth with natural dyes according to the scheme

Along with creating color schemes using natural dyes by collaborators, data collection of color formulas was also conducted to give crafters an idea of the richness of variations of natural dyes, as shown in Figure 2.

In the next stage, the production process of the natural dye scheme was obtained from the previous research. The results of color matching show that the production of Batang batik cloth with natural dyes can be carried out. This stage uses two kinds of klowongan cloth (which has been drawn using canting), namely batik *pagi sore tiga negeri* of typical motifs *Rujak Beling* and *Pelo Ati* with *Rifaiyahan* style from Kalipucang Wetan, Kabupaten Batang:

Fabric (a) in Figure 4 shows the fabric with the original Batang batik-style dyeing. In contrast, the photo of the fabric is the result of a dyeing experiment using natural dyes, following more or less the same color scheme of brown-dark brown-reddish brown tones. Meanwhile, fabric (b) uses the new scheme, dominantly composed of the blue tone. The initial concept was expected to achieve other colors, such as purple, but the difficulty of coloring with *tarum* or *indigofera* made

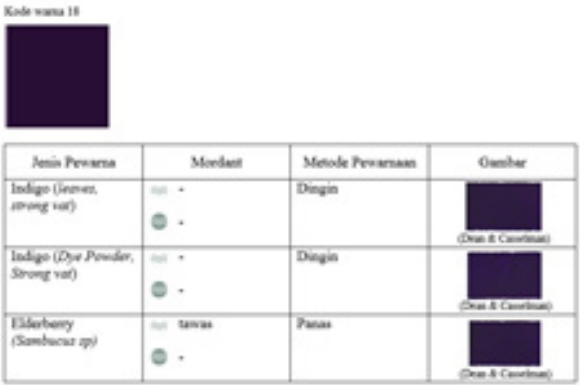


Figure 2. An example of a color matching scheme conducted before the coloring experiment. Source of comparison data: Wild Color: The Complete Guide to Making and Using Natural Dyes (Jenny Dean & Karen Casselman, 2010)

(A)

(B)

Figure 3. Comparison of the results and color impressions of the tiga negeri batik pagi sore batik cloths of the Rujak Beling and Pelo Ati rifaiyahan styles from the Kalipucang Wetan center, Batang Regency: a) Rifaiyahan batik cloth with original colors using synthetic dyes, b) Rifaiyahan batik cloth with composed colors using natural dyes.

collaborators focus on the results of blue tones.

The results of natural dyeing on cotton fabrics using natural dyes show that, in principle, it should be able to pursue the *tiga negeri* design using two processes of dyeing-dyeing-drying to obtain red and blue colors in one cloth. However, technically, because the natural dyeing process was carried out in Yogyakarta, which did not get used to making batik in the style of *the tiga negeri*, the work was done in one dyeing and *pelorodan* process. The impact was that the impression of diverse colors could not be fulfilled, so only batik cloth with one color tone, reddish and bluish, could be seen (Figure 4 a and b). It has also been realized that the use of natural colors will reduce the high intensity of synthetic colors, so batik cloth works dyed with natural materials always tend to have fainter and softer colors. Thus, batik fabrics given natural coloring have provided their taste segment for batik cloth lovers with softer colors.

Batik Community Responses

The batik group in Kalipucang village, Batang district, especially those members of *Rifaiyahan* batik, were previously unfamiliar with batik using natural dyes. Their characteristics are hand-drawn batik (*batik tulis halusan*) but the coloring uses synthetic dyes. The introduction of coloring using natural dyes for the batik community requires proof that natural coloring techniques can be an alternative coloring for *Rifaiyahan* batik. Coloring with natural substances positively influences the natural environment and the human environment by minimizing synthetic dyes, minimizing liquid waste from dyes as pollutants in waterways, and growing awareness of the usefulness of natural materials typical of the environment in the coloring process.

The community involved in this community service activity was the Rifaiyahan batik crafter community led by Mrs. Miftakhutin as the driving force. She welcomed the scheme test activities carried out and coordinated well with the craftsmen so that the batik *klowongan* cloth with two distinctive characteristics, namely: 1) Rifaiyahan style *halusan*; 2) *non-halusan* pesisiran style for the scheme test can be obtained promptly. Afterward, the cloth was dyed with the batik color trend scheme in Batang Regency using natural dyes at the Batik Bixa, Batik Gama Indigo, and Batik Akasia workshops, Yogyakarta Special Region. Positive feedback was obtained from the batik workshops as collaborators that played a role in dyeing, including that it is highly recommended that batik klowongan to the needs of natural dyes have pre-treatment using a basic mordant first so that the dye adheres better to the fabric.

Using natural dyes was a brand-new challenge for the Batang batik community, but they were willing to try after seeing successful experimental results. As a concept and method that had yet to be mastered before, they chose to plan the process of learning this natural dyeing skill first. However, it does not rule out the possibility of collaborative methods offered in this research.

CONCLUSIONS

The test of the dyeing scheme in fabric form was technically successful, as the longan fabric from Batang could be dyed well, and a similar color impression to the distinct reference color could be obtained. However, there was still dissatisfaction that the characters of the *tiga negeri*, having high color complexity, were not directly represented. However, it should also be noted that the success of this process requires a collaborative effort with a dyeing workshop that is accustomed to systematically working with natural dyes. So the recommendation is that if Batang batik artisans want to continue their exploration of coloring further, they need to be open to accepting the natural dyeing process, which is different from the synthetic dyeing process. Furthermore, other characters, such as ornamental varieties, can still be identified if the regional character is not fully represented with natural colors. Likewise, natural dyeing results can open up opportunities for artisans to diversify their batik products, which is relevant to the current sustainability trend.

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