

The Impact of the Types of Fixer for Batik Natural Dyes From Fresh and Fallen Leaves

TRI RAHAYUNINGSIH*

FUNGKI SRI REJEKI

*Department of Agroindustrial Technology, Universitas Wijaya Kusuma
Surabaya (UWKS), Surabaya 60225, Indonesia*

DYAH WIDHOWATI

*Department of Veterinary Medicine, Universitas Wijaya Kusuma Surabaya
(UWKS), Surabaya 60225, Indonesia*

Abstract: *Synthetic dyes have a wide variety of colors with wide color range, guaranteed, stable, easy to wear, strong dyeing power, easy to obtain, cheap, and easy to use. Nevertheless the use of synthetic dyes can cause health and environmental problems. Therefore it is necessary to explore various potential sources of natural dyes from various plants for batik. The sources of natural dyes is often used from the plant that take from stem, flower, fruit or leaf. One of the important process of batik making is fixation to lock the color. There are many types of material for fixation that influence coloring. This reserach aims to explore the suitable fixer for natural dyes from various leaves of fresh and fallen plants. Natural dyes are extracted using a heating method with a water solvent. Natural dye sources are taken from Glodogan Tiang Leaves (*Polyathea longifolia*), Teak Leaves (*Tectona grandis L. F*), Sono Leaves (*Pterocarpus indicus*), and Mango Leaves (*Mangifera indica*). The Fixer will be used lime, alum and tunjung. Batik will be tested with preference consumer test.. The result showed that consumer preferred batik from tunjung fixer.*

Keywords: *Natural dyes, tunjung, fixation and fallen leaves*

1. Introduction

The use of batik natural dyes is the right solution in an effort to preserve the environment. This is based on the reality on the ground that batik artisans use synthetic dyes to get imported batik from other countries. In addition, if its use in a long period of time will have an impact on the damage to the natural environment. The impact of pollution will only be felt after a few decades later, namely the emergence of health problems in the form of cancer or indigestion due to the

*Corresponding author: t_rahayu66@yahoo.co.id

accumulation of harmful substances that enter the body through drinking water, polluting the availability of ground water or damage to plants.

The use of natural dyes besides being environmentally friendly, also produces more beautiful colors as the color transfers and fades (Mayusoh, 2015). Natural dyes are also in demand by consumers (Degani et al, 2017), because natural dyes can apply for many purposes, such as coloring fibers wool, cotton, and silk as well as fur and leather (Cristea and Vilarem, 2006), as well as in food, cosmetics, and pharmaceuticals (Wahyuningsih, 2017) . In addition, many natural dye sources in Indonesia are available with an easier extraction process (Lestari and Satria, 2017). According to Rosyida and Achadi, (2014), Guljarani (2001) and Mohini et al (2018), natural dyes plants are one of the natural resources that have the potential to be used as textile coloring agents in Indonesia, especially in product development nuanced naturalist, amative, culturist and exclusive and can be the raw material of textile industry which has high economic value.

In this study will be applied natural dyes derived from fresh leaves and fallen leaves for making batik. The purpose of this study was to determine whether the kind of fixation material will influence batik.

2. Theoretical Framework

One process of making batik is a fixation process that aims to bind colors so that the coloring results are not easily faded. This fixation process uses a material called fixer. The fixation process in principle is to condition the dye that has been absorbed at a certain time so that a reaction occurs between the colored material, and the dyes and materials that will be used for fixation. There are several fixation materials that are often used including alum $\text{Al}_2(\text{SO}_4)_3$, lime (CaCO_3), and tunjung (FeSO_4) Pujilestari (2014). The use of different types of fixers will produce different colors (Rahayuningsih and Noerhartati, 2016). According to Pujilestari (2014), fixation can function to strengthen colors and change natural dyes according to the type of metal that binds them and locks the dyes that have entered the fiber.

3. Research Method

3.1. Sample preparation

The materials used in the study were as natural coloring sources, namely fresh or fallen leaves of glodogan tiang (*Polyathea longifolia*), mango (*Mangifera indica*), angšana (*Pterocarpus indicus*), and teak (*Tectona grandis* L. F). Cotton cloth and water as extraction solvent. Fixation materials used were lime, alum, and tunjung.

3.2 Methods

The study design used a randomized block design consisting of two factors. The first factor was the many kind of plants (S) consisting of glodogan tiang, teak, angšana and mango plants. The second factor was the types of leaf (L) which consists of fresh and fallen leaves. Natural dyes were obtained from fresh and fallen leaves of glodogan tiang, teak, angšana and mango plants. The leaves were extracted by heating at a temperature of 100⁰ C or until boiling. The solution obtained was applied to the coloring of batik on cotton fabric by repeated dyeing. Furthermore, the cloth was locked using lime, alum and tunjung fixation materials. It is intended to maintain color so it does not fade easily.









3.3 Observation and data analysis

Batik will be analysed with consumer preferences focussed on color intensity, neatness of batik and motif clarity of batik.

4. Results and Discussion





The colour of batik after fixation with lime was shown in Table 1.

Table 1.
 The colour of batik with lime

| Various of Plants | Fresh Leaves | Fallen Leaves |
|--|--|---|
| Glodogan Tiang (<i>Polyathea longifolia</i>) |  |  |
| Mango (<i>Mangifera indica</i>) |  |  |
| Angsana (<i>Pterocarpus indicus</i>) |  |  |
| Teak (<i>Tectona grandis L. F</i>) |  |  |

The colour of batik after fixation with alum was shown in Table 2.









Table 2.
 The colour of batik with alum

| Various of Plants | Fresh Leaves | Fallen Leaves |
|--|---|--|
| Glodogan Tiang (<i>Polyathea longifolia</i>) |  |  |
| Mango (<i>Mangifera indica</i>) |  |  |

| | | |
|---|---|--|
| Angsana (<i>Pterocarpus indicus</i>) |  |  |
| Teak (<i>Tectona grandis L. F</i>) |  |  |

The colour of batik after fixation with tunjung was shown in Table 3.

Table 3.
The colour of batik with tunjung

| Various of Plants | Fresh Leaves | Fallen Leaves |
|--|---|--|
| Glodogan Tiang (<i>Polyathea longifolia</i>) |  |  |
| Mango (<i>Mangifera indica</i>) |  |  |
| Angsana (<i>Pterocarpus indicus</i>) |  |  |
| Teak (<i>Tectona grandis L. F</i>) |  |  |

Based on Table 1, 2 and 3 showed that batik with tunjung fixation produced colors that can be accepted by consumers, in contrast to lime and alum produced very faded

colors. This is in accordance with the opinion Nilamsari (2001), which states that alum fixation materials produce colors that tend to be brighter, while tunjung produces colors that tend to be darker.

Therefore only batik with tunjung will be tested with consumer preference test. The parameters used in the consumer preference test are color intensity, neatness and motif clarity. The percentage of panelists who stated they were very like and much more very like of (batik) the results of treatment were presented in the following Table 4.

Table 4.
Percentage of Panelists Who Prefer (%)

| Parameters | S1L1 | S1L2 | S2L1 | S2L2 | S3L1 | S3L2 | S4L1 | S4L2 |
|------------|------|------|------|------|------|------|------|------|
| Color | 0 | 20.5 | 79.5 | 20.5 | 25.6 | 53.8 | 46.2 | 79.4 |
| Intensity | | | | | | | | |
| Neatness | 0 | 23.1 | 0 | 23.1 | 41 | 20.5 | 23.1 | 76.9 |
| Motif | 0 | 17.9 | 64.1 | 0 | 35.9 | 0 | 0 | 100 |
| Clarity | | | | | | | | |

From Table 4 showed that most consumer preferred batik with natural dyes from jati fallen leaves.

5. Conclusion, Implication and Limitation

5.1. Conclusion

Among fixation materials of alum, lime and tunjung, the faded colour were produced by alum fixation material. Based on the consumer preference test, the panellists preferred the S4L2 (Jati Fallen Leaves).

5.2. Implication and Limitation

Tunjung is the fixation material that is most suitable for batik using natural dyes from Glodogan Tiang, Mango, Angsana and Teak fresh also fallen leaves. From these sources of natural dyes, Jati fallen leaves produce reduce natural batik dyes that are most preferred by consumers. Further research needs to find the ways of extracting more effectively so that it is easy to use.

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