

The Effect of Mordanting Process and Mordant's Type on the Quality of Tie-Dye Fabric with Natural Dyes using Banana Blossom

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Abstract—Banana blossom/banana flower can be used as a natural dyes that are eco-friendly. The purpose of this study is to utilize banana blossom as a natural dyes for tie-dye fabric and to learn the effect of different alum mordant solution, burnt lime, and lotus on the quality of colour, the fastness to washing, and the sharpness of motif. The objects of this study was a pure white silk which haven't been dyed or had contact with alum, burnt lime or lotus. The independent variables in mordanting process were pre mordanting, metachrom, monochrom and post mordanting. The dependent variables of the tie-dye fabric as the indicators of the effects were the quality of colour, the fastness to washing, and the sharpness of motif. The controlled variables were the scale of water and banana blossom which is 1:10, the frequency for each sample which is 15 times, the allocated time for each sample that is 450 minutes, and mordanting time for each sample which is 10 minutes. The data is taken from laboratory tests.

The results of descriptive analysis show that the highest and darkest quality of colour was obtained in pre mordanting process with 64,09 average value for alum mordant solution and 68,84 for lotus mordant. The best quality of the fastness to washing and the change of colour were shown in pre mordanting process with score 4 and in type of burnt lime mordant with score 4. The sharpest motif and the sharpest colour were obtained in post mordanting process with 70,67 average value. The analysis shows that there's no significant effect of mordanting process and mordants' type. However, the change of colour (Grey Scale) shows that mordanting process effected the colour significantly while mordant's type didn't. In the stainig scale, both types of modarnts and their interactions showed significant effect, and so did in the sharpness of motif.

Keywords—*Mordanting Porcess, Type of Mordants, Banana Blossom*

I. INTRODUCTION

Indonesia is rich with her natural resources. Biodiversity plays important role in both economic and social life and even culture. Some types of plants have been used for herbal or traditional medicine, as a raw matreial for artcraft, industrial and as natural dyes. It is also well known that there are approximately 150 types of plants that are recorded in the useful plants data. This condition forces us to think of a good way to make us of the natural resources and explore them further. Natural dyes is one of the natural resources that could bring benefits for us.

Banana blossom is one of the plants that can be used as natural dyes. The parts of banana blossom that we can use are the waste or the calyx of fallen banana blossom. The fact that the latex of banana is hard to clean when it meet fabric is a prove that banana blossom can be used as a good natural dyes with hopes that the colour will be absorb well by the fabric.

Based on the background of the study, natural resources utilization, mordant's type and mordanting process, the writer was inclined to know more about "The Effect of Mordanting Process and Mordant's Type on The Quality of Tie-Dye Fabric with Natural Dyes Using Banana Blossom".

II. HYPOTHESIS

The hypohthesis of this study are:

Ha : "There are some effects of mordanting process and type of mordants on the quality of tie-dye fabric with natural dyes using banana blossom."

Ho : "There is no effect of of mordanting process and type of mordants on the quality of tie-dye fabric with natural dyes using banana blossom."

III. RESEARCH METHOD

Experimental method was used to conduct this study. The object of this study were alum, burnt lime, lotus and white silk fabric. The independent variables in mordanting process are pre mordanting, metachrom, monochrom and post mordanting. The dependent variables of the tie-dye fabric as the indicators of the effects are the quality of colour, the fastness to washing, and the sharpness of motif. The controlled variables are the scale of water and banana blossom which is 1:10, the frequency for each sample which is 15 times, the allocated time for each sample that is 450 minutes, and mordanting time for each sample which is 10 minutes.

IV. PROCEDURES OF COLLECTING DATA

Laboratory tests were done to test the darknest of the colour, the fastness to washing, and the quality of motif on tie-dye fabric that is dyed with banana blossom natural dyes based on the mordanting process and the type of mordants used.

V. PROCEDURES OF ANALYSING THE DATA

A. The used descriptive analysis formulation is

1) Mean

$$\bar{X} = \frac{\sum X_i}{n} \quad (1)$$

Description :

\bar{X} = Mean
 $\sum X_i$ = Total of x
 n = Total of sample

2) Standard Deviation (SD)

$$S = \sqrt{\frac{\sum y^2 - \frac{(\sum y)^2}{n}}{n-1}} \quad (2)$$

Description :

\bar{X} = Mean
 $\sum y^2$ = Total of y
 n = Total of sample

3) Coefficient of Variation

$$KV = \frac{S}{\bar{X}} \times 100\% \quad (3)$$

Description :

KV = Coefficient of Variation
 S = Standard Deviation
 \bar{X} = Mean

B. Test of Homogeneity

Test of variation homogeneity, the analysis of this test can be found through *levene's test* by using *SPSS for windows release 16* program. The hypotheses are : H_0 : $\sigma_1 = \sigma_2$ (homogenous variants) H_1 : $\sigma_1 \neq \sigma_2$ (heterogenous variants) The criteria of the used formula is if $Sig > 0,05$, then H_0 is accepted and it means that the data is homogenous, if $Sig < 0,05$, then H_0 is denied and it means the data is not homogenous.

C. Linearity Test

Regression test was done by doing it with *SPSS for windows release 16*. The hypotheses are H_0 : there is effect, H_1 : there is no effect. The criteria of the used formula is if $Sig < 0,05$ then H_0 is accepted and it means there is no effect of mordanting process and type of mordants on the quality of tie-dye fabric , if $Sig > 0,05$ maka H_0 is denied and it means there is effect of mordanting process and type of mordants on the quality of tie-dye fabric

VI. RESULT AND DESCRIPTIONS

A. Descriptive Analysis of The Quality of Dyeing

The results of descriptive analysis show that the highest and darkest quality of colour is obtained in pre

mordanting process with 64,09 average value for alum mordant solution and 68,84 for lotus mordant. The best quality of the fastness to washing and the change of colour are shown in pre mordanting process with score 4 and in type of burnt lime mordant with score 4. The sharpest motif and the sharpest colour are obtained in post mordanting process with 70,67 average value.

B. Pre-requirement Analysis of Statistic Test

Homogeneity test shows that probability score of darkness of color is $0,654 > \alpha (0,05)$, while the result of grey scale is $0,692 > \alpha (0,05)$, the staining scale is $0,001 < \alpha (0,05)$ and the sharpness of motif is $0,014 < \alpha (0,05)$, it means that the result of the colour darkness is homogenous while sthe result of the staining colour and the sharpness of motif is not.

C. Variants Analysis

The result of variant analysis on the darkness of colour shows that mordanting process, type of mordant, and its interaction have no significant effect. However, the change of colour (Grey Scale) shows that mordanting process effected the colour significantly while mordant's type didn't. In the staining scale, both types of modarnts and their interactions showed significant effect, and so did in the sharpness of motif.

VII. CONCLUSIONS

Based on the results of the study and the previous chapters, we conclude that :

1. It is possible to use banana blossom as natural dyes on tie-dye fabric with any kind of mordanting process and type of mordants.
2. The dying result of tie-dye fabric on the darkness of colour is good in pre mordanting process and with lotus as the mordant. The fastness to washing on grey scale and staining scale are also good in pre mordanting process and with burnt lime as the mordant. The sharpness of motif is good in post mordanting process and with lotus as the mordant.
3. There are some effects of mordanting process and mordant's type on the fastness to washing and the sharpness of motif of the tie-dye fabric with banana blossom as natural dyes, and there is no effect on the darkness of colour.

VIII. SUGGESTIONS

Textile producents can make use of banana blossom as an alternative natural dyes that is more eco friendly and to replace the synthetic one that is not. Mordant that shows best on fastness to washing is burnt lime, but if anyone wants to get darker colour, lotus is the mordant that should be used. The study onle focus on tie-dyeing method, but it could work on batik dyeing method with further study. Other researchers could also use banana blossom extract as natural dyes with natural mordants such as lemon, javanese sugar, and vinegar. They could also do further study on the fastness to sun, sweat, and ironing.

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