The effect of naphthol dyes composition on the results of shibori

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Abstract. The objectives of this study were 1) to determine the effect of the naphthol dye composition on the tie-dye results, and 2) to determine the best naphthol dye for tie-dye on primisima fabrics. This research is an experimental study with independent variables, namely the composition of the dye naphthol with a weight variation of 2 grams, 3 grams, and 4 grams as BO with a composition of 4 grams of BB salt and 6 grams of salt, and 8 grams of table salt. Dependent variable; the tie-dye results in primisima which are reviewed from the results of the color sharpness test and the sharpness of the motif test. Control variables: binding technique, dyeing technique, tools, and people working. The data collection method used in this research is observation. The data analysis technique used was a single ANOVA. Based on the data analysis, it can be concluded that: 1) there is an effect of the composition of the dye naphthol, namely 2 grams and 3 grams with a salt composition of 4 grams and 6 grams on the jumputan result on primisima cloth, and 2) the composition of 3 grams/liter naphthol ASBO and 4 grams/liter of BB salt has the sharpest color and motif.

Keywords: Naphthol dyes, Tie-dye, Primisima

1. Introduction
The development of textile designs at this time grew rapidly, as evidenced by the emergence of Indonesian designers who raised domestic textiles to be brought abroad. The uniqueness of this textile is obtained from the effort to improve textiles including the improvement of the appearance of the material in the form of coloring and giving motifs, as well as special refinements. Tie-dyed products are a result of local wisdom of unique patterns and colors in cotton fiber, which is a natural material [1]. The dyeing of fabrics has been done by sharing colors and methods of dyeing, this continues to develop technically by using dyed, stamped, or sprayed, or dyed. The tie-dye technique known today originated in the far east, around 3000 BC. Also, many experts argue that tie-dye fabrics are found separately in various parts of the world, such as in India, China, Japan, South America, and Africa [2]. The African name it adire, the Indian call it bandhana, and the Japanese word is shibori [3]. Indonesia as a nation that is known for its rich cultural arts has recognized the art of tie-dyeing as a traditional art form. In Indonesia, tie-dye is known by different names, Javanese people call jumputan, in Bali, it is known as sangsangan, while in Palembang people call it rainbow cloth, in Kalimantan, it is known as sasirangan, and in Sulawesi, it is known as roto cloth [4].

In making tie-dye, you can use synthetic dyes or natural dyes. Synthetic dyes that are often used for dyeing on tie-dye are naphthol, indigosol, rapid and reactive dyes. In this study, the coloring of the tie-dye used a reactive dye in the form of a powder. With cold staining technique, reactive dyes can react...
with cellulose fibers to form covalent bonds. Based on its reactivity, there are two types, namely cold reactive dyes and hot reactive substances. Cold reactive dyes are more reactive than hot reactive dyes, because of their fixation through squeezing [5].

Color has long been an important part of society. Color can denote class, economic position, and style [6]. Therefore, tie-dye produced today tends to use a lot of synthetic dyes, because synthetic dyes are easier and more efficient to use [7]. The synthetic dye chosen is naphthol because it has a variety of colors, the coloring process is easy, the price is affordable, and tends to be widely used by batik craftsmen. The dye used for naphthol is AS.BO. Naphthol AS.BO is a type of neutral naphthol dye which color direction depends on the fixator salt used. Naphthol dye requires a fixator in the color fixation process. The naphthols are insoluble in water. They are phenols, soluble in alkaline solution and substantive to cotton, particularly in the presence of salt. In the presence of strong alkali they are converted to the corresponding naphtholate ions and are water soluble [9].

The fixator salt for naphthol dye has different types, its use is adjusted to the type of naphthol and the color to be generated. The type of salt used is BB salt because it will evoke AS.BO naphthol towards a dark blue color. However, until now there has never been researched on the amount of BB salt concentration to produce a good tie-dye, so in this study, a treatment will be carried out with different concentrations of AS.BO and BB salt to determine which concentration produces a good tie-dye, by looking at the sharpness of the color and the sharpness of the motif.

2. Research Method

This research uses experimental research type. Experimental research is research that is intended to determine whether or not there is a result of "something" imposed on the subject investigating [8]. This type of experimental research is a way of looking for a causal relationship between two factors that are deliberately caused by the researcher by eliminating or reducing or setting aside other disturbing factors. The purpose of conducting experimental research is to try to examine the presence or absence of a cause-and-effect relationship, by comparing one or more experimental groups treated with one or more control groups who do not receive treatment.

Operational Definition of Variables

2.1. Independent Variables

In this study, using the independent variable, namely the composition of the dye naphthol, namely 2 grams, 3 grams, and 4 grams of AS.BO with the composition of BB salt 4 grams, 6 grams, and 8 grams.

2.2. Dependents Variables

In this study using the dependent variable, namely the tie-dye results. Judging from the sharpness of the tie-dye color, and the sharpness of the tie-dye motif

2.3. Control Variables

Control variables are variables or research objects that are used as benchmarks in the treatment of objects. In this study, there are control variables, namely:

- Primisima type of cloth
- Same cloth size
- Same motif design
- The size of the motif is the same length and width
- the same way of manufacture
- People working on the same

The research design is a design made to avoid irregularities in collecting data. This research is an experimental study using a single factor design. Table 1 describes the research design.
Table 1. Research Design

| Variable | Y1       | Y2       | Y3       |
|----------|----------|----------|----------|
| X1       | X1Y1     | X1Y2     | X1Y3     |
| X2       | X2Y1     | X2Y2     | X2Y3     |
| X3       | X3Y1     | X3Y2     | X3Y3     |

Information:
- X: Naphthol AS.BO
- Y: BB salt
- X1: Naphthol AS.BO 2 gr + BB salt 4 gr
- X2: Naphthol AS.BO 3 gr + BB salt 4 g
- X3: Naphthol AS.BO 4 gr + BB salt 6 g
- Y1: 4 grams of BB salt
- Y2: 6 grams of BB salt
- Y3: 8 grams of BB salt

The data collection method is a method that can be used to collect data in a study. Data collection aims to obtain the data needed in shaping the reality and information of a specified object. To get an objective conclusion. The data collection method used in this research is the observation method. According to Arikunto [7], the observation method is an activity of focusing attention on an object by using all the senses. In the checklist, there are research guidelines for each observed aspect, in the form of tie-dye results criteria on primisima fabrics with differences in the composition of naphthol AS.BO and BB fixator salts. Data were collected by 30 people consisting of 4 lecturers of the Department of Fashion Design, PKK, Faculty of Engineering, and 26 students of the Fashion Design study program who have taken Textile Design courses.

3. Results and Discussion

The results achieved in the study were as follows

3.1 Color Sharpness Test

This study aims to obtain a sample of the color sharpness of tie-dye making with the right composition. The parameters used in this study were the composition of naphthol AS.BO and BB fixator salts. To achieve this objective, several sample compositions must be made with different compositions of naphthol AS.BO and BB fixator salts for each sample. The samples made in this study were 9 (nine) samples.

The following is the composition of 9 samples of tie-dye making with different compositions of AS.BO naphthol and BB fixator salts:
1. Sample A: Naphthol AS.BO 2 gr + BB salt 4 gr
2. Sample B: Naphthol AS.BO 3 gr + BB salt 4 gr
3. Sample C: Naphthol AS.BO 4 gr + BB salt 4 gr
4. Sample D: Naphthol AS.BO 2 gr + BB salt 6 g
5. Sample E: Naphthol AS.BO 3 gr + BB salt 6 g
6. Sample F: Naphthol AS.BO 4 gr + BB salt 6 g
7. Sample G: Naphthol AS.BO 2 gr + BB salt 4 gr
8. Sample H: Naphthol AS.BO 2 gr + BB salt 4 gr
9. Sample I: Naphthol AS.BO 2 gr + BB salt 4 gr

After making the composition of the tie-dye sample, then the color sharpness test is carried out with 9 compositions that have been made. Testing the sharpness of the motive was carried out using a questionnaire method with qualitative and quantitative assessments. Qualitative assessment is carried...
out by giving opinions or responses from the sample visually by observing. Meanwhile, a quantitative assessment is carried out by counting the number of respondents who chose and gave good scores to the sample.

The number of respondents in this test was 30 people. Each respondent was asked to give a value to each sample by looking at the smoothness of batik with 9 samples. The results of the questionnaire assessment (questionnaire) can be seen in Table 2.

| No. | Sample | Very sharp | Sharp | Sharp enough | Less sharp |
|-----|--------|------------|-------|--------------|-----------|
| 1.  | Sample A | 10         | 27/4  | 41.8         | 20.8      |
| 2.  | Sample B | 12.3       | 21.5  | 34.6         | 31.6      |
| 3.  | Sample C | 20.5       | 15    | 35.6         | 28.9      |
| 4.  | Sample D | 28.9       | 15.6  | 38.9         | 16.6      |
| 5.  | Sample E | 34.2       | 28.9  | 25.6         | 11.3      |
| 6.  | Sample F | 50.5       | 35.6  | 11.4         | 2.5       |
| 7.  | Sample G | 85.6       | 14    | 0.4          |           |
| 8.  | Sample H | 64.5       | 28.7  | 6.8          |           |
| 9.  | Sample I | 63         | 35.2  | 1.8          |           |

To see the results of the assessment of the sharpness of the tie-dye motif with 9 different sample compositions, it can also be seen in Figure 1.

Based on the results of the diagram, it can be seen that sample G has the best quality level of color sharpness compared to other samples. This can be seen from the results of the questionnaire that has been conducted. Respondents who gave a very sharp assessment of 85.6% were sample G, namely the manufacture of tie-dye with the composition of Naphthol AS.BO 2 gr + BB salt 4 gr.
3.2 Motif Sharpness Test

This study aims to obtain a sample of the sharpness of the tie-dye motive with the right composition. The parameters used in this study were the composition of naphthol AS.BO and BB fixator salts. To achieve this objective, several sample compositions must be made with different compositions of naphthol AS.BO and BB fixator salts for each sample. The samples made in this study were 9 (nine) samples.

The following is the composition of 9 samples of tie-dye making with different compositions of AS.BO naphthol and BB fixator salts:

1. Sample A: Naphthol AS.BO 2 gr + BB salt 4 gr
2. Sample B: Naphthol AS.BO 3 gr + BB salt 4 gr
3. Sample C: Naphthol AS.BO 4 gr + BB salt 4 gr
4. Sample D: Naphthol AS.BO 2 gr + BB salt 6 g
5. Sample E: Naphthol AS.BO 3 gr + BB salt 6 gr
6. Sample F: Naphthol AS.BO 4 gr + BB salt 6 gr
7. Sample G: Naphthol AS.BO 2 gr + BB salt 4 gr
8. Sample H: Naphthol AS.BO 2 gr + BB salt 4 gr
9. Sample I: Naphthol AS.BO 2 gr + BB salt 4 gr

After making the composition of the tie-dye sample, the sharpness of the motif is tested with 9 compositions that have been made. Testing the sharpness of the motive was carried out using a questionnaire method with qualitative and quantitative assessments. Qualitative assessment is carried out by giving opinions or responses from the sample visually by observing. Meanwhile, a quantitative assessment is carried out by counting the number of respondents who chose and gave good scores to the sample.

The number of respondents in this test was 30 people. Each respondent was asked to give a value to each sample by looking at the smoothness of batik with 9 samples. The results of the questionnaire assessment (questionnaire) can be seen in Table 3.

| No. | Sample | level of batik fluency | Very sharp | Sharp | Sharp enough | Less sharp |
|-----|--------|------------------------|------------|-------|--------------|-----------|
| 1   | Sample A |                        | 11         | 26.4  | 31.8         | 30.8      |
| 2   | Sample B |                        | 28.9       | 21.5  | 26.5         | 23.1      |
| 3   | Sample C |                        | 38.7       | 20.4  | 26.7         | 14.2      |
| 4   | Sample D |                        | 48.9       | 15.6  | 32.7         | 2.8       |
| 5   | Sample E |                        | 66.7       | 18.9  | 9.6          | 4.8       |
| 6   | Sample F |                        | 68.9       | 24.6  | 6.5          |           |
| 7   | Sample G |                        | 88.9       | 10    | 1.1          |           |
| 8   | Sample H |                        | 70.5       | 20.5  | 0.9          |           |
| 9   | Sample I |                        | 68.8       | 28.3  | 2.9          |           |

To see the results of the assessment of the sharpness of the tie-dye motif with 9 different sample compositions, it can also be seen in Figure 2.
Based on the results of the diagram, it can be seen that sample G has the best quality of the sharpness of the motive compared to other samples. This can be seen from the results of the questionnaire that has been conducted. Respondents who gave a very sharp assessment of 88.9% were sample G, namely the manufacture of tie-dye with the composition of Naphthol AS.BO 2 gr + BB salt 4 gr.

4. Conclusion
From the research and studies that have been done, it can be concluded that there are different compositions of naphthol and fixator salts in the manufacture of tie-dye. And also The finished result of making tie-dye with the composition of Naphthol AS.BO 2 gr + BB salt 4 gr has the best composition seen from the color sharpness test and the sharpness test of the motif.

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