

Utilization of Natural Color Material from Rod, Leaf and Jackfruit Tree Root Extracts as Batik Fabric Dyes

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Abstract—Batik is one of Indonesia's original cultures that has been recognized worldwide. UNESCO recognizes batik as an Indonesian intangible culture. Indonesian batik is recognized worldwide because of its beautiful composition of motifs and colors in a piece of batik. Batik crafters generally use synthetic dyes such as naptol, remasol or indigosol. This synthetic batik dye contains a lot of chemicals. The use of batik dyes that contain chemicals continuously will have a negative impact on the environment. Therefore it is necessary to experiment with natural dyes, to reduce the containing chemicals. In this study experiments were conducted using jackfruit stem extract, jackfruit leaves and jackfruit roots as natural dyes. Fixation is done with three types of fixators, namely *kapur*, *tawas* and *tunjung*. The experiment that I did was the polishing of each color extract using *kapur* fixation, *tawas*, and *tunjung* on a cotton cloth that had been mordant. To see the results of the dyes the experiment was carried out with different amounts of polishing with each fixation. The results showed that the part of jackfruit plants that gave rise to thick colors were leaves. Root and stem extracts produce faded colors. The use of natural dyes requires more time than synthetic dyes because to bring up a thick color must go through a process of polishing more than ten times.

Keywords—batik, dyes, natural

I. INTRODUCTION

Batik is an authentic Indonesian art that has its own beauty. The beauty of batik can be seen from the composition of the motif or the combination of colors [1]. Batik comes from Javanese language, "Mbatik", word Mbat in a language which is also called ngembat. The meaning of the word throws. While the word "tik" can be interpreted as a point. So what is meant by batik is to throw points repeatedly on the cloth [1]

The process of making batik always starts from making designs, sticking, giving color, and finally removing the wax. In general, the dyes used are synthetic dyes. The type of batik dye that is often used by craftsmen is naptol, indigosol and remasol [2] Synthetic batik dyes are in great demand because of their easy, inexpensive, and varied colors. The drawback of synthetic batik dyes is that these dyes contain chemicals. Waste from synthetic dyes is certainly not good for the surrounding environment. Waste colored containing these chemicals is not easily broken down. If this synthetic coloring agent is used continuously

without environmental maintenance, it will have a bad impact on the surrounding environment [3]

Starting from these problems, it is necessary to develop environmentally batik dyes. This environmentally batik dyes can be processed naturally through non-chemical materials around us. This is reinforced by Rini [3] natural batik coloring is one option because it promises the development of textile coloring that is more environmentally friendly.

Natural dyes are pigments obtained from plants, animals, and minerals. These dyes have been used for a long time and are generally considered safer than synthetic dyes. One source that can be processed into natural coloring ingredients is extract from plants. Plant extracts can be used as natural dyes ranging from roots, stems, and leaves [3].

II. METHODOLOGY

This study uses an experimental method. The experimental steps in this study are presented in the chart below :

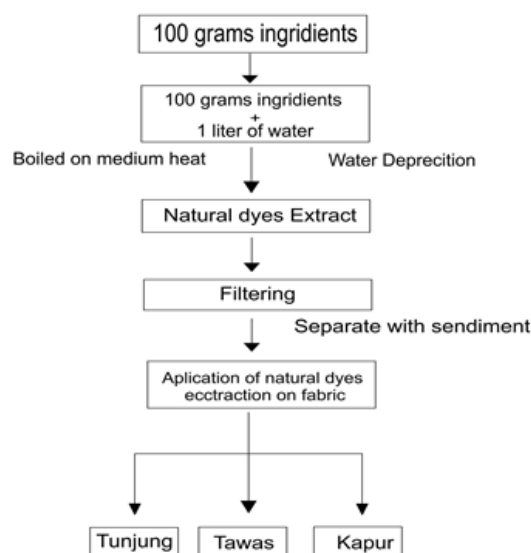


Fig. 1. Natural color experiment flow chart

Based on the flowchart of the experiment above, in one experiment each material contained a size of 100 grams of material boiled with 1 liter of water. Boiling with medium

heat approximately 1 hour until the water is bubbly and shrinks. From the results of boiling, extracts of natural dyes will be obtained. Then filter the extract of the dye. The experiment was carried out by rubbing on the primisima cloth that had been drilled. Each jackfruit leaf extract, barnangka skin, jackfruit root bark, and skinless jackfruit stem. The mordanting process on textile material that will be batik is done by soaking the cloth in water containing alum 6 grams per liter of water, heated at a temperature of $\pm 90^{\circ}\text{C}$ for 1 hour, then cooled for 24 hours. The cloth is lifted and then dried in an aerated way. After drying the fabric is ready for processing [3].

Coloring experiments on the fabric are done by polishing the fabric that has been striped using the wax. The application of dye extracts on the fabric is carried out in different amounts, from one time to ten times. This is done to see the difference between the colors produced by the different amounts of spread. From every process of polishing to the next process, the cloth must be aired first to dry.

After the dye extract is applied to the fabric, the next process is fixation. Fixation is to condition the dye that has been absorbed in the material at a certain time so that a complex reaction occurs between the material with the coloring agent and the material used for fixation [4]. The ingredients used for fixation are tunjung, alum and lime. The fixation process is done by soaking the colored material on the three types of final mordant solution which each contains 70 grams of kapur, 50 grams of tawas and 30 grams of tunjung. The ingredients are dipped in mordant solution for ± 5 minutes until evenly distributed, then drained and rinsed with clean water.

III. RESULT AND DISCUSSION

Fabric production using synthetic dyes over time will cause serious environmental pollution problems. Therefore, it is necessary to conduct research on batik dye innovation with environmentally friendly coloring agents. Besides being environmentally friendly, natural coloring agents can be processed by utilizing the surrounding natural resources.

This research is an extra use of jackfruit bark, jackfruit root bark, jackfruit jack bark, and jackfruit leaves. Each 100 grams of coloring material is boiled with 1 liter of water. Each ingredient is boiled one by one separately (not mixed between the ingredients of Jackfruit bark, Jackfruit root bark, Jackfruit stem without skin and leaves of Jackfruit. Based on the results of the research experiment, each boiled material experienced a shrinking of its water volume. The water depreciation data are:

Depreciation of water (ratio of 100g = 1 liter of water)

- 1) root Skin (110 g) = from 1 liter of water to 200 ml of water
- 2) sticks of wood (250 g) = from 2.5 liters of water to 400 ml of water
- 3) bark (100 g) = from 1 Liter of water to 500 ml of water
- 4) leaves (250 g) = from 2.5 liters to 500 ml of water

The results of the colored extract were filtered, separated by the animal water and the remaining ingredients. Then the dye extract was carried out by a trial process which was

satisfied with the divided cloth field (striped into 10 experimental test columns). Each starts from the top means that if the color test in column 1 means only 1 time of control. If it is done in column two, it means that twice the coloring agent is applied to the fabric so that it is up to the 10th column. The results of the dyeing test of the natural substance are as follows:

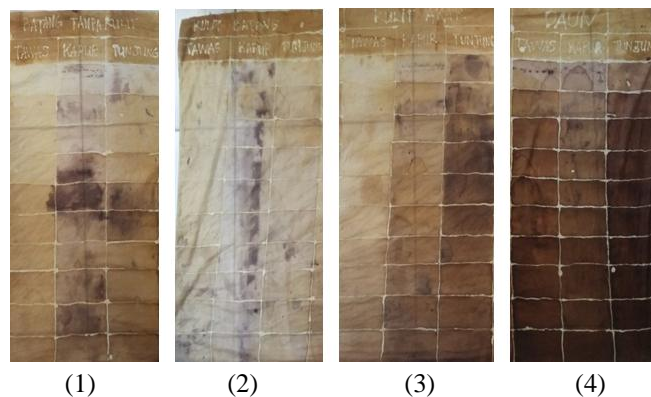


Fig. 2. Dyes extract

- (1) Jackfruit's Skinless Rod, (2) Jackfruit's Bark, (3) Jackfruit's Root Skin, (4) Jackfruit's Leaves

From the results of the above experiments can be seen Jackfruit leaves produce the most powerful extracts of coloring agents. The result of the color produced by the extract of dye of Jackfruit leaves is dark brown. Next the results of extracts of jackfruit root bark dyes have color results from light brown to brown. Extracts of dyes from the jackfruit bark produce the youngest brown color or look faded, the color produced is only vague.

After applying the fixation there is a difference from each fixation. For fixation of alum and lime does not really affect the initial color, but for lime produces a more faded color than the color smeared with alum fixation. Fixation using tunjung shows the most powerful effect for color change. Of all the colors that use tunjung fixation, all colors change to the darkest.

IV. CONCLUSION

Based on the results of this study it can be concluded that Jackfruit bark, Jackfruit root bark, Jackfruit stem without skin and Jackfruit leaves can be used as raw materials for natural coloring batik. To produce maximum color in one coloring process, it must be applied 10 times or more of natural dyes. Jackfruit plant parts that give rise to thick colors are jackfruit leaves, while others look faded.

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