Utilization of Sap from Part of Kepok Banana Tree (Musa Mcuninata Balbisianacolla) with Variation of Extraction Solutions as Textile Dyes

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Abstract. The purpose of this study was to obtain tannin natural dyes from the sap of the fronds/stalks of kepok banana leaves, namely the percentage of yield, color intensity, time and good solvents for taking the most dyes in the sap of the banana tree. The extraction of dyes in various parts of banana trees was carried out by means of an extraction process using soxhlet, with a medium of distilled water, methanol, ethanol and ethylacetate. The raw material was sliced, dried to + 6.7% moisture content, ground powder made from size 60-80 mesh. The powder was weighed 50 grams and extracted with each medium solution in 500ml at each evaporation temperature, the results were evaporated to dryness. Test the tannin color intensity with a spectrophotometer. The results showed that the optimal amount of sap yield on the banana midrib was 16.248%, the color intensity of tannin obtained was 0.218 in methanol solvent products. The solvent which can provide the optimal yield in extracting tannins from banana leaf midrib was methanol. The time of the extraction process to the maximum out tannin was 4-4.5 hours

1. Introduction
The development of the textile industry and textile products in Indonesia is progressing rapidly, also with additional materials related to industrial products, namely dyes. The development of the above synthetic dyestuff solution resulting from inorganic chemical reactions can cause quite serious problems for the environment, namely the wastewater produced. Liquid waste and the textile industry contain relatively high BOD, COD, color suspended solids and can also contain heavy metals that interfere with water bodies (Paryanto, 2015). Most textile dyes on the market are carcinogenic / cancer-causing (Arifin, 2009).

Banana tree sap when it comes to clothes is difficult to remove even though washed over and over again, with the nature of banana sap is very soluble when attached to the fabric (Endang, 2010). Banana sap in the health sector is useful in healing wounds due to scratches on the surface of the skin (Riyani, 2015; Kwartiningsih, 2010; Paryanto, 2015).

Banana sap contains tannins, which are natural brown coloring pigments. Brown color is widely used in batik coloring. Many grow various types of banana plants that spread throughout the Indonesian archipelago. Most natural dyes are obtained from plant parts, for example in roots, tubers, tree bark, leaf stalks, fruit stalks, fruit peels, fruit skins, leaves, fruits and seeds.

2. Research methods
The material used is part of the tree, namely the stem, stem and fruit stalk on the Kepok banana plant. The extraction of dyes in the banana tree is carried out by the extraction process using a soxchlet tool. Solvents for the extraction process are aquades, methanol, ethanol and ethyl acetate.

The raw material for tree parts, fronds and tangakai bananas, sorted in slices, dried in the sun for ± 5 days, blended to powder. ± 12 grams are taken to put in filter paper to be placed in Soxchlet and extracted in parallel with distilled water, methanol, ethanol and ethyl acetate. Heating was carried out at 100°C for water solvents, 64°C for methanol, 78.4°C for ethanol, and 77°C, for etylacetate solvents with time for 4-4.5 hours respectively.

The product of extraction is in the form of viscous liquid, then the evaporation process is carried out by ovening 4-6 hours at 105°C. Absorbance testing with UV VIS spectrophotometry by dissolving the dyes produced with distilled water.

The weight of the powder product is weighed for each solvent, then tested:
1. Soaking weight in each solvent and soaking weight.
2. Absorption of dyes in various parts of a banana tree.

### 3. Result and Discussions
The powder material to be processed was measured by the water content of stem powder, stem, stem of the kapok banana and the extraction process was carried out using soxchlet with aqueous media of distilled water, methanol, ethanol, ethyl acetate for 4-4.5 hours. The tannin dye extracted in the form of a thick brown liquid, then concentrated by evaporating water with an oven at a temperature of 105oC for 8-10 hours. The results of the extraction of dyes obtained for all raw materials, tested the average water content of 0.0012%.

Absorbance was measured by diluting the results of the dyes extracted from 1gram in distilled water, then inserting a UV VIS spectrophotometer at a wavelength of 570 nm. The yield and absorbance obtained in various parts of the Kepok banana tree and various solvents can be seen in Table 1 below:

| Solvent media | Stems | midribs | fruit stalks |
|---------------|-------|---------|-------------|
| Stems         | Yields (%) | Absorbance | Yields (%) | Absorbance | Yields (%) | Absorbance |
| Aquades       | 1,9069  | 0,024   | 4,9034      | 0,199      | 1,4243     | 0,159      |
| Metanol       | 5,6083  | 0,106   | 16,2481     | 0,218      | 7,4106     | 0,194      |
| Etanol        | 2,5317  | 0,023   | 13,8665     | 0,083      | 0,3501     | 0,014      |
| Etil Asetat   | 1,0231  | 9,012   | 1,4954      | 0,030      | 0,4345     | 0,005      |

Quantitative yield results of dyestuff results obtained by the highest weight of extract containing tannin dyes are banana fronds with methanol as a solvent. This is due to the fact that the methanol solvent is a polar solvent and does not have a high boiling point so it does not damage the components to be extracted when the desired compound is susceptible to high temperatures. Although distilled water is more polar compared to methanol. This is in accordance with research Riyani (2015), which carried out the extraction process on ambon banana stems obtained the highest concentration of flavonoid substances of 8.4301 mg / l in methanol solvents.

This shows that although aquades are more polar than methanol, ethanol and ethyl acetate, methanol solvents produce more tannins than aquades because methanol has a lower boiling point.
Calculating the color intensity resulting from extraction with soxhlet was tested with a UV VIS spectrophotometer, wavelength of 570 nm. The 0.5 gram dye powder was dissolved in 100 ml of distilled water and then absorbed on the spectrophotometer.

In the graph above the higher the absorbance price, the higher the color intensity. The highest absorbance price is in the original dyestuff from Kepok banana fronds with methanol extraction media producing an older color than the banana tree and fruit stalks. This is in accordance with the study of Kwartiningisih, (2010) the highest absorbance results in dyes from the Kepok banana tree compared to ambon bananas and plantains by extraction using distilled water.

Extraction time of 4-4.5 hours, it is expected that tannin dyes will be extracted entirely. In the study of Paryanto (2015), extraction of banana stems with distilled water and ethanol in the variation of the extraction process time of 20-120 minutes, the results of the extract of dyes obtained were less than the maximum.

4. Conclusions
Natural brown tannin dyes obtained from the extraction process using soxchlet from the part of the Kepok banana tree (stem, stem, fruit stalk). The time and temperature of the extraction process using soxhlet is 4-4.5 hours and the boiling point temperature of methanol is 64°C. The solvent that can produce the highest dye is methanol, and the portion of the banana tree that produces tannin dyes is the banana leaf midrib. The highest tannin dye composition in leaf fronds was 16.248%, and the intensity / absorbance of tannin dyes obtained 0.218 in banana leaf fronds with methanol extraction solvent.

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