

Standardization of Suitable Mordant for *Terminalia catappa* L Leaf dye for Textile Dyeing through Alkali Extraction

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SUMMARY

In this research, an experiment was carried out to standardize the suitable mordant for *Terminalia catappa* L leaf (Red and Yellow) dye for an alternate textile dyeing. The dye was extracted through Alkali extraction with addition of different mordant. From the research the different colour was noticed from different mordants. Results suggested that pre mordanting dyeing method with heating improves dyeing abilities in Cotton, Wool and Silk fabrics. This has been done to test the quality of dyeing in Cotton, Silk and Wool.

INTRODUCTION

After the advent of synthetic dyes, the utilization of natural dyes to color textile fibers declined until the latter half of the 19th century, primarily due to the numerous advantages synthetic dyes offered in terms of application, color variety, durability, and widespread availability. However, it's worth noting that some synthetic dyes pose health risks, being carcinogenic and contributing to environmental pollution during their production process (Patel, 2021).

In the early 21st century, there has been a resurgence of interest in natural dyes, particularly in the fashion industry. This resurgence is driven by the increasing demand for products that employ natural dyes, as Western consumers grow more concerned about the adverse effects of synthetic dyes, which rely on the use of hazardous byproducts from fossil fuels, on both human health and the environment. As an example, to broaden their export opportunities in Europe, the European Union has encouraged Indonesian batik fabric manufacturers to transition to natural dyes. Companies like De la Robbia, founded in Milan in 1992, produce water extracts of natural pigments such as cochineal, weld, and chlorophyll, certified under the Eco-Text program. Allegro Natural Dyes also manufactures natural dyes for the textile industry in the USA under the E colour label (Collier *et al.*, 1997).

The leaves of *Terminalia catappa* L contain various compounds, including flavonoids like kaempferol or quercetin, tannins such as punicalin, punicalagin, or tercatin, saponins, and phytosterols. Due to this chemical diversity, both the leaves and bark have been employed in traditional medicine for treating conditions like liver diseases, dysentery, and diarrhea. In light of these characteristics, the leaves of *Terminalia catappa* L serve as a viable source for textile dyeing purposes

Materials and Methods

Sample Collection and preparation

Fallen leaves of *Terminalia catappa* L are big in size and easy to collect. Red leaves and yellow leaves were collected and dried at room temperature, ground and sieved.

Dye Extraction methods (Alkali extraction)

As many dyes are in the form of glycosides, these can extract under dilute alkaline condition. The addition of the alkaline facilitates the hydrolysis of glycosides resulting in better extraction and higher yields of coloring materials.

25g of dried leaf powder and 0.2% KOH was soaked in 250ml of water, then the samples was filtered and placed in water bath for 1hour at 60°C and stirred at an interval of 15mins. After 1 hour of boiling, the extract was filtered and tested for coloration.

Fabric coloration

Fabric used for dyeing includes: 1) Cotton, 2) Wool, 3) Silk

Mordanting

For dyeing of fabric, pre- mordanting technique turned into executed in each natural and chemical mordant all through the study. Cotton, wool and silk fabric turned into soaked in each mordants in a single day for round 12hours in water each at 60°c for one hour. After soaking of mordants, the fabrics were dyed overnight with the dye. After 12hours, the fabrics were dried and the colours were observed (Kuchni, 2004).

Mordant details

T₁	mordant
T₂	hate rent
T₃	<i>ia chebula</i> leaf extract
T₄	ulphate
T₅	
T₆	hate rent + <i>Terminalia chebula</i> leaf extract
T₇	ulphate + Alum

Results

Determination of presence of dye (Alkali extraction)

After boiling process, the extract was filtered and the extract colour was observed as yellow and brownish shades respectively. The result of this study was shown in the figure 1.

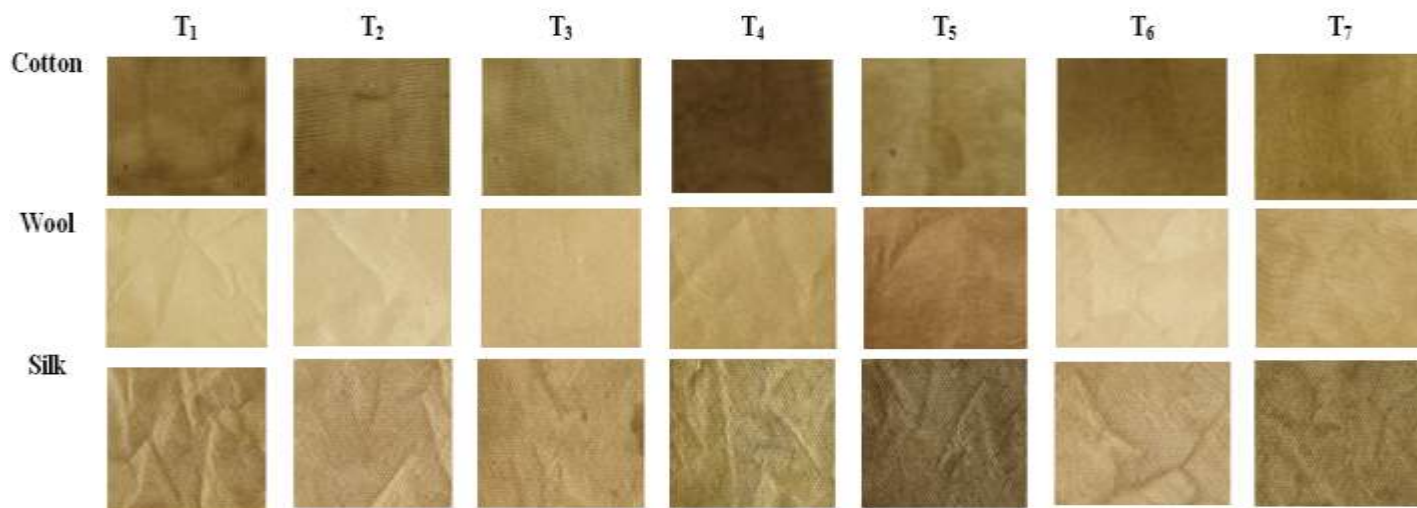


Figure 1. Terminalia catappa leaf dye chart (Alkali extraction)

CONCLUSION

Being a safe, economical and easy-to-use product, among naturally occurring colorants. The clothed dye by natural colour evidently possesses a higher price tag. This is the first things, which make them unpopular in the market because, only the rich and savvy can afford them. They are not within the reach of common man, who therefore, shuns the clothes to rectify these cost factors of naturally dyed clothes to be brought This is possible only if large scale production of dye stuffs is accomplished. It can be done if large amount of plant materials, which produces dyes, are produced and harvested.

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