

NATURAL DYEING IN COTTON FABRIC BY USING CALENDULA OFFICINALIS

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ABSTRACT

Natural dyeing, an ancient practice with renewed interest in contemporary times, involves extracting colorants from various plant, animal, and mineral sources to dye textiles and other materials. Natural colorants are becoming more well-known worldwide and are seen to be a safer option than environmentally hazardous synthetic dyes. Using natural dyes in textiles is challenging due to their restricted colour range. The study aims to prepare colour on cotton fabric by dyeing with natural dye mixtures without adding mordants. A sustainable dyeing approach for cotton was evaluated with natural dyeing, by boiling method. The *Calendula Officinalis* dye was taken for the application of fabric. This sustainable and eco-friendly method was developed as a home textile product.

keywords: Natural cloth, natural colouring, and domestic product.

1. INTRODUCTION

To acquire the desired colour and fastness, textile fabrics are dyed by applying dyes or pigments. The bonding process is influenced by temperature and time, and it includes a specially prepared solution that combines dyes and a certain chemical. Up to the 19th century, the majority of dyes came from natural sources, to provide a greater variety of colours and increase their durability, artificial dyes were developed.

Because chemicals are used in the effluent, the textile processing sector contributes significantly to environmental contamination. Effluent treatment facilities should be constructed, and eco-friendly paints and chemicals should be utilized to lessen this. Natural dyes provide distinctive beauty and value to the textile manufacturing process.

They may be produced in market gardens or collected from tree litter, which makes them a good alternative to artificial colours and chemicals.

Commercial dyers and small textile export enterprises are investigating the use of natural dyes for textile dyeing and printing due to the current upsurge of interest in natural dyes on natural fibers. To produce balanced colorfastness and unique hues, it is necessary to explore and rebuild ancient natural dyeing techniques.

2. MATERIALS AND METHODS

2.1 SELECTION OF FABRIC: COTTON FABRIC

One of the most popular types of fabrics in use today is cotton. The fibres that cover cotton plant seeds, which emerge in a rounded, fluffy structure once the seeds are grown, are used to make cotton cloth. The cotton fabric is purchased at the Coimbatore local market.



Plate. 1 COTTON FABRIC

2.2 SELECTION OF SOURCE: CALENDULA OFFICINALIS

Growing environmental awareness of the health concerns caused by synthetic dyes has led to a revival of natural colours. The marigold flower, or *Calendula officinalis*, produces a gorgeous yellow colour that is used in natural dyes. It has also been researched for its ability to extract colour and can be used as a source of dye. The marigold flower is

purchased locally, and it is a widespread plant. The flowers have been purchased from the place of Virudhunagar, Aruppukkottai local market.



Plate. 2 MARIGOLD FLOWER-*CALENDULA OFFICINALIS*

2.3 EXTRACTION OF DYE SOLUTION



Plate.3 Extraction of Natural dye from - MARIGOLD FLOWER- *CALENDULA OFFICINALIS*

PROCEDURE FOR DYE EXTRACTION

- Take a vessel and add hot water.
- Make sure the temperature is set.
- add the flowers according to your usage.
- Then put the fabric in the dye solution.
- Add some the natural salt and leave it.
- Then dry the fabric.

2.4 PRETREATMENT OF COTTON FABRIC

Preparation dyeing is necessary to remove contaminants from the fibres in order to enhance the visual appeal and fabric-processing capabilities of the fibres. In order to enhance whiteness and absorbency, impurities are eliminated. Increased absorbency is necessary because it makes dyeing fabrics easier. Fabric preparation, often referred to as pre-treatments, aims to purge the fabric of any impurities or pollutants in order to make it ready for subsequent procedures such as optical brightening, dyeing, printing, or finishing. The overall objectives of the dyeing preparation process include minimising fibre damage, removing impurities from the fabric, such as protruding fibres, sizing agents,

cotton seed husks, fats, oils, waxes, dirt, and lubricants, and ensuring uniform residual size, pH, alkalinity, whiteness, and absorbency.

2.6 COLOUR FASTNESS

Color fastness tests might be more important depending on the design and intended use of textile products. Standards tests for colour fastness to water wash, chlorinated water, soap, and other unique conditions.

3. RESULTS AND DISCUSSION

3.1. Colour Fastness to Water

1	Cloth Color Before Wash	Yellow
2	Cloth Color After Wash	Yellow
3	Temperature	Room Temperature
4	Crocking Test	Good
5	Soap	Moderate
6	Wash Water	Moderate
7	Light	Moderate
8	Chlorine	Moderate

The results were findings the 15 ml treated extract showed no colour fad. 75 ml treated extract shows a slightly fad colour. 95 ml and 105 ml treated cloths are slightly fading yellow colour specimen and blue colour specimen shows fading the colour above tests.

2.5 DYEING OF FABRIC

The selected cotton fabric of 500gms is dyed with the *Calendula officinalis* flower aqueous extract of 2.5liters as dip and dry treatment. Test is held on room temperature.



Plate. 4 DYEING OF COTTON FABRIC IN MARIGOLD FLOWER- *CALENDULA OFFICINALIS*

CONCLUSION

The study on the application of marigold flower natural dyes in textiles offers important new perspectives on environmentally responsible and sustainable dyeing techniques. Natural colours are

less hazardous to the environment than synthetic ones since they require fewer chemicals and leave less of an ecological impact. Their extensive colour pallet, which includes vivid yellows and oranges, purples, and blues, gives textile designers and producers a plenty of options. Because these colours degrade naturally, there is a lower chance of allergic reactions or skin irritations. But before natural dyes are widely used in the textile business, there are several concerns that need to be resolved, such colourfastness and uniformity. More investigation is required to enhance colourfastness, optimise the dyeing procedure, and investigate the possibility of increasing output. Working together, botanists, chemists, and textile specialists can assist overcome these obstacles. Overall, the study shows how environmentally friendly, culturally relevant, and sustainable dyeing techniques may be used in the textile sector.

REFERENCES

1. Broadbent AD. Basic principles of textile coloration, society of dyers and colourists. West Yorkshire. 2001.
2. Ali S, Hussain T and Nawaz R, Optimization of alkaline extraction of natural dye from Henna leaves and its dyeing on cotton by exhaust method, *JCleanerProduction*, 2009, 17, 61-66.
3. Kumaresan M, Palanisamy PN and Kumar PE, Application of Eco-Friendly Natural Dye Obtained from Flower of *Spathodea Campanulata* on Silk Using Combination of Mordants, *European J. Sc Research.*, 2011, 52 (3), 306-312.
4. Jothi D, Extraction of natural dyes from African marigold flower *Tagetes erecta* for textile coloration, *Autex Research journal*, 2008, 8 (2), 49-53. 5.
5. Samanta AK, and Agarwal, Application of Natural Dyes on Textiles, *IJFTR*, 2009, 34, 384-399.
6. "The Evolution of Cotton". Learn. Genetics. Retrieved 22 March 2023.
7. "Natural fibres: Cotton". 2009 International Year of Natural Fibres. Archived from the original on 3 September 2011.
8. Singh, Phundan. "Cotton Varieties and Hybrids" (PDF). Archived (PDF) from the original on 9 October 2022.
9. Dawson TL. Biosynthesis and synthesis of natural colours. *Coloration Technology*. 2009;125(2):61-73
10. Adeel S, Rehman F-U, Rafi S, Zia KM, Zuber M. Environmentally friendly plant-based natural dyes: Extraction methodology and applications. *Plant and Human Health, Volume 2: Springer*; 2019. p. 383-415.