

# STUDY ON NATURAL DYEING IN DENIM FABRIC BY USING BRASSICA OLERACEA

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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 color range. The study aims to prepare color on denim fabric by dyeing with natural dye mixtures without adding mordants. A sustainable dyeing approach for denim was evaluated with natural dyeing, by boiling method. The Brassica Oleracea 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

Applying dyes or pigments to textile fabrics to create the desired colour and fastness is known as dyeing. Temperature and time are crucial variables in the bonding process; a customised solution including colours and a particular chemical component is used. Printing is a different use from dyeing in that it applies colour locally in the required patterns. Although artificial dyes were developed later to generate a greater spectrum of colors and increase their durability, natural dyes have been the main source of dyes since the 19th century. Because chemicals are used in the effluent, the textile processing sector contributes significantly to environmental contamination. Environmentally friendly colors and chemicals should be utilized, and wastewater treatment facilities should be constructed, to lessen this. Natural dyes add to the value of textile manufacture and provide distinctive aesthetics. 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 fibres. The proper scientific approaches, such as research on dyeing processes, process factors, dyeing kinetics, and the compatibility of selected natural dyes, must be applied to successfully use natural dyes for commercial reasons. Rebuilding and revisiting ancient natural dyeing techniques is necessary to create unique hues and balanced colorfastness.

## 2. MATERIALS AND METHODS

### DENIM FABRIC

Jeans and other apparel items are frequently made from denim, a hardy cotton twill fabric. Even though there are many different shades of blue, it is most famous for its color. Denim is both fashionable and durable because of the way the fabric is weaved, which produces a diagonal ribbing pattern. For many years, it has been a well-liked fabric for both professional and informal clothing. The denim fabric is purchased at the local market.



**Fig.1 DENIM**

**BRASSICA OLERACEA**

Red cabbage is not a frequently used source of dye in textile dyeing because of its pH-sensitive colour-changing characteristics. When exposed to varied environments, textile dyes must maintain their stability and resist fading or changing colour. It is not possible to utilise red cabbage dye, which changes colour depending on pH, in textiles since it would be subject to environmental conditions including washing, exposure to light, and pH variations. Red cabbage waste has been brought from hotel in Coimbatore.



**Fig.2, BRASSICA OLERACEA**

### 3. EXTRACTION OF NATURAL DYE



**Fig.3 Extraction of Natural dye from -BRASSICA OLERACEA**

### 4. APPLICATION OF NATURAL DYE ON FABRIC

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

### DYEING OF FABRIC



[A]

[B]

**Fig.4, DYEING OF DENIM FABRIC IN BRASSICA OLERACEA (RED CABBAGE)**

## 5. RESULT AND DISCUSSION

Table.1, Colourfastness Test

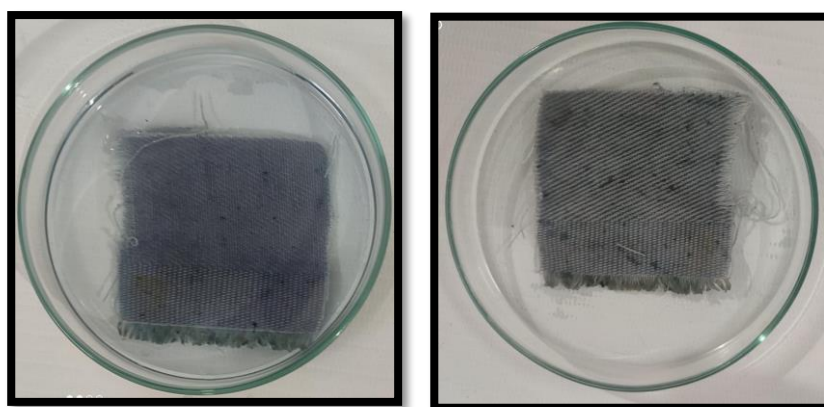
S. No	Cloth Color Before wash	Cloth Color After wash	Temperature	Croaking test	Soap	Wash Water	Light	Chlorine
1	Blue	Pale blue or green	Room Temperature	Good	Good	Good	Good	Moderate
2	Pale green	Shadow color	Room Temperature	Moderate	Moderate	Moderate	Moderate	Moderate

### 1.Colour Fastness to Water

Color fastness tests might be more important depending on the design and intended use textile products. Standards tests for color fastness to water wash, chlorinated water, soap and other unique conditions. Results were findings the 15 ml treated extract shows no color is fad. 75 ml treated extract shows slightly fad the color. 95 ml and 105 ml treated cloths are slightly fading yellow color specimen and blue color specimen shows fading the color above tests.

#### Testing Procedure:

- Cut the specimen to the size of 40mm X 100 mm.
- Cut the standard covering fabric to the sample size.
- Sandwich the specimen between the standard covering fabric and stitch all the four sides.
- Take distilled water in 1:50 ratio and fully wet the sandwiched specimen for 30 min.
- Now place the wetted sample between two plastic plates and place all plastic plates one above the other.
- Now transfer the plates on bottom metal plate of the perspire meter.
- Place the top metal plate and adjust the load with the help of thumb screws.
- Then keep the loaded instrument in the air oven for 4 hours at a temperature of 38+ 1° C.
- After 4 hours remove the sample specimen from the instrument and remove the stitching.
- Compare the test specimen with the original sample for change in colour compare with scale also.
- Compare the standard covering cloth with the fresh sample.

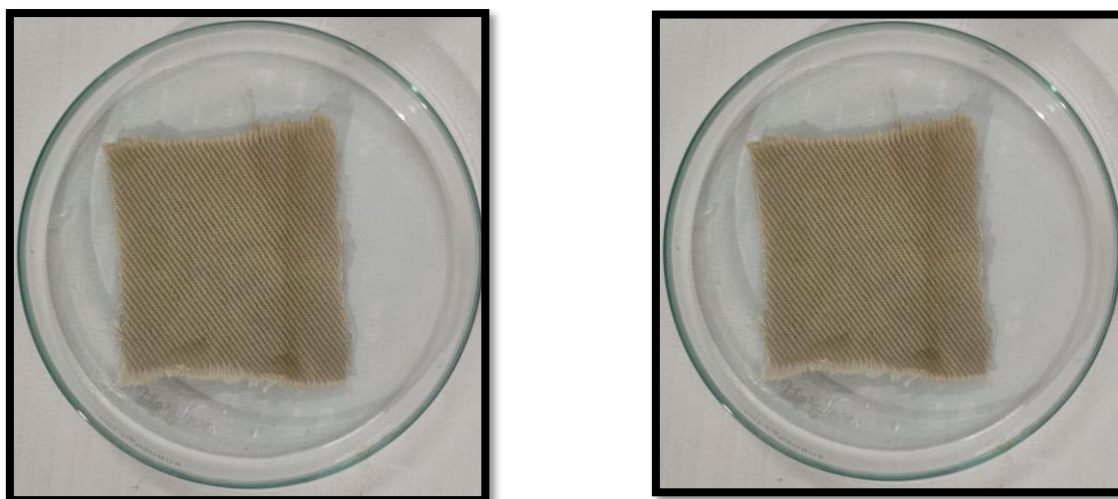


Before Washing [A]

After Washing [B]

Fig .5, COLOUR FASTNESS IN *BRASSICA OLERACEA* DYED FABRIC DENIM FABRIC





Before Washing [A]

After Washing [B]

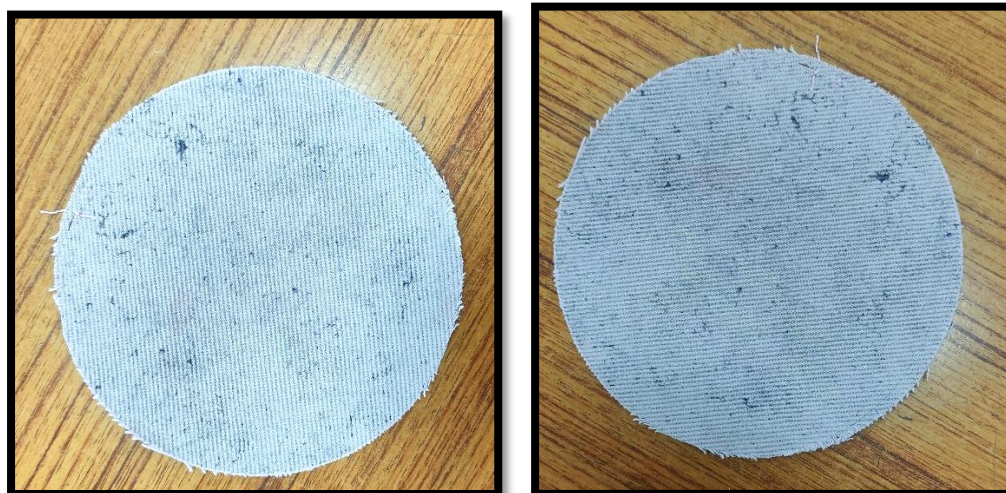
**Fig.6, COLOUR FASTNESS IN *BRASSICA OLERACEA* DYED FABRIC (DENIM FABRIC)**

**2.GSM CUTTER**

**1. DENIM FABRIC**

**Table.2, GSM Test**

S.NO	SAMPLES	GSM TEST
1.	Sample 1	4.56g
2.	Sample 2	4.36g



[A]

[B]

**Fig.7, GSM TEST IN *BRASSICA OLERACEA* DYED FABRIC (DENIM FABRIC)]**

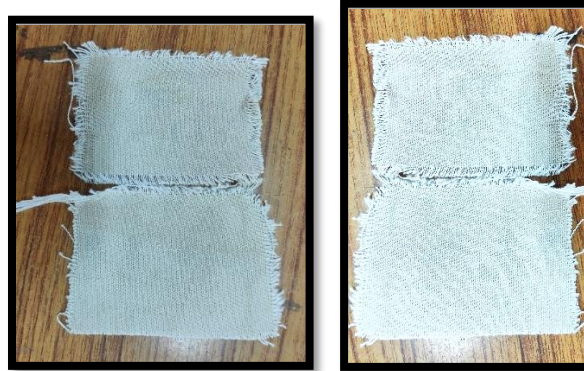
**3.TEARING STRENGTH TEST**

**1. DENIM FABRIC**

**Table.3, Tearing Strength Test**

S.NO	SAMPLES	FABRIC WEIGHT	TEARING TEST
1.	Sample 1	3.20g	95 of range

2.	Sample 2	3.12g	100 of range
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[1]

[2]

**Fig.8, TEARING STRENGTH TEST IN BRASSICA OLERACEA DYED FABRIC (DENIM FABRIC)**

### 7. CONCLUSION:

The study on the use of natural dyes from marigold flowers in textiles provides valuable insights into sustainable and eco-friendly dyeing processes. Natural dyes are environmentally friendly alternatives to synthetic dyes, reducing the use of harmful chemicals and minimizing the ecological footprint. They offer a wide range of color, including purples, blues, and vibrant yellows and oranges, providing a rich palette for textile designers and manufacturers. These dyes are biodegradable, reducing the risk of allergic reactions or skin irritations. They have been used in various cultures for centuries, reflecting tradition, heritage, and artistic expression. However, natural dyes also face challenges such as colourfastness and standardization issues, which need to be addressed for wider adoption in the textile industry. Further research is needed to refine the dyeing process, improve colourfastness, and explore the potential for scaling up production. Collaborations between textile experts, botanists, and chemists can help overcome these challenges. Overall, the study demonstrates the potential of sustainable, eco-friendly, and culturally significant dyeing methods in the textile industry.

### 8. ANNEXURE:



**[Fig.9, PILLOW COVER AND PHONE CASE IN RED CABBAGE DYE]**

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