

DEVELOPMENT OF TIE AND DYE SUSTAINABLE PRODUCT WITH NATURAL DYE

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Abstract: The aim of the study was to evaluate the performance of dyes extracted from plant leaves in cotton dyeing. The current textile dyeing business employs much too many synthetic dyes to suit the color requirements of the world's textile consumption since they are less expensive, offer a greater variety of vibrant hues, and have significantly better fastness qualities than natural dyes. These dyes pose major health risks and have a detrimental impact on the natural equilibrium. Natural dyes are made from natural resources, as the name suggested. Different textile fabrics were colored using coloring ingredients derived from natural resources of plant, animal, mineral, and microbiological origins. The dyeing industry was most sophisticated and scientific level today. There are many different methods for coloring. The natural dyes are extracted and the fabric dyeing process is examined in this article. The processes of extraction and purification are essential in the handling of natural dyes.. First extract the dye from *Mangifera indica*, *Annona squamosa* L. *Eclipta* by using aqueous solution method. At a boiling point of 100 °C, these compounds have a specific vapor pressure and are either insoluble in water. After completed boiling green & red shade dyes are obtained. Natural mordant like alum, salt, vinegar & coffee powder was used as a mordant in the extracted dye coloration process for achieving different colours. Cotton fabric is tie & dyed with this three different solution and dried. After the process physical tests are like Colour fastness to rubbing, colour fastness to sunlight and abrasion testing to know the fabric quality. Finally the sustainable products are developed

Keywords: Natural dyes, *Mangifera indica*, *Annona squamosa* L. *Eclipta Alba*, natural mordants, colour fastness, sustainable products.

I. INTRODUCTION

Dye that gives textiles, leather, paper, and other materials its colour so that washing, heating, light, and other factors that the material is likely to be exposed to do not easily change the colour. There are two different kinds of dyes: synthetic and natural. The use of natural dye in dyeing is arguably the oldest art form ever discovered. The first tool that individuals use to portray themselves and their surroundings is natural. Natural dyes or colorants are made from minerals, plants, or invertebrates. Most natural dyes are vegetable dyes derived from plants, including wood, bark, leaves, berries, roots, and other biological sources like fungi. Dyes Made from Plants. Evidence of natural dyeing in numerous ancient societies has been found all over the world. Mordanting is the crucial process for preparing fibers to absorb colour. It involves a mineral salt that binds with the fiber, facilitating the dye's adhesion. Cotton cloth is one of the most commonly used materials. Using dye extracted from natural plants to dye cotton fiber is said to be environmentally benign. *Annona squamosa* L. is an American shrub or small tree that is a member of the Annonaceae family. Some of these substances are linked to the ability of plants to produce dyes; for example, tannins in leaf extracts give them dark hues.

Additionally, in many regions of the world, different portions of this plant have long been recognized for their potential as medicines to treat illnesses. The leaves of *Annona squamosa* L. stated by (Prathyusha, Ket.al.,2022) Were employed to make an extract that could be used as *Mangifera indica* (mango)dye in the current work, which involved coloring simple cotton woven cloth using the extract.*Eclipta prostrata*, also referred to as fake daisy, Bhangra, or brindraraj, is one such natural source. Sustainable products are ones that, from the extraction of raw materials to their ultimate disposal, benefit the economy, society, and environment. while also protecting the environment and public health. Renewably or recycled materials can be used in textiles, which are made with techniques that save energy, water, and hazardous chemicals.Tie and dyeing usually involves folding, twisting, and pleating the fabric or garment.The cloth can be adorned with a vast array of designs using tie and dye, ranging from classic patterns like the spiral, peace sign, diamond, sunburst, and marble effect to stunning artwork.

II. MATERIALS & METHOD

SELECTION OF RAW MATERIAL

Cotton cloth was sourced from textile store. Modrant (salt, coffee powder, vinegar) was sourced from Supermarket

SOURCES OF DYEING MANGIFERA INDICA

Mango leaves used for the extraction purpose was collected from nearby trees and dried using sunlight



ANNONA SQUAMOSA L

Custard apple leaves used for the extraction purpose was collected from nearby trees



ECLIPTA ALBA

Eclipta alba used for the extraction purpose was collected from road side



MORDANT SOLUTION

Mordant is the important process of prepare fiber to accept colour .A metallic that fixed with fiber to allow the dye to bond to it .The mordants are used in this dyeing process are salt and coffee powder and vinegar

PREPARATION OF DYE SOLUTION

PROCEDURE FOR DESIZING

Desizing is the process of taking the sizing materials out of the woven fabrics' warp strands. In this process Detergents as been used for desizing .Detergent are substances that can dissolve dirt or oil from a substance and maintain it in suspension

DYE EXTRACTION OF *ECLIPTA ALBA*

The freshly harvested leaves of *Eclipta alba* were used to make the leaf extract. With carefully surface cleansed using distilled water after running tap water. The leaves were then boiled after being chopped into little bits. After being made, the leaf extract was filtered. then mordent will be add in the state while boiling stage Use the cotton fabric which as been desized put on the dye solution leave it for an hour for the fabric absorb the dye .after the process over dry it

MEASUREMENT

S.NO	INGREDIENTS	MEASUREMENT
1	<i>Eclipta alba</i> (leaves)	65
2	Mordant (Salt,coffee powder)	25G/25G
3	ML ratio	2.5ML
4	Temperature	100°C
5	Time	1 hr

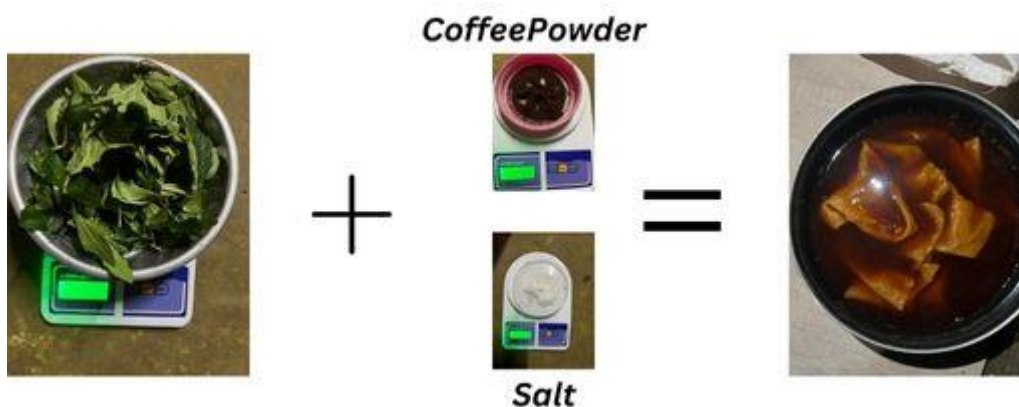


Plate:3.7 *ECLIPTA ALBA* SAMPLE

MIXING OF DYES

The dye extraction of Mangifera indica(mongo leaves) and the Annona squamosa l

MEASUREMENT

S.NO	INGREDIENTS	Value
1	Mangifera indica (dye solution)	150ml
2	Annona squamosa L (dye solution)	150ml
3	Total dye solution	300ml



TIE AND DYE METHOD

Folding Techniques

A variety of folding techniques can be employed to produce distinct patterns:

Accordion Folding: This method involves folding the fabric back and forth to generate pleats or stripes.

Square Box Folds: The fabric is folded into a square shape, followed by binding and dyeing to achieve a grid-like design.

Spiral Fold: By twisting the fabric into a spiral and securing it, a circular pattern is formed.

Scrunching: This technique entails crumpling the fabric and then binding it, resulting in a more random, mottled appearance.



QUALITATIVE ANALYSIS

COLOUR FASTNESS TO WASHING

SCOPE: This test is used to assess a fabric's color fastness to water.

SAMPLE COLLECTION: Random sampling

SAMPLE SIZE: 40 cm full width fabric

Atmospheric condition: Room temperature

CONDITIONING TIMING: 10-15 min

APPARATUS USED: Soap, sample cloth before testing, Grey scale for assessment

TESTING PROCEDURE:

Cut the specimen to the size of 40 mm

Cut the standard covering fabric to the sample size

Material to be tested was placed between two pieces were held together by stitching round the edge

The wash 10-15mins . after the specimen dried remove the sample specimen from the instruction an remove the stitching.

Compare the test specimen with the original sample for change in colour compare with grey sacal.

Compare the standard covering cloth with the fresh sample

5.2 COLOUR FASTNESS TO LIGHT

The resistance to fading of dyed textile when exposed to daylight exposure to sunlight is a testing

SCOPE: This test is used to assess a fabric's colour fastness to sunlight

SAMPLE COLLECTION: Random sampling

SAMPLE SIZE: 40 cm full width fabric

APPARATUS USED: UV rays, sample cloth before testing, Grey scale for assessment

5.2.1 TESTING PROCEDURE:

Prepare a 7 specimen want to test along with a original one.

Place the fabric specimen in a location where they will receive sunlight directly.

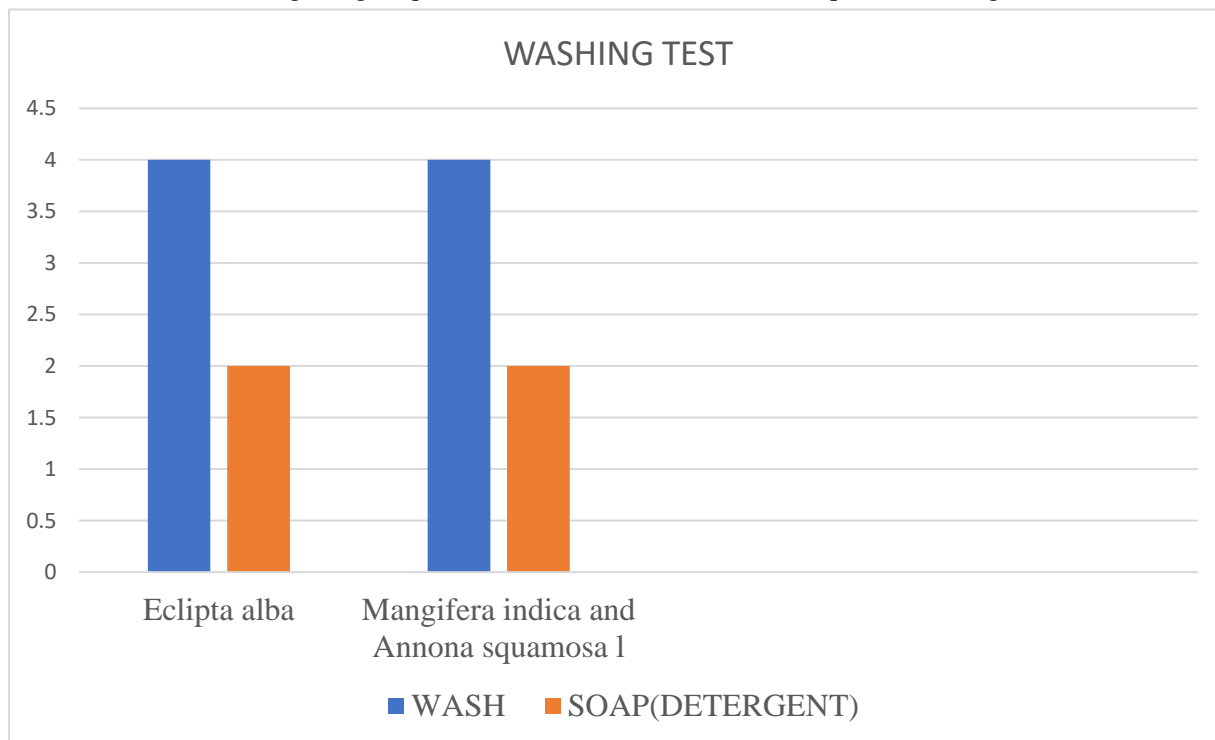
Check the specimen periodically if any colour change or fading,compare the test specimen with the original sample for change in colour compare with grey sacal.

III. RESULT AND DISCUSSION

COLOUR FASTNESS TO WASHING

S.NO	CLOTH COLOUR	IMMERSSION TIME	TEMPERATURE	SOAP (DETERGENT)	WASH WATER
1	Eclipta alba	40CM	1Hrs	Moderate	Good
2	Mangifera indica and Annona squamosa l	40CM	1Hrs	Moderate	Good

Colour fastness to washing using soap and water in the colour cloth of *Eclipta alba* with gives the moderate result in

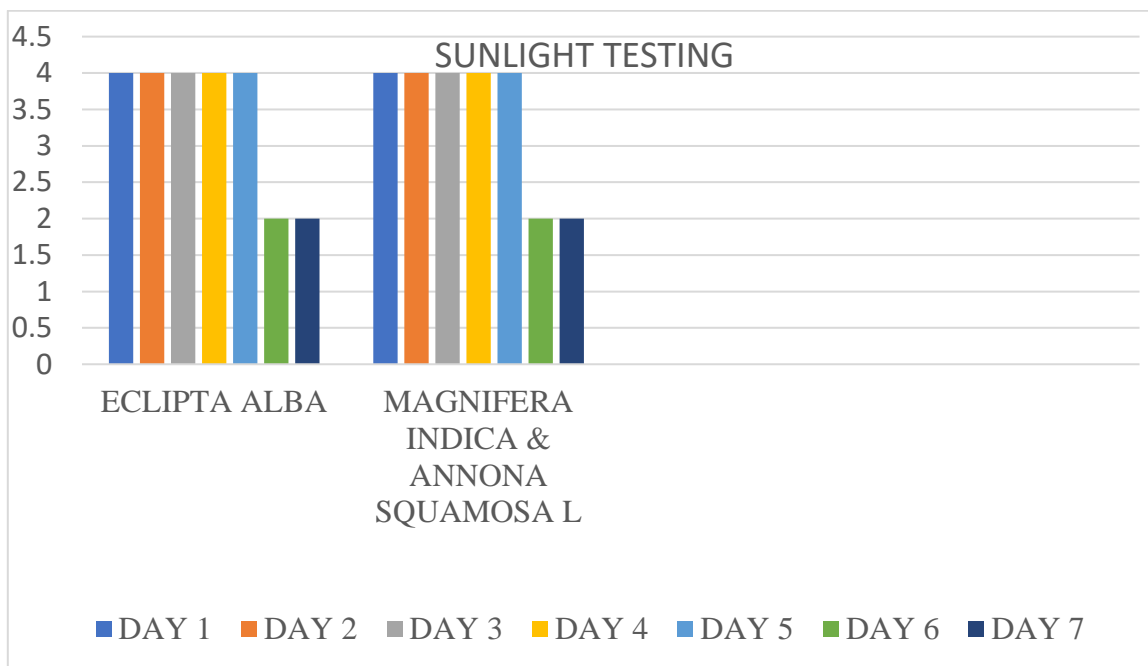


detergent ang good fastness in water

Colour fastness to washing using soap and water in the colour cloth of *Mangifera indica and Annona squamosa l* with gives the moderate result in detergent ang good fastness in water

S.NO	CLOTH COLOUR	IMMERSION TIME	TEMPERATURE	SUN LIGHT						
				NO of Days						
1	Eclipta alba	40CM	1Hrs	G	G	G	G	G	M	M
2	Mangifera indica and Annona squamosa l	40CM	1Hrs	G	G	G	G	G	M	M
G = GOOD			M = MODERANT							

COLOUR FASTNESS TO LIGHT



The resistance to fading of dyed textile when exposed to daylight exposure to sunlight is a testing in the *Eclipta alba* for the several days the first 5 days it be good and next 2 days it be moderant.

The resistance to fading of dyed textile when exposed to daylight exposure to sunlight is a testing in the *Mangifera indica and Annona squamosa l* the several days the first 5 days it be good and next 2 days it be moderant.

IV. CONCLUSION

Instead of using their synthetic counterparts, the current situation is more concerned with using the wide variety of natural resources for color pigments in fabrics, food products, and medications. This tendency aims to preserve and extend life on Earth while also protecting human health. Consequently, natural dyes must meet the same exacting performance requirements as synthetic dyes if they are to be commercialized. Therefore, a great deal of research and development work in this field is required.

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ANNEXURE

Plate 23 table mate



Plate 25 Placemat set