

DEVELOPMENT OF PARTY WEAR READY MADE SILK SAREE USING NATURAL DYE

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ABSTRACT

The main idea of extracting dyes from plant (natural) sources is to avoid the environmental pollution. Present days with global concern over the use of eco-friendly and biodegradable materials, considerable research work is being undertaken around the world on the application of natural dyes in textile industry. The effluent problems of synthetic dyes occur not only during their application in the textile industry, but also during their manufacture and possibly during the synthesis of their intermediates and other raw materials. After synthetic dyes were discovered in 1856, the usage of natural dyes for textile colouring significantly reduced. As a significant replacement for synthetic dyes, natural dyes have gained popularity. Our health is negatively impacted by synthetic dyes and any dyeing-related procedures. Natural colours can lessen the danger of synthetic dyes. As a natural source, indigo has been used for thousands of years to colour fabrics. This review aims to explore the various raw materials used for the extraction of natural dyes, the various natural dye extraction processes, and the characteristics of fabric dyed by those dyestuffs. In studies, the majority of natural dyes demonstrated very good fastness characteristics. Trees, bark, leaves, flowers, seeds, and a variety of other materials can all be used to extract colours. The majority of natural dyes have unique qualities like anti-microbial, low toxicity, low allergenicity, and UV protection.

Key Words: *Natural dye, silk, Tasmanian blue gum, Cuminum Cyminum*

INTRODUCTION

NATURAL DYES

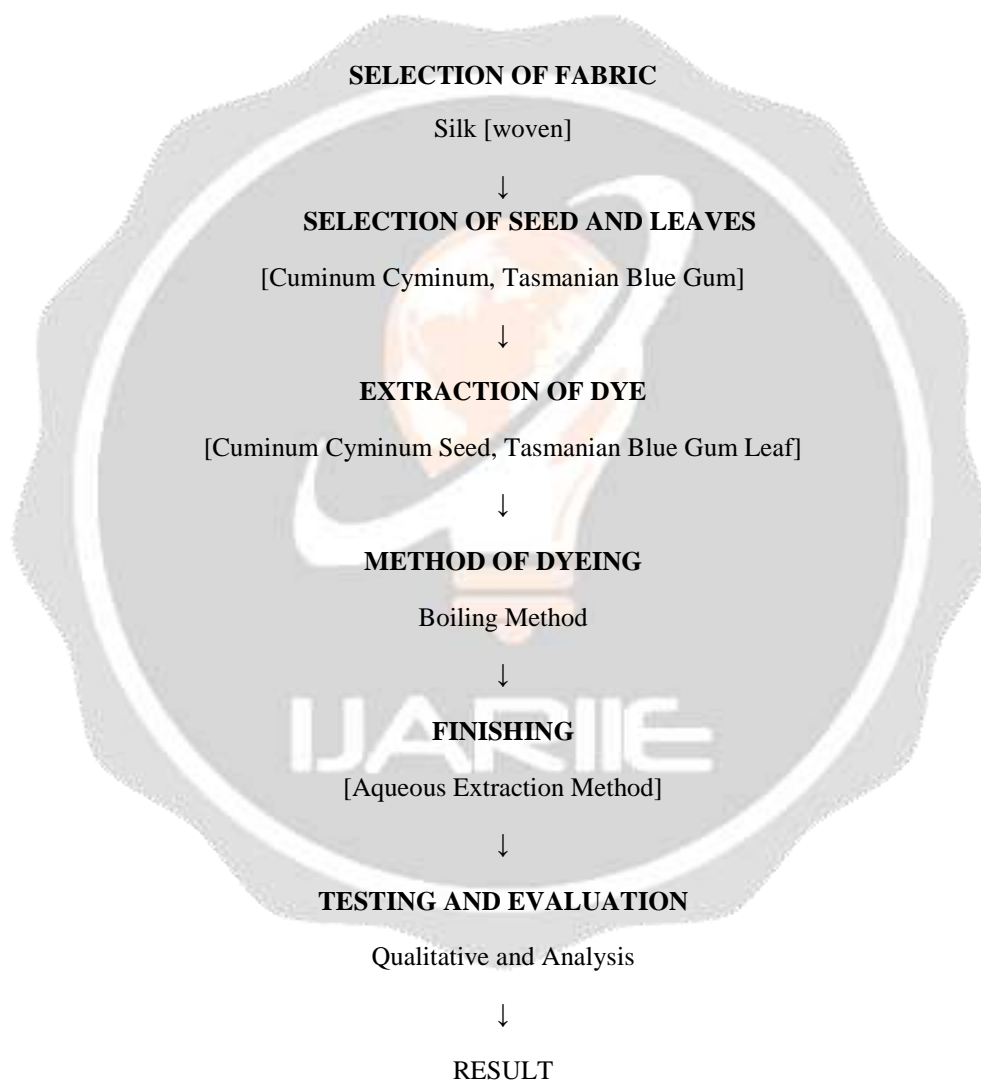
Natural dyes are pigments or colourants made from plants, invert sugars, or minerals. The bulk of natural dyes are vegetable dyes derived from plant sources, including roots, berries, bark, leaves, and wood, as well as other biological sources like fungi. Researchers have discovered Neolithic-era textile dyeing artefacts. Around 5,000 years ago, dyeing with plants, barks, and insects was practised in China. Little has changed in the fundamentals of dyeing over time. The dye material is typically placed in a pot of water and heated to extract the dye compounds into solution with the water. The dyed fabrics are then added to the pot and heated until the desired colour is produced. Textile fibre can be coloured before spinning or weaving ("dyed in the wool"), after spinning ("yarn-dyed"), or after weaving ("piece-dyed"). To bind the dye to the textile fibres, many natural dyes need the application of compounds referred to as mordants. Metal salts called mordants, which come from the Latin verb "mordere," which means "to bite," can assemble into a stable molecular coordination complex with both natural colours and natural fibres. In the past, alum (potassium aluminium sulphate, an aluminium metal salt) and iron were the two most popular mordants (ferrous sulphate).

SILK

A natural protein, silk can be woven into textiles in some forms. Fibroin makes up the majority of the protein that makes up silk, which is produced by certain insect larvae to create cocoons. The best-known silk is made from cocoons made by *Bombyx mori* (Domestic Silk Moth - Insects), a mulberry silkworm bred in captivity (sericulture). The triangular prism-like structure of the silk fibre, which enables silk cloth to refract incoming light at different angles and produce diverse colours, is

what gives silk its shimmering appearance. Although several insects generate silk, only the silk of moth caterpillars has traditionally been used to make textiles. Research has been conducted on various molecularly distinct forms of silk. Although some insects, such as web spinners and raspy crickets, make silk during their whole lives, the majority of silk is produced by insect larvae completing complete metamorphosis. Hymenoptera, which includes bees, wasps, and ants, as well as silver fish, mayflies, thrips, leafhoppers, beetles, lacewings, fleas, flies, and midges, produce silk. Arachnids, including spiders, are among the several sorts of arthropods that make silk. Although it ultimately spread to other parts of the world, silk manufacture began in China in the Neolithic era (Yangshao culture, 4th millennium BC). Although China retained its virtual monopoly over silk manufacturing for another thousand years, the Silk Road didn't begin to trade silk until some point in the latter half of the first millennium BC.

METHODOLOGY FLOW CHART



MATERIALS AND METHODS

SELECTION OF FABRIC

SILK



Fig: 1 [Silk Fabric]

THE SPECIAL PROPERTIES OF SILK

With these pearls of knowledge about the characteristics of silk, you'll feel silky smooth. Whether you're toying with your favourite silk scarf or relaxing in silk sheets, there's nothing quite like the sensation of silk against your skin. Let's examine the characteristics of silk to better understand why you adore this luxurious and smooth fabric.

SELECTION OF HERBS AND LEAVES

Cuminum Cyminum

The human diet has included cumin for thousands of years. It is cultivated in China, India, the Mediterranean, and the Middle East. Nowadays, India still supplies the majority of the cumin that is sold in the United States. Cumin is used as a food flavour and for making perfumes all over the world. It is also a well-liked treatment in conventional medicine. Several little seeds of cumin contain a lot of health benefits.



Figure:2 Cuminum cyminum seed

Tasmanian Blue Gum

As you learn all the wonderful things eucalyptus can do, you'll probably be inclined to use it excessively. Please keep in mind that, as we previously indicated, eucalyptus oil should not be drunk because it may be hazardous if done so! Second, test eucalyptus on a tiny area of skin before using it all over, as you should with any new product (including natural ones). If you have sensitive skin, certain components can irritate it. Yet, you don't have to instantly discount items that contain eucalyptus if your baby has sensitive skin. The ideal product will calm and soothe their skin without causing it any irritation.



Figure:3 Eucalyptus leaves

EXTRACTION METHOD

Aqueous extraction system

The dried and finely chopped raw material for natural dye (cuminum cyminum) is ground into powder form, new leaves were harvested from the tree (Tasmanian blue gum), and the colour component is then extracted in water using a normal procedure. The aqueous extraction of dye liquor is performed under a variety of conditions, including time of extraction, temperature of extraction bath, pH of extraction liquor, concentration of color-source material (source natural dye material in powder form), and material-to-liquor ratio (MLR). In each instance, a UV-Vis absorbance spectrophotometer plant and its extraction method can be used to assess the optical density or absorbance value for the aqueous extracts of the natural dye material at a certain (maximum) absorbance wavelength. Tasmanian blue gum fresh leaves and cuminum cyminum dry powder were collected, combined, and stored at 25°C for 8 hours before being filtered through filter paper.

Preparation of Raw Materials

The seed was first ground into a powder. The powder was next sieved with a (60) mesh screen to get rid of the bulky residues. Then the fresh tree leaves were ploughed for boiling. After that, it was put to use in the extraction process.

Natural Dye Extraction from the cuminum cyminum and Tasmanian blue gum

Tasmanian blue gum and cuminum cyminum powder were individually added to a steel saucepan with 400 cc of water. The saucepan was then heated at 80°C for one hour. Filter cloth was used to chill and filter the solution. 200 cc of each dye solution were ultimately obtained.

Scouring the silk Fabrics

The fabric was first cleaned by being washed for 30 minutes in hot, detergent-containing water. Following a water rinse, the materials were let air dry for the final step.

METHOD OF DYEING

BOILING METHOD

Tasmanian blue gum leaves and about (7) g of Cuminum Cyminum powder were added to a steel kettle with 400 ml of water. The pot was then cooked separately for 1 hour at 80°C. The solution was chilled and put through a filter. Eventually, 200 cc of each dye solution were collected. [Mostafa2011].

Boiling Method



Figure.4

QUALITATIVE ANALYSIS

COLOUR FASTNESS TEST

COLOUR FASTNESS TO WATER

- Scope: This testing is used to determine the colour fastness of fabric to water.
- Sample collection: Random sampling

S. No	Clot h Color	Specimen size	Immersi on time	Temperatur e	Crocking test	Soap	Wash water	Light	Chlorine
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- Sample size: 40 cm full width fabric
- Atmospheric condition: 70° to 90° F
- Conditioning timing: Minimum 1 hour
- Apparatus used: Perspirometer, Air oven, Aluminium container, Grey scale for assessment.

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 perspirometer.
- 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

RESULT AND DISCUSSION:

RESULTS:

Colour fastness tests might be more important depending on the design and intended use textile products. Standards tests for colour fastness to water wash, chlorinated water, soap and other unique conditions. Results were findings the both yellow colour and brown colour cloths are not fading while doing above tests.

TABLE-1

Colour fastness test result table

1	Bro w n	40mmX 100 mm	1 hrs.	Room temperature	Good	Good	Good	Excell ent	Good
2	yello w	40mmX 100 mm	1 hrs.	Room temperature	Moderat e	Moderate	Good	Good	Moderate

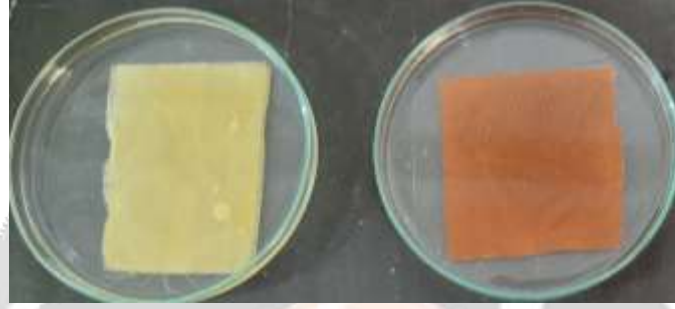


Figure.5

Color fastness test result image of the natural silk fabric

6. QUANTITATIVE ANALYSIS

A group of 40 persons were used to physically assess the developed product. Based on the use of the natural dye silk fabric, a questionnaire was created. The opinions of consumers are regarded as the main factors, and additional information, such as the product's good and negative attributes, was also questioned.

6.1. SILK SAREE SURVEY QUESTIONS

01. Does natural dye helps in preventing of skin disease? YES/NO

01. தோல் நோயைத் தடுக்க இயற்கை சாயம் உதவுமா?

02. Did you find this natural dye useful? YES/NO

02. இந்த இயற்கை சாயம் உங்களுக்கு பயனுள்ளதாக இருந்ததா?

03. Have you heard about natural dye on silk saree? YES/NO

03. பட்டுப் புடவையில் இயற்கையான சாயத்தைப் பற்றி கேள்விப்பட்டிருக்கிறீர்களா?

04. Does natural dye gives the same colour as synthetic dye? YES/NO

04. இயற்கை சாயம் செயற்கை சாயத்தின் அதே நிறத்தை தருமா?

05. Do you have used any natural dyed fabric before this? YES/NO

05. இதற்கு முன் நீங்கள் இயற்கை சாயம் பூசப்பட்ட துணியை உபயோகித்திருக்கிறீர்களா?

06. Whether you felt natural dye fabric is more popular than synthetic dye fabric? YES/NO

06. செயற்கை சாய துணியை விட இயற்கை சாய துணி மிகவும் பிரபலமானது என்று நீங்கள் உணர்ந்தீர்களா?

07. Have you heard about any positive things about natural dye? YES/NO

07. இயற்கை சாயத்தைப் பற்றி ஏதேனும் நேர்மறையான விஷயங்களைப் பற்றி நீங்கள் கேள்விப்பட்டிருக்கிறீர்களா?

08. Whether do you felt natural dye fabric cost is high? YES/NO

08. இயற்கை சாய துணியின் விலை அதிகமாக இருப்பதாக நீங்கள் உணர்ந்தீர்களா?

09. Does silk fabric is affordable for you? YES/NO

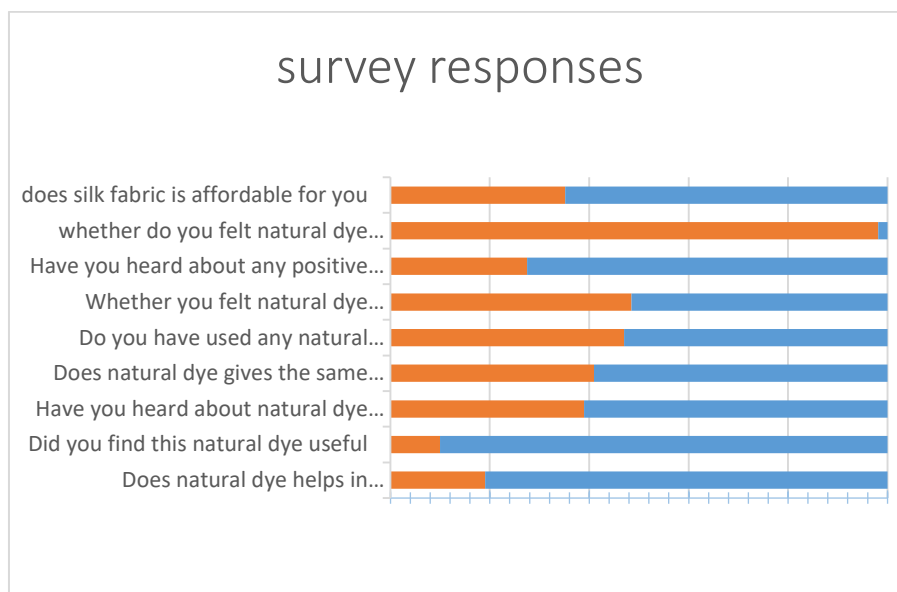
09. பட்டு துணி உங்களுக்கு கட்டுப்படியாகுமா?

10. Did you felt any irritation while using this? YES/NO

10. இதைப் பயன்படுத்தும் போது உங்களுக்கு ஏதேனும் எரிச்சல் ஏற்பட்டதா?

SURVEY QUESTIONS AND RESPONSES

QUESTIONS	RESPONSES	
Does natural dye helps in preventing of skin disease	81%	19%
Did you find this natural dye useful	90%	10%
Have you heard about natural dye on silk saree	61%	39%
Does natural dye gives the same colour as synthetic dye	59%	41%
Do you have used any natural dyed fabric before this	53%	47%
Whether you felt natural dye fabric is more popular than synthetic dye fabric	51%	49%
Have you heard about any positive things about natural dyes	72%	28%
whether do you felt natural dye fabric cost is high	65%	35%
does silk fabric is affordable for you	68%	32%



COST OF THE DEVELOPED FABRIC

Silk fabric -7,000

Blouse work – 1,500

Cuminum Cyminum -300

Total Cost – 8,800

According to the calculated amount for raw material used for developing the Natural dyed fabric the cost per fabric is Rs:7,000 it is less expensive as compared to the ones available in the market, when produces on large scale still the cost can be reduced and the fabric can be produced at the cheaper rate.

7. SUMMARY AND CONCLUSION

As natural colours are made from renewable resources, they never contaminate like synthetic dyes. Although though many people believe synthetic dyes have far greater colour fastness capabilities than natural dyes, some natural dyes have very good colour fastness qualities. The use of natural colours is increasingly restricted since the invention of synthetic dyes. Natural dyes, on the other hand, can degrade without the need of oxidising or reducing chemicals. If byproducts of the degradation of synthetic colours are proven to be harmful to human health, either directly or indirectly. Yet, there is some doubt as to whether or not natural dyes completely breakdown in a healthier manner.

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