



INVESTIGATION OF RUBIA CORDIFLORIA (INDIAN MADDER) DYE ON SILK FABRIC

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ABSTRACT Synthetic dyes release huge amount of waste and uniform colourants lead to health hazard. It also disturbing the ecobalance of the nature. Natural dyes are mostly derived from plants, invertebrates, or minerals. The most of the natural dyes are vegetable dyes from plant sources—roots, berries, bark, leaves, and wood—and other organic sources such as fungi and lichens. Natural dyes exhibit good biodegradability and are more compatible with the environment. In spite of their inferior fastness, natural dyes are more acceptable to environmentally conscious people around the world. The present study deals with the natural dyes extracted from *Rubia Cordiflora*. The extracted dye used to dye selected silk fabric and myrobalan mordant used for dye ability, fastness properties, absorbency test. Two shades with different concentration have been developed. Absorbency properties of the dyes extracted from madder and sinking test was determined. The colour fastness through washing and rubbing (Wet and Dry) was an excellent satisfaction in both different concentrations.

KEYWORDS : Natural dye, *Rubia cordiflora*, Myrobalan, Colour Fastness

INTRODUCTION

In ancient times natural dyes are used for dyeing the carpets, rugs and clothing by using various dye plants from root to flowers (Gulrajani, 1992). Now a days innovative dyeing techniques were developed to dye the natural fiber textiles and to improve the eco friendly nature (Samantaa & agarwal, 2009). Synthetic dyes are releasing more hazardous gas and peoples are facing many problems like allergy, rashes etc., The main impact during processing and production, the environment get more polluted by using synthetic dyes (Dutta,1996). Natural dyes are mostly eco-friendly, bio degradability, non toxic and non allergic (Shahid et al.,2003;Guesmi et al.,2012). Current research has been undertaken on the application of natural dyes.

Madder has traditionally been an important natural source of red colour for textiles (AG perkin et al.,1918) The *Rubia cordiflora* belongs to the family of Rubiaceae, also known as manjith or manjista, it is a perennial herbaceous climbing plant with very long roots, cylindrical, flexuous, with a thin red bark. Stem often have a long, rough, grooved, woody base. The colour pigment especially present in the root of *Rubia Cordiflora*

This study deals with the myrobalan mordant, colour fastness and absorbency test are evaluated on madder dye on silk fabric.

METHODOLOGY

Materials

Fabric, mordant and natural dyes

Silk fabric brought from Pothys-400, Oppanakar street, Townhall, Coimbatore. A myrobalan powdered were obtained from Sivaguru naatu marunthu kadai, Saibaba colony, Coimbatore. Powdered madder root were obtained from Mohan naatu marunthu kadai, periya kadai veethi, Dindugul.

Methods

Degumming of selected Fabric

Degumming is an essential for silk fabric. It is a process to removing the "sericin" substance from the silk fabric which it is necessary before dyeing, printing and finishing. This process helps to absorb dye uniformly in the fabric.

TABLE -1 PREPARATION OF DEGUMMING

| S. No | Requirement | Amount |
|-------|---------------|--------------|
| 1 | Fabric weight | 22.520 grams |
| 2 | Soap oil | 2 to 4% |
| 3 | Water (MLR) | 1:20 |
| 4 | Temperature | 100°C |
| 5 | Time | 45 |

Extraction of dye from *Rubia cordiflora* (Madder root)

For this study the aqueous extraction of madder roots was done, to bring out the dye from the roots. At first it was dried and then dried

roots are converted into powder by using mixer, followed by boiling this powder. 1l of water was used for 100g of madder powder to make solution. This dye solution was boiled for 2 hours and then filter to get clean solution

Mordanting process

In this I have chosen natural mordant myrobalan (Kadukkai). In pre-mordanting, the mordant was applied to the fabric, I have weighted the dry materials followed by rinsing the fabric. For this study, I used two different grams of mordant 25g and 50g. Then we started moderating at 80°C temperature for 30 mins pre Mordanting.

Dyeing of silk fabric

Sample 1

TABLE-2 PREPARATION OF SAMPLE 1

| S.No | Requirements | Amount |
|------|-------------------|------------------------|
| 1 | Selected material | 1.250 gram (1/2 meter) |
| 2 | Dye solution | 250 ml |
| 3 | Mordant | 25 grams |
| 4 | Temperature | 100°C |
| 5 | Time | 30 mins |

Selected fabric was immersed in 250 ml of dye solution and boiled it for 1/2 hour. After completing the boiling process. Then the fabric was taken out and rinsed in cold water. Gentle squeeze was given to the sample and dried in shade until the water dried out.

Sample 2

TABLE-3 PREPARATION OF SAMPLE 2

| S.No | Requirements | Amount |
|------|-------------------|------------------------|
| 1 | Selected material | 1.250 gram (1/2 meter) |
| 2 | Dye solution | 250 ml |
| 3 | Mordant | 50 grams |
| 4 | Temperature | 100°C |
| 5 | Time | 30 mins |

Selected fabric was immersed in 250 ml of dye solution and boiled it for 1/2 hour. After completing the boiling process. Then the fabric was taken out and rinsed in cold water. Gentle squeeze was given to the sample and dried in shade until the water dried out.

Colour fastness to washing

Colour fastness through washing was determined by IS 764-test 3-1979 method. The fabric was stitched on edge of four corners. The silk fabric was washed in water by detergent solution. Colour change in the fabric was assessed by grey scale. The rating of grey scale ranges from grade 1 (poor) to grade 5 (excellent).

Colour fastness to rubbing (Dry and Wet)

Colour fastness through rubbing (Dry and Wet) were tested by using a crockmeter by placing the fabric on a panel and 20 rotation was given to the sample. The colour transfer and colour change from the unfinished and finished, white material was assessed with the help of gray scale.

Absorbency test

Sinking test

Sinking test is a test for checking the absorbency of the material. The 1×1 inch piece of fabric is immersed in the soft water. The sinking time is measured using stop watch. If sample does not immerse in the soft water. If sample does not immersed within a minute it is consider as poor absorbency.

RESULT AND DISCUSSION

Colour fastness to washing

TABLE-4 COLOUR FASTNESS TO WASHING

| Sample | Colour Fastness to washing | |
|------------------------|----------------------------|-------|
| | Before | After |
| Dyed fabric (Sample-1) | 5 | 4 |
| Dyed fabric (Sample-2) | 5 | 3 |

Colour fastness before washing was rated excellent and colour fastness after washing of the sample 1 was rated as good and sample 2 was rated moderate.

Colour fastness to rubbing (dry and wet)

TABLE-5 COLOUR FASTNESS TO RUBBING

| Sample | Colour Fastness to Dry crocking | | Colour Fastness to Wet crocking | |
|------------------------|---------------------------------|--------------------|---------------------------------|--------------------|
| | Before dry crocking | After dry crocking | Before dry crocking | After dry crocking |
| Dyed fabric (Sample-1) | 5 | 5 | 5 | 4 |
| Dyed fabric (Sample-2) | 5 | 5 | 5 | 4 |

Colour fastness before dry crocking was rated excellent and colour fastness after dry crocking of sample 1 and 2 was rated excellent. Colour fastness to before wet crocking was rated excellent and colourfastness to after wet crocking of sample 1 and 2 was rated good.

Absorbency test

Sinking test

TABLE-6 SINKING TEST

| Samples | Sinking (mins) |
|------------------------|----------------|
| Undyed fabric | 3 |
| Dyed fabric (Sample-1) | 1.40 |
| Dyed fabric (Sample-2) | 1.03 |

The sinking test of undyed was taken more than 3 mins and dyed sample 1 and 2 was immersed within 1 mins

CONCLUSION

Two different concentration of madder was extracted, and applied on silk fabric and investigated for dyeing colour fastness and absorbency test activity. *Rubia cordiflora* creates a wide variety of red shades on silk material. Natural dyes are bio degradable. So to promote this natural dyes. I have dyed Madder in silk fabric. Developed two different shades of natural dyes were evaluated among that sample-1 and 2 was rated excellent.

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