

Extraction Of Natural (Dab Shell And Latkan) Dyes Blended It With Synthetic (Reactive Red And Methyl Orange) Dyes And Observe Their Dyeing Effects On Silk And Cotton Fibre.

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Abstract: Natural (Dab shell and Latkan) dyes were extracted by the conventional method. Blended it with synthetic (Reactive Red and Methyl orange) dyes, applied on silk and cotton fibre and observed their dyeing effects. It was found that in case of silk fibre using dab shell + latkan dyes + Reactive Red dye and dab shell + Latkan dye + Methyl orange produced deep chocolate and deep brown colour and shades. But in case of cotton fibre the colour and shade changed to light pink and light cream shade respectively. Light and washing fastness were also observed both kinds of fibre and found fine fastness to light and then washing.

Key Word: Dab- Shell, Latkan fruits, Reactive Red, Methyl Orange, Coper Sulphate, Acetic acid and Soap.

I. Introduction

Natural dyes are the best creation of Allah. They are obtained from the roots, barks leaves, fruits or wood of the plants.¹ In ancient times all dyes were obtained from natural sources.² Natural dyes exhibit better biodegradability, compatibility with environment and possess lower toxicity and non allergic reaction on human body^{3,4}. Some natural dyes give long life shade one cotton fibre⁵. A dye is a substance that observes strongly in the visible region or physical attraction between the dyes and the dyed substance⁶. For a substance acts as a dye which must be able to fix itself to the fibre and must be resistance to acid, alkali and water⁷.

(Indigo) a blue dye, (catechu) a brown dye, (Turmeric) a yellow dye, (Eucalyptus) a brown dye all are obtained from the different parts of the plants. They chemically identical to natural dyes⁸. Similarly Dab shell (*Cocos nucifera*) a chocolate dye obtained from its waste shell and latkan (*Bixa orellana*) orange dye obtained from its seed coat. At present, the textile industry is a flourishing in Bangladesh. The dyeing section of this industry is fully dependent on improved synthetic dyes. But many of them have got allergic reaction or human body⁹. Considering it in mind our present work has been under taken with a view to reduce the direct use of synthetic dye as well as to increase the use of natural dyes either alone or blended with synthetic dyes and applied on silk and cotton fibre and observe their dyeing effects.

11. Materials and methods

(a) Extraction of dab shell dye :

Waste green dab shell were collected from bazar and cut into flakes manually. The flakes were then smashed in a wooden mortar. The smashed flakes were then boiled with water in the ratio 1:50 for 8 hours in a stainless steel beaker. The extraction was repeated 2nd and 3rd times with water in the same condition. The extracts were filtered through a fine cloth to remove adhering materials. The filtrate was then concentrated by heating to requisite density. This concentrated pest like mass was used as dye.

(b) Extraction of latkan dye :

Warm water method :

50 gm of ripe mature latkan seeds were taken in ground joint conical flask and 100 one of warm water was poured in to it. Then the flask was put on a mechanical shaker and shaken one our at a temperature of 80^o c. After then it was allowed to stand for one our and the soluble portion was decanted from the seeds carefully. Finally the soluble portion was dried and obtained the dye (past like mass).

(c) Degumming of silk and cotton fibre:

For degumming soap solution of strength 3.5 g/litre was prepared by adjusting the ph 10.5. Now the silk and cotton fibre were dipped into the soap solution and then heated at 100^o c for one hour. After degumming both the fibre were washed 2-3 times with distilled water.

Dyeing of silk and cotton fibres :

Dyeing is the process by which the dye is applied to substance being dyed¹⁰. Now the mordanting bath was prepared with 0.5% copper sulphate in a 250 ml beaker in a ratio (1:20). The degummed silk fibre was dipped into the mordanting bath and heated to boiling for 30 minutes with stirring. Here mordant acted as a key or bridge between the dye and fibre¹¹. Then the mordanted silk fibre was taken out, squeezed and dried at room temperature. Two dye baths were prepared by dissolving 1 gm Dab shell dye, 1 gm Latkan dye and 0.20 gm Reactive Red dye and 1 gm Dab shell dye, 1 gm Latkan dye and 0.20 Methyl orange separately. Now the bath was heated for 30 minutes with occasional stirring. The bath was allowed to cool down and filtered. The mordanted silk fibre sample was dipped into the filtrate solution and again heated for 30 minutes at 90°C and the dyeing was continued for another one hour. The dyed fibres were then taken out, squeezed and treated with 0.1% sodium dichromate solution in a separate bath and heated at 90°C for 20 minutes. The dyed fibres were then taken out of the bath, washed with soap, rinsed well with 1% acetic acid solution and dried at room temperature. Shades were obtained which are shown in table - 1. The same dyeing procedure was followed in case of cotton fibre.

Fastness test:

Light and washing fastness were measured with the help of Grey Scale fastness grade-5 followed by I.S.O Recommendation.

(a) Light fastness :

The dyed sample of silk and cotton fibres were exposed to sunlight in air for 150 hours and the change in colour was measured with the help of Grey Scale. The results were shown in table-2.

(b) Washing Fastness:

All the dyed samples of silk and cotton fibres were washed with 3.5% soap solution separately for 3-4 times, squeezed and allowed to dry in sunlight. The washing fastnesses were measured with the help of Grey Scale which is shown in table-2.

11.1. Results and Discussion

From the results shown in table 1, it is observed that when the silk and cotton fibres were dyed with Dab shell dye & Latkan dye blended with Reactive Red dye and Methyl orange dye, they produced deep shades on silk fibres and light shades on cotton fibres with same concentration, dyeing temperature and dyeing time.

From the results in table 2, it is found that blended dyed exhibited somewhat poor light and washing fastness on cotton fibres than that on silk fibres when exposed to sunlight for 150 hours due to the binding capacity. The Reactive Red and Methyl orange were used in silk dyeing to give a wide range of shades which have very good fastness to light and washing¹³. Therefore, it can be concluded that the blended dyed Reactive Red dye and Methyl orange are best utilized for dyeing of silk fibres but not for cotton fibres. Because the binding capacity of silk fibres is more superior than the cotton fibres.

Table-1 :- Dyeing effects of silk and cotton fibres with natural (Dabshell dye +Latkan) dye blended with Reactive Red and Methyl orange.

Types of fibre	Mordanting used	Dyeing	Nature of shades
Silk fibre	0.5% copper sulphate and 1% Na ₂ Cr ₂ O ₇	1 gm Dab shell dye + 1 gm Latkan dye + 0.02% Reactive Red.	Deep chocolate
Silk fibre	“	1 gm Dab shell dye + 1 gm Latkan dye + 0.02% Methyl orange.	Deep brown
Cotton fibre	“	1 gm Dab shell dye + 1 gm Latkan dye + 0.02% Reactive Red.	Light pink
Cotton fibre	“	1 gm Dab shell dye + 1 gm Latkan dye + 0.02% Methyl orange.	Light cream

Table-2 :- Light and washing fastness of natural dye blended with Reactive Red and Methyl orange on silk and cotton fibre.

Types of fibre	Dyeing	Light fibres	Washing fastness
Silk fibre	Dabshell dye + Latkan dye + Reactive Red	5.2	5.0
Silk fibre	Dabshell dye + Latkan dye + Methyl orange.	4.5	5.0
Cotton fibre	Dabshell dye + Latkan dye + Reactive Red.	3.5	3.2
Cotton fibre	Dabshell dye + Latkan dye + Methyl orange.	3.5	3.5

IV. Conclusion

The dyeing effect, light and washing fastness of natural dyes on between the two fibres silk and cotton fibre blended with synthetic dyes it was found that the silk fibre has got good dyeing effect than that of cotton fibre, similarly light and washing fastness has also fine fastness on silk fibre due to its superior binding capacity than the cotton fibre. So it may be concluded that the silk fibre is best utilized for dyeing for its higher binding capacity.

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