

Effect of *Sapindus mukorossi* and *Balanites aegyptiaca* on colour fastness properties of Silk dyed with *Butea monosperma*

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Manuscript details:	ABSTRACT
<p>Received: 31 January, 2015 Revised : 26 February, 2015 Accepted: 28 February, 2015 Published : 30 March, 2015</p> <p>Editor: Dr. Arvind Chavhan</p> <p>Cite this article as: Ghembad Mukta * and Deshmukh Anjali (2015) Effect of <i>Sapindus mukorossi</i> and <i>Balanites aegyptiaca</i> on colour fastness properties of Silk dyed with <i>Butea monosperma</i>, Int. J. of Life Sciences, 3(1): 111-114.</p> <p>Copyright: © 2015 Author(s), This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>The paper reveals the study of <i>Sapindus mukorossi</i> and <i>Balanites aegyptiaca</i> as natural soap for degumming of silk was carried out. Three different concentrations 2, 4 and 8 % on weight of fabric were taken and degumming time 30 and 45 minutes was maintained during process. Silk Degummed with <i>sapindus mukorossi</i> and <i>Balanites aegyptiaca</i> were mordanted with potash alum and stannous chloride as metal mordent. <i>Butea monosperma</i> flowers were used for dyeing degummed silk, and M:L ratio was kept 1:50. Dyeing was carried out with 60°C for 60 minutes .Colour fastness properties of sample degummed with <i>sapindus mukorossi</i> and <i>Balanites aegyptiaca</i> and dyed with <i>butea monosperma</i> were assessed. It was observed that when increased in soap concentration reetha and hinganbet showed improved wash fastness rated as very good. In case of sunlight fastness there is slight difference was found reetha showed better fastness, where as no difference found among the sample degummed with hinganbet.</p> <p>Keywords: <i>Sapindus mukorossi</i>, <i>Balanites aegyptiaca</i>, <i>Butea monosperma</i>, Silk, Degumming and Fastness properties.</p>
	<p>INTRODUCTION</p> <p>Silk is universally accepted as a luxury fiber. The international Silk Association of the United States emphasizes this by its slogan “Only silk is silk.” Silk has a combination of properties not possessed by any other fiber: It has a dry tactile hand, unique natural luster, good moisture absorption, lively suppleness and draping qualities, and high strength (Kadolph, 2006). Silk has been considered as one of the elegant of fiber. it is popularly known as queen of fiber (Satheesh <i>et al.</i>, 2005) The process of degumming“ Removal of sericin from raw silk fabric is known as degumming process Ghembad (2014) Upadhyay and Singh (2012). The <i>sapindus mukorossi</i> (Gaertn) is a fairly large, deciduous tree with a straight trunk up to 12 meters in height. Flowers are about 5 mm across.</p>

The fruit is valves for the saponins (10.1%) present in the pericarp and constitutes upto 56.5 of the drupe known for inhibiting tumour cell growth. *Balanites aegyptiaca* (L) Delile is a deciduous tree found native to much of Africa and part of Middle East. This tree reaches 10m (33 ft) in height the yellow single seeded fruit is edible, but bitter (Dubey *et al.*, 2011).

Butea monosperma (Lam) is commonly known as flame of forest, belong to the family fabaceae. It is locally known as palas. Generally it grows gregariously on open grasslands and scattered in mix forest. It is an erect tree 12-15 m height and scattered in mix forest. It is an erect tree 12-15 m high with crooked trunk and irregular branches, bark, rough, ash coloured, young parts downy. and Deshwal, 2011). The plant of this genus are well known for their colouring matters. Flowers of *butea monosperma* exhibited anticonvulsant activity. (Sharma and Deshwal, 2011).

MATERIALS AND METHODS

Materials:

100% pure silk was used. Silk being a natural protein fibres, only the silk of moth caterpillars has been used for textile manufacturing. hence preferred safe route of using reetha and Hinganbet for degumming. *butea monosperma* flowers extract was used as a source of natural dye. two metal mordants *potash alum* (Alum) and *Stannous chloride* (Tin) were used.

Experimental Methods:

Degumming with *sapindus mukorossi* (reetha) and *balanites aegyptiaca* (hinganbet):

To make the degumming process eco friendly natural soaps were used for degumming. Optimization and soap concentrations were optimized, Three different concentrations 2, 4, and 8 % of reetha and hinganbet on weight of fabric were taken, with two different time period. Degumming was carried out at 60°C 1:50 M: L ratio was maintained during the degumming process. Optimum time for degumming was determined at 60°C with 1:50 M: L ratio. Time intervals for degumming were 30 and 45 minutes respectively.

Aqueous extraction of *butea monosperma* flowers:

Dye extract was prepared with 60% dye material concentration (OWF) keeping M:L ratio 1:50

extraction was carried out for 30 minutes, temperature was kept 90°C maintaining the level of extract in the container throughout. The extract was then allowed to cool at room temperature and filtered to remove residual part to get clear solution was then transferred to open bath for exhaust dyeing.

Mordanting:

Mordanting of degummed silk sample was carried out with 10% alum in combination with tin in 9:1 proportion (OWF) was taken in to make the process more ecofriendly. M:L ratio of mordanting bath was kept as 1:50. Initial temperature of the mordanting bath was 60°C and it was slowly raised up to 90°C. mordanting was carried out for 45 minutes with constant fabric liquor movement. Mordanting bath was allowed to cool. Mordanting was carried out separately for each mordant and experimental sample.

Dyeing:

Mordanted sample was entered into the previously prepared dye bath. The dye bath was set with 1:50 M:L at 60°C. temperature was slowly raised up to 90°C. Dyeing was carried out for 60 minutes with continuous fabric liquor movement. The dye bath was allowed to cool for minutes. The dyed sample was removed, washed thoroughly and shade dried. The procedure was repeated for each experimental sample.

Assessment of fastness properties:

Wash fastness (ISO2) (IS:3361-1979)

Sunlight fastness (IS:686-1985)

RESULTS AND DISCUSSION

Table - 1 reveals the Silk sample were subjected for washing fastness 100% silk was treated with 3 different soap concentration for two different time periods in the degumming process. Two natural sources Reetha and Hinganbet were used. Samples degummed using 2% Reetha powder for 30 minutes showed good colour fastness rated 4 on grey scale. Similar results was obtained for sample degummed for 45 minutes. When silk was treated with 4% soap solution for 30 and 45 minutes showed no significant difference in washing fastness which rated 4 as good colour fastness. for 8% Slight decrease in fastness was noted for dyed sample treated for 30 and 45 minutes showed fairly good results(fastness).

Table 1: Washing fastness of Silk Degummed with Reetha and Hinganbet Dyed with Palas

Soap Concentration	Degumming Time	Reetha		Hinganbet	
		C.S	C.C	C.S	C.C
2%	30	5	4	5	4
	45	5	4	5	4
4%	30	5	4	5	4/5
	45	5	4	5	4/5
8%	30	5	3/4	5	4/5
	45	5	3	5	4/5

Table 2: Sunlight fastness of Silk Degummed with Reetha and Dyed with Palas extract

Soap Concentration	Degumming Time	Reetha C.C	Higanbet C.C
2%	30	4	4
	45	4	4.5
4%	30	4.5	4.5
	45	4.5	4.5
8%	30	4.5	4.5
	45	4.5	4.5

It can be said over can discussion increase in soap concentration slight decrease in colour fastness when the sample were degummed with Reetha as a source of natural soap. Table also depicts rating for sample degummed with hinganbet powder it can be seen from the table when degumming time was kept 30 minutes and degummed with 2% Hinganbet powder dyed with palas extract when subjected for washing test it rated good fastness that is(4) 45 minutes degummed time showed no significant difference on fastness which also rated 4 as good fastness. Increased in soap concentration showed improved wash fastness which rated very good wash fastness rated 4/5 increased in degumming time showed no significant difference and noted similar wash fastness. Further increase in soap concentration during degumming time made absolutely similar results with very good wash fastness (4/5).

Kumaresan *et al.* (2011) have studied the application of eco-friendly natural dye on silk using combination of mordants. The colour fastness properties of the flower of *Cordia Sebestena* dyed on silk were studied using combination of mordants such as myrobolan:nickel sulphate myrobolan: aluminium

sulphate, myrobolan: potassium dichromate, myrobolan: ferrous sulphate, myrobolan:stannous chloride in the ratio of 1:3, 1:1, 3:1. The washing, rubbing, light and perspiration fastness of the dyed samples was also evaluated, giving fair to excellent fastness grades.

It is clear from the table 2 that reetha powder was used as source of natural soaps in three different concentrations for two different time periods. It was observed that when 2 % reetha soap was used for degumming and time allotted for degumming was 30 minutes. When dyed with palas extract. Good sunlight fastness that is 4 sunlight fastness. Similarly good fastness was noted for dyed sample which was degummed with hinganbet for 30 minutes. Using 2 % soap concentration for 45 minutes for degumming with reetha silk when dyed similarly good fastness were rated 4. Whereas for same concentration and time period using hinganbet and dyed noted improved sunlight fastness which was rated 4/5 as very good fastness. It was further noted that increase in soap concentration that is 4%for degumming and 8% with increased time period of degumming from 30 minutes to 45 showed very good sunlight fastness which rated 4/5 on grey scale for all the samples.

Where it can be said that there is slight difference between reetha showed better fastness properties, where as no difference was found among the sample degummed with hingan.

CONCLUSION

From the result it can be concluded that when degumming with *balanites aegyptiaca* as a natural soap found better performance compared to reetha.

Metal mordant helps in improving colour fastness properties degumming with *balanites aegyptiaca* natural soap imparted better fastness properties compared to *Sapindus mukorossi*.

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