



Colour Fastness Properties of Natural dyes

*The present study focus on dyeing of cotton fabric with the natural dye obtained from combination of onion skin (*Allium cepa*) and Mango bark (*Mangifera indica*). Selective, Simultaneous mordanting and natural dyeing of bleached mercerized cotton fabric was carried out using mordants (Aluminium Sulphate, Copper Sulphate, Ferrous Sulphate and Potassium Dichromate) with different percentages (20, 40, 60%) and extract of Onion skin and Mango bark Mixture as dyeing agent, under varying dyeing condition to optimize the dyeing process variables. It was found that dyed pieces over all good colour fastness to perspiration (Alkali and Acid) and Sunlight. **Keywords :** Dyeing Cotton, Mordants, Natural dye, Onion Skin, Mango Bark.*

SHAILJA KUMARI* & NASREEN RAHMAN SHEIKH**

Introduction :

Natural dyes have become a part of human life Since time immemorial Egyptian mummies , document of mughal period etc. bear testimony of the use of these dyes, today in the world of growing environmental Consciousness, natural Colourants have attention not only from the point of view of safety of health and environment but also for their beauty and Novelty.

Textile processing industry is one of the Major environment pollutants as the effluent from these industries contains a heavy load of chemicals, including dyes used during textile processing. There are two main ways to limit the environmental impact of textile processing. One is to construct sufficiently large and highly effective effluent treatment plants and the other way is to make use of dyes and chemicals that are environment friendly (Alis Hussain Tand Nawaz E 2009). The rich biodiversity of our country has provided us plenty of raw materials, yet sustainable linkage must be developed between cultivation, collection and their use (Kumaresan M. Palanisamy P N and Kumar PE 2011). Natural dyes can produce special aesthetic qualities, which combined with the ethical significance of a product that is environmentally friendly gives added values to textile Production as Craftwork and as an industry.

Natural dyes can offer not only a rich and varied source of dyestuff but also the responsibility of an income through sustainable harvest and sale of these dye plants (Jothi D 2008). Natural dyes are safe ecologically.

This has influenced the need to develop ecofriendly technologies to produce dyes from natural resources which come from leaves, stems, roots flowers bark etc. Natural dyes,

now have improved fastness property and good compatibility.

The Present study assesses the fastness property of natural pigment of onion skin and mango bark mixture dye. Simultaneous dyeing are similar to verma and venkata chalam (2002) for ferrous sulphate and with other mordants similar method to Gurumallesh and Senthil Kumar on silk (1998).

Objective of the Study :

(1) To study the colour fastness of the dye by combining the extract of onion skin (*Allium cepa*) and Mango bark (*Mangifera indica*) on cotton material to perspiration (Alkali and Acid.)

(2) To study the colour fastness of the dye prepared by onion skin and mango bark pigment mixture on cotton material to sunlight.

Hypothesis :

(1) After dyeing with the prepared dye. Cotton material will have good colour fastness to perspiration. (Alkali and Acid)

(2) After dyeing with prepared dye, cotton material will have good colour fastness to sunlight.

Material and Methods :

Materials : Following material were used in the study.

(i) Mill mercerized bleached plain. Weave cotton fabric was used.

(ii) Onion skin and outer most shell of the mango(bark) were used.

(iii) Mordants aluminium sulphate, ferrous sulphate, copper sulphate, potassium dichromate were used for mordanting purpose.

(iv) Na₂CO₃, H₂O₂, Na₂Sio₃ detergent were used for scouring and bleaching purpose.

*Assistant Professor (Department of Home Science), S.P.R.C. P.G. College, Haridwar (Uttarakhand)

**Professor

(Department of Home Science), Govt. Girls P.G. College, Barwani (Madhya Pradesh)

Method - Pre-treatment of Cotton Material :

Cotton fabric samples were scoured in standard conditions using the following ingredients.

MLR ; 1:50 Na₂Co₃ ; 5gpL :

Detegent : 2gpl tem. ; 40 450 c (room temperature)
Time: 30 min.

After scouring the cotton fabric samples were bleaching with hydrogen peroxide (H₂O₂), using the following ingredients.

MLR : 1:30 H₂O₂ : 2-3 gpL Tem : 700c

Na₂SiO₃: 1-2 gpL

Time: 60 min pH alkaline

After bleaching each sample was washed thoroughly in normal water and dried at room temperature

Extraction of dyes :

(i) Onion skin was dried in natural way and then powdered for the purpose of obtaining the dye.

(ii) Second natural source mango bark was cut into small chips then was for the purpose of obtaining the dye.

(iii) Ten gm. Onion skin powder was added in 100 ml water and extracted at 1000c for one hour then cooled and filtered 25 gm. mango bark chips were soaked in 100 ml cold water for twenty four hours then boiled for two hours in same water and water bath was maintained the solution was cooled filtered and used.

(iv) After extraction the samples were dying with 50 50 % mixture of onion skin and Mango bark dye solution.

Mordanting :

Mordant is an integral part of the natural dyeing process to improve the affinity. In the experiment from different mordants aluminium sulphate, ferrous sulphate, copper sulphate, potassium dichromate were used with 20, 40, 60% concentration.

Simultaneous mordanting : The mordant was added in the dye bath itself.

Application of dye :

For the dying Purpose fabric was dipped in 50 - 50% mixture of the extracted dye by onion skin and mango bark, in the same dye bath with material liquor ratio of 1:50 for 60 minutes at 900C for mordants (Aluminium sulphate, Copper sulphate and Potassium

dichromate) and pH of dyeing solution was changed to alkaline medium by used Sodium Carbonate. In case of ferrous sulphate mordant, 45 min and temperature 500C were used. After dyeing sample was washed with cold water and dried in shadow.

Result and Discussion :

The study was carried out to determine the effect of application of onion skin and mango bark dye mixture on cotton material to observe was perspiration and sunlight fastness with mordant at different percentages and result was obtained. After dying fastness to perspiration (Alkali and Acid) and sunlight were tested. Five readings of each

Table 1 : Colour fastness to perspiration (Alkali and Acid) of cotton pieces dyed with Onion skin and Mango bark dye combination using different mordants

S. No.	Mordant	Mordant concentration % owf	Perspiration (Alkali) fastness rating (Mean Values)		Perspiration Acid fastness rating, (Mean Values)	
			Numerical rating for changing colour	Numerical rating for staining of the two adjacent fabrics	Numerical rating for changing colour	Numerical rating for staining of the two adjacent fabrics
1.	Aluminium Sulphate	40	4/5**	4/5**	4*	4/5**
2.	Ferrous Sulphate	20	4/5**	5***	4/5**	4/5**
3.	Copper Sulphate	20	3	2/3	3	3/4
4.	Potassium Dichromate	40	4/5**	4/5**	4/5**	5***

*** No staining ** very slight staining *slight staining

piece were recorded and after taking reading of very piece their average mean value was calculated (Table No. 1 and 2).

Table no.1 shows that the colour fastness obtained by using Aluminium Sulphate (40%) Ferrous Sulphate (20%) and Potassium Dichromate (40%) have good colour fastness to perspiration (Alkali) and copper sulphate (20%) showed moderate fastness Aluminium Sulphate (40%), Ferrous Sulphate (20%) and Potassium Dichromate (40%) have good

Table 2 : Colour fastness to Sunlight of cotton pieces dyed with Onion skin and Mango bark dye combination using different mordants

S.No.	Mordant	Mordant concentration % owf	Sunlight Fastness rating (Mean Values)	
			Numerical rating for changing colour	Numerical rating for colour staining of the two adjacent fabrics
1.	Aluminium Sulphate	40	4*	4/5**
2.	Ferrous Sulphate	20	4/5**	5***
3.	Copper Sulphate	20	4*	4/5**
4.	Potassium Dichromate	40	4*	4/5**

*** No staining ** very slight staining *slight staining

colour fastness to perspiration (Acid) and copper sulphate (20%), showed moderate fastness.

From the above table (Table No. 2) was clear that the colour fastness obtained by using Aluminium Sulphate(40%) Ferrous Sulphate(20%), Copper Sulphate(20%) and Potassium dichromate(40%) have good colour fastness. Similar results good to excellent fastness to sunlight observed by Devi et. al (2002) with Eclipt alba on silk.

Conclusion :

In this century a global awareness is already in place favouring the use of natural resources for protecting the environment and earth from pollution and ecological unbalances. The present scenario is focused more towards the utilization of the vast diversity of natural resources of colour pigments for their use in food materials, pharmaceuticals and Textiles in place of their synthetic counterparts considering the impact of chemical dyes on environment and its toxic nature. Going back to natural dyes is sensible option and colour fastness can be achieved by using modrants as the present study shows.

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Empowering Adult Girls Through Nutrition Education

*Nutrition justice will be achieved when women are empowered and nutrition programmes are responsive. Dr. Ambedkar tried on adequate inclusion of women's right in the political vocabulary and constitution of India i.e. Article 47- Duty of the State to raise the level of nutrition and standard of living of its people and the improvement of public health. Fighting against malnutrition and ensuring the empowerment of women is the main aim of this research work. In the present study sample of 500 adult girls of age 17 to 20 years in Jamnagar city were selected and grouped as 250 college adult girls of urban area and 250 non college adult girls of urban slum area. Nutrient requirement of protein, calcium and iron was inadequate in the diet of adult girls. Protein deficiency results in malnutrition. Iron deficiency anemia was prevalent in adult girls. Need of protein for growth and increased demand for iron during menstruation is necessary for adult girls. Nutrition education was given to take balanced diet containing essential nutrients protein, calcium and iron rich foods. The study provides hope for improving health of adult girls. **Key Words** : Malnutrition, Anemia, Nutrition education.*

KAMALAMANI R.RAO* & DR. VEENA S. SAMANI**

Introduction :

Life cannot be sustained without adequate nourishment. One needs adequate food for sustainable growth and development. Dr. Ambedkar tried on adequate inclusion of women's right in the political vocabulary and constitution of India i.e. Article 47- Duty of the State to raise the level of nutrition and standard of living of its people and the improvement of public health. Health is defined by the WHO as the "State of complete physical, mental and social well being and not merely the absence of disease or infirmity" to maintain good health and nutritional status. Public health systems need to prevent and treat micronutrient deficiencies, encourage to meet dietary needs of adult girls throughout their lives. Unhealthy food choices and imbalanced food intake in adults make them nutritionally vulnerable.

Objective :

- (1) To study nutritional requirement of adult girls .
- (2) To give nutrition education about dietary knowledge.

Methodology :

In the study sample of 500 adult girls were selected randomly and grouped as 250 college adult girls of urban area and 250 non college adult girls of urban slum area in Jamnagar city. Using questionnaire a 24 hour recall method was used to study the diet and nutrient requirement. Nutrition education was given related to dietary knowledge.

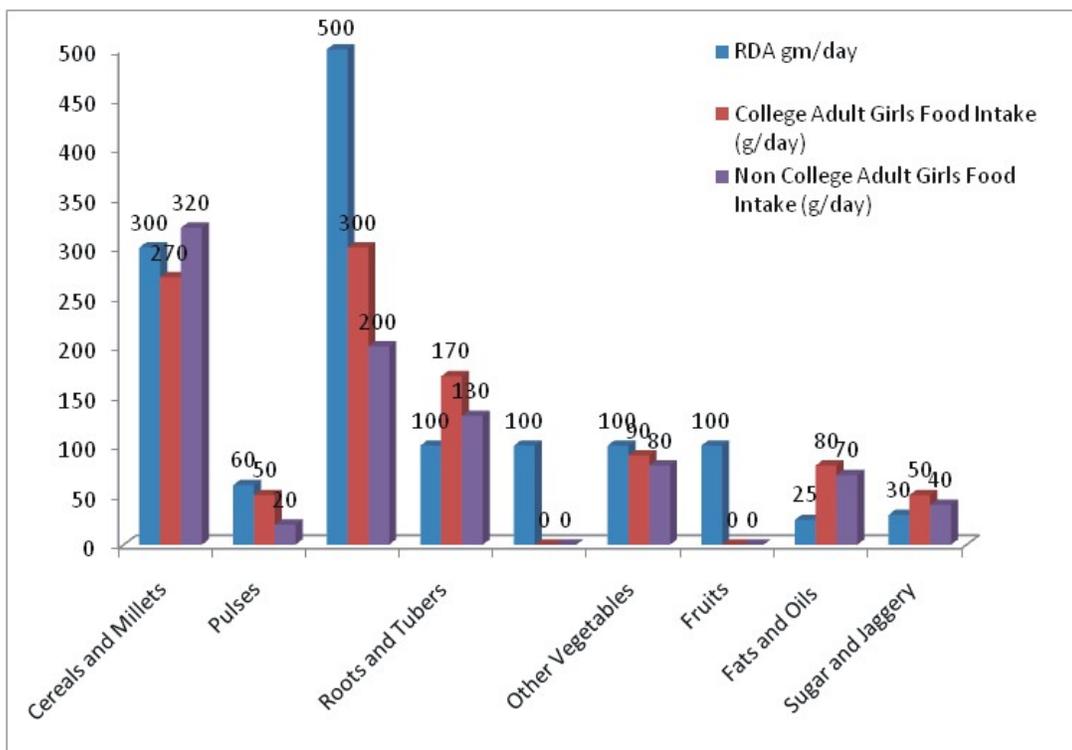
Result and Discussion :

It is revealed from the figure that food intake of cereals by college adult girls (Urban) is 270gm/day less than non college adult girls (UrbanSlum) 320gm/day and more than RDA. Cereals are the main source of energy. Dietary intake of pulses in both the groups is less 50gm/day and 20gm/day respectively compared to RDA. Pulses are rich in protein and is essential for growth. Daily intake of milk and milk products by both groups is less 300ml/day and 200ml/day respectively compared to RDA. They are important source of protein and calcium. Green leafy vegetables are not included in the diet of both groups which are rich in iron. Diet of both the groups had high intake of roots and tuber 170 and 130gm/day compared to RDA which is concentrated source of starch. Fruits rich in vitamins were avoided by both groups. High intake of fats and oils 80gm and 70 gm/day and sugar 50 and 40 gm/day respectively was taken by both groups compared to RDA which provides only fat and calories.

It is revealed from Table that calorie intake of college adult girls (Urban) is 2395.4 Kcal./day and in non college adult girls (UrbanSlum) is 2152.9 Kcal./day compared to RDA. Protein intake by college adult girls (Urban) was 59.6 gm/day and non college adult girls (UrbanSlum) was 46.4 gm/day which was less than RDA. Nutrition knowledge was given to include protein rich foods in the diet such as pulses

*Research Scholar, Rai University, Ahmedabad (Gujarat)

**Research Guide, Rai University, Ahmedabad (Gujarat)



Graph : Comparison of Mean Daily Food Intake of Adult Girls

Table : Nutrient Requirement of Adult Girls

No	Nutrients	RDA	College Adult Girls (Urban)	Non College Adult Girls (Urban Slum)
1	Energy (Kcal.)	2060-2225	2395.4	2152.9
2	Protein (gm)	63-50	59.6	46.4
3	Calcium (mg)	500-400	589.5	317.6
4	Iron (mg)	30	14.7	20.2

and dals ,soyabean,milk and milk products like paneer, buttermilk, use of nuts like groundnuts which are rich in protein as well as in B complex vitamins. Emphasis was given to include germinated pulses and fermented products in the diet to increase protein and vitamin C and vitamin C which is necessary for iron absorption.

Calcium in the diet of college adult girls(Urban) was 589.5 mg/day and in non college adult girls(Urbanslum) was 317.6 mg/day less than RDA. Nutrition education was given about calcium rich foods like green leafy vegetables, beet root, fruits like banana, papaya, oranges, nuts, sesame(Til),ragi, milk and milk products and importance of calcium for bone formation and to prevent osteoporosis. The diet of both the groups was deficient in Iron 14.7 mg and 20.2 mg/day respectively when compared with RDA. Symptoms of iron deficiency anemia like fatigue, weakness, breathlessness, headache and low haemoglobin value (Normal value-11.5mg/dl) in blood were observed. They were advised to take iron rich foods like green leafy vegetables, beet root, tomatoes, nuts, cereals etc. and vitamin C rich fruits like oranges, guava, papaya, amla which is important for iron absorption.

Conclusion :

Empowerment of adult girls through nutrition education can help to overcome protein deficiency and prevent risk of nutritional anemia. Nutrients like protein, calcium and iron were deficient in the diet of adult girls. Emphasis on nutrition education is required to reduce the risk of malnutrition and anemia and improve their health status.

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