

# Conceive of Waste Flowers

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**Abstract**— The flowers are offered to Deities in temple and thus available in huge quantities as temple waste. The total waste generated in Aurangabad city alone has been estimated to be 50kg per day. Most of these flowers are either dumped by the side of river or allowed to naturally decay, resulting in water pollution as well as environmental pollution. We have made use of the waste flowers and utilized its colorant for dyeing purpose which can be use in small scale industry.

**Keywords**— Waste rose and marigold flowers, Extraction, Scouring, mordanting, Cotton and silk dyeing.

## I. INTRODUCTION

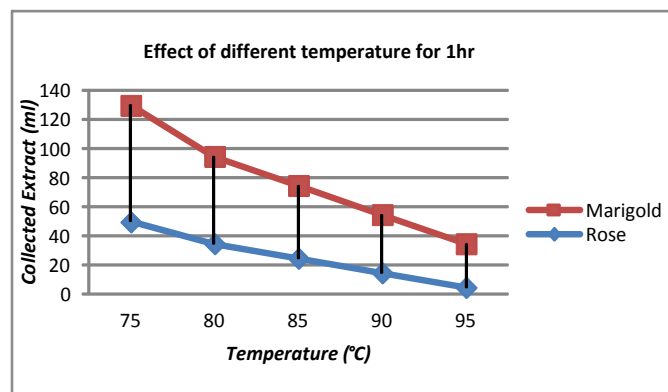
Huge amount of rose and marigold flowers are offered to God in temple in India, creating a very large waste. These waste flowers were collected and used for dyeing to cotton and silk. Extraction of dry flowers petals of rose and marigold with water at boiling condition. Extracted colour used for dyeing to cotton and silk using mordant copper sulphate and ferrous sulphate. The present work indicate good dyeing result. Waste flowers of temples are easily available and economical to use for dye. Dyeing of marigold and rose are no allergic to human health and available in abundant.

## II. MATERIALS AND METHOD

**Collection of flowers:** Waste flowers are collected from temples in Aurangabad city. These flowers petals were dried in room temperature. Average temperatures in Aurangabad 25 °C.

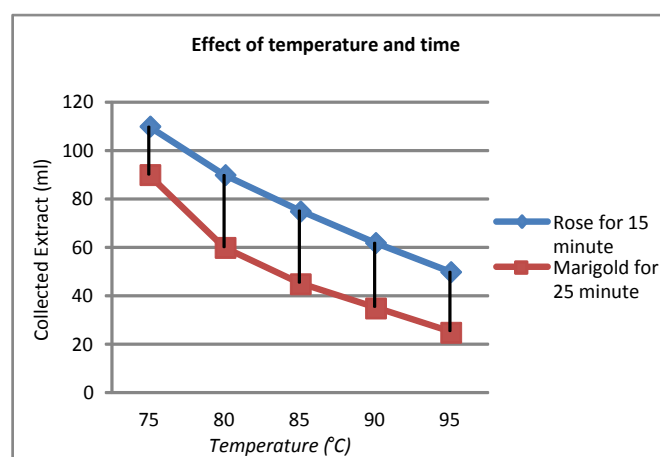
## III. EXTRACTION OF COLOUR

Dried flowers petals weight 20 gm were taken and dissolved in 140 ml distilled water. Heat it gradually to 95°C, maintain this temperature for 15min to yield a rose dye extract and for 25 min to yield marigold dye extract , to be used for dyeing . Now, this extracted dye solution (10 ml) was diluted with distilled water (40 ml).



Graph -1

Graph-1, observed collected most quantity of extract at temperature 75°C for 1hr, but not good colour quality. Temperature at 80°C -85°C collected good quality colour, Samples shows good result from flower dye. The extraction is favoured at high temperature 90°C - 95°C, but at higher temperature, there is problem of charring of dye and collected extract in minimum quantity.



Graph -2

Graph-2, Observed time for Rose 15 minute and 25 minute for Marigold petals for extraction at temperature 75°C to 90°C, collected low quality colour at maximum quantity. Temperature at 95°C observed collected extract good quality for dye to cloth.

#### IV. SCOURING


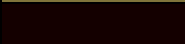
Cotton and silk fabrics were washed in solution containing 2 ml non-ionic liquid soap for 50 ml distilled water cloth samples were dipped for 20 min. The scoured sample was through washed with tap water and dried at room temperature.

#### V. MORDANTING

Mordant copper sulphate (CuSo4) and Ferrous sulphate (FeSO4) used. The fibres mordanted for 1hr at the temperature 80°C then samples of cloths squeezed and dried in room temperature.

Laboratory experiment, table-1 show that use of mordant can produce different colours on fabrics dyed with its flower extract.

TABLE-1 COLORIMETRIC VALUES

Flower + Mordant	Colour Shade	Colour Model (R,G,B)
Rose + Copper Sulphate		129,116,59
Rose + Ferrous Sulphate		20,0,0



Flower + Mordant	Colour Shade	Colour Model (R,G,B)
Marigold + Copper Sulphate		208,184,10
Marigold + Ferrous Sulphate		83,97,21

Table-1 shows received colour shade on dyeing with different mordants for Rose and Marigold flower.

#### VI. DYEING

Cotton fabric (10cm x 10cm) weighing 1.17 gm and silk fabric (10cm X 10cm ) weighing 0.64 gm were dyed in a beaker, gradually increased temperature at 80°C and maintained for 20 minute. After 3 days dyed cloth samples was washed with tap water by using detergent.

As per proportion of colour quantity and cloth size of experiment, dyed cloth sample (50cm X 50cm) of laboratory requirement to test fastness properties of cloth.

TABLE-2 FASTNESS PROPERTIES OF DYED COTTON WITH DIFFERENT MORDANTING OF ROSE EXTRACT

Tests on Cotton	Different mordant					
	Copper Sulphate (CuSo4)		Ferrous Sulphate (FeSO4)			
<i>Colour fastness to Rubbing (ISO 105X12 : 2001)</i>	Dry	4-5		4-5		
	Wet	4		4-5		
<i>Colour fastness to washing (ISO 105 C06 AIM at 40°C : 2010)</i>	Change in shade	2-3		3-4		
	Staining on	A	4-5	5		
		C	4	4-5		
		N	4	4-5		
		P	5	5		
		A	5	5		
W	5	5				
<i>Colour fastness to perspiration (ISO 105 E04 : 2013)</i>		Ac	Al	Ac	Al	
	Change in shade	4	4	4-5	4-5	
	Staining on	A	4-5	4-5	4-5	4-5
		C	4	3-4	4	4
		N	4	4	4	4
		P	4-5	4-5	4-5	4-5
A		4-5	4-5	4-5	4-5	
W	4	4	4	4		
<i>Colour fastness to light (ISO 105 B02 : 2013)</i>		4		4		

TABLE-3 FASTNESS PROPERTIES OF DYED SILK WITH DIFFERENT MORDANTING OF ROSE EXTRACT

Tests on Cotton	Different mordant					
	Copper Sulphate (CuSo4)		Ferrous Sulphate (FeSO4)			
<i>Colour fastness to Rubbing (ISO 105X12 : 2001)</i>	Dry	4-5		4-5		
	Wet	4		3-4		
<i>Colour fastness to washing (ISO 105 C06 A2S at 40°C : 2010) (Without steel balls)</i>	Change in shade	4		4		
	Staining on	A	5	5		
		C	4	4-5		
		N	4-5	5		
		P	4-5	5		
		A	5	5		
W	5	5				
<i>Colour fastness to perspiration (ISO 105 E04 : 2013)</i>		Ac	Al	Ac	Al	
	Change in shade	4-5	4-5	4-5	4	
	Staining on	A	4	4	4-5	4
		C	3-4	3-4	4	3-4
		N	4	4	4	3-4
		P	4-5	4	4-5	4
A		4-5	4	4-5	4	
W	4	4	4-5	4		
<i>Colour fastness to light (ISO 105 B02 : 2013)</i>		4		>4 (tested up to grade 4)		

TABLE-4 FASTNESS PROPERTIES OF DYED COTTON WITH DIFFERENT MORDANTING OF MARIGOLD EXTRACT

Tests on Cotton		Different mordant				
		Copper Sulphate (CuSO <sub>4</sub> )		Ferrous Sulphate (FeSO <sub>4</sub> )		
<b>Colour fastness to Rubbing</b> (ISO 105X12 : 2001)	Dry	5		4-5		
	Wet	4		3-4		
<b>Colour fastness to washing</b> (ISO 105 C06 AIM at 40°C : 2010)	Change in shade	2-3		2		
	Staining on	A	5	5		
		C	5	4-5		
		N	5	5		
		P	5	5		
		A	5	5		
W	5	5				
<b>Colour fastness to perspiration</b> (ISO 105 E04 : 2013)		<i>Ac</i>	<i>Al</i>	<i>Ac</i>	<i>Al</i>	
	Change in shade	3-4	4-5	4	4	
	Staining on	A	4	4	4-5	4
		C	3	3-4	3-4	3
		N	3	4	3-4	3
		P	4	4	4-5	4
A		4	4	4-5	4	
W	3-4	4	4	3-4		
<b>Colour fastness to light</b> (ISO 105 B03 : 2013)		4		>4 (tested up to grade 4)		

TABLE-5 FASTNESS PROPERTIES OF DYED SILK WITH DIFFERENT MORDANTING OF MARIGOLD EXTRACT

Tests on Cotton		Different mordant				
		Copper Sulphate (CuSO <sub>4</sub> )		Ferrous Sulphate (FeSO <sub>4</sub> )		
<b>Colour fastness to Rubbing</b> (ISO 105X12 : 2001)	Dry	4-5		4-5		
	Wet	4		3-4		
<b>Colour fastness to washing</b> (ISO 105 C06 A2S at 40°C : 2010) (Without steel balls)	Change in shade	3		2-3		
	Staining on	A	5	4-5		
		C	4-5	4-5		
		N	5	4-5		
		P	5	5		
		A	5	5		
W	5	5				
<b>Colour fastness to perspiration</b> (ISO 105 E04 : 2013)		<i>Ac</i>	<i>Al</i>	<i>Ac</i>	<i>Al</i>	
	Change in shade	4	4	4-5	4-5	
	Staining on	A	4-5	4	4-5	4
		C	3-4	3	3-4	3-4
		N	3-4	3-4	3-4	3
		P	4-5	4-5	4-5	4
A		4-5	4-5	4-5	4	
W	4	4	4	3-4		
<b>Colour fastness to light</b> (ISO 105 B02 : 2013)		4		>4 (tested up to grade 4)		

A= Acetate, C= Cotton, N= Nylon, P= Polyester, A= Acrylic, W= Wool.

Ac= Acidic, Al= Alkaline.

## VII. FASTNESS EVALUTATION

The dye samples were tested according to ISO method. The specific tests were as follows:

- Colour fastness to Rubbing : (ISO 105X12 : 2001)
- Colour fastness to washing : (ISO 105 C06 A2S at 40°C : 2010)
- Colour fastness to perspiration : (ISO 105 E04 : 2013)
- Colour fastness to light : (ISO 105 B02 : 2013)

Result of fastness properties of dyeing with Rose and marigold petals by using different mordants are shows in table 2,3,4 and 5.

Colour fastness properties of dyed sample were observed that almost shows good to very good rating and very good to excellent 4-5.

## VIII. SURVEY OF COLLECTION AND DYE TO CLOTH

- Daily collection of flowers = 50 kg
- Transportation cost =Rs. 200/-
- Labour charges = Rs. 400/-
- Other cost required for dyeing = Rs. 1000/-
- Total cost for dye = Rs.1500/-
- Approximately 25kg cloth can dye daily.

## IX. CONCLUSION

A Globe awareness is already in place favoring the use of natural resources for protecting the environment and earth from pollution and ecological imbalances. Hence, the presented work shows different flowers can be used as dye .In this study compound shades were obtained using combinations of natural dye and mordant to fabric sample.

## X. FUTURE SCOPE

1. Natural flowers colour can be use for making colourful candles.
2. Waste of flowers can be use as fertilizer.
3. Flowers can be use to making herbal gual.

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## REFERENCES

- [1] Raja A S M, 2012, "Extraction of Natural Dye from Saffron Flower Waste and its Application on Pashmina fabric".
- [2] Nattadon Rungruangkitkrai, 2012, "Eco-Friendly of Textiles Dyeing and Printing with Natural Dyes" RMUTP International Conference: Textiles & Fashion 2012, Bangkok Thailand.
- [3] Padma S Vankar, 2000, "Chemistry of Natural Dyes" RESONANCE
- [4] Kubelka P, Journal of the Optical Society of America A, 1954, 44 (4), 330.
- [5] Jothi D, Autex Research Journal, 2008, 8 (2), 49.
- [6] Thilagavathi G, Rajendrakumar K, Rajendran R, Indian J. Fibre Text Res, **2005**, 30, 431.
- [7] Pareek D, Chaudhary, M, Pareek, P K, Ravi Kant, Ojha K G, Pareek R, Pareek A, Der Pharmacia Sinica, 2011.
- [8] Enfield, NH. USA, 2006, pp 169.
- [9] Nehvi F A, Wani S A, Saffron production in Jammu and Kashmir, SKUAST-K, Srinagar, 2008, 269.
- [10] Mathur J P, Bhandari C S, Indian Journal of Fibre and Textile Research, 2001, 26, 432.
- [11] BS DILTA, 2011, "Flower drying techniques - A review" International Journal of Farm Sciences
- [12] Aravinda K and Jayanthi R 2004. Standardization of drying techniques for chrysanthemum (*Dendranthema grandiflora* Tzvelev cv Button Type Local) flowers. Journal of Ornamental Horticulture 7(3-4): 370-375
- [13] Bassapa H Sharana, Patil AA and Shirol AM 1991. Effect of drying on the colour intensity of everlasting flower *Helichrysum bracteatum* Andr). South Indian Horticulture 39(3): 172-173
- [14] Kashyap B, Sharma YD, Dhiman SR, Bhalla R and Thakur P 2007. Dry flower making: a potential cottage industry in HP. Quarterly newsletter of the Centre of Minor Forest Products for Rural Development and Environment Conservation. Vol xvii (3):5-8

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