

Bioprospection of underutilised plant resources for natural dyes.

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Abstract

The study was conducted on 10 plant materials grow in Maharashtra. 100 gm of each powder used for ethanol extraction by using Soxhlet apparatus. The results were amazing that plants shown wonderful colours.

The studies like, sensitivity of colour at different pH and heat were carried out. Of these, 5 plants have shown change in colour at different pH. Heat sensitivity studies carried out by mixing colours in milk, in this 7 plant colours do not show any change in colour while there was precipitation of milk in case of 3 plants.

The colours obtained were applied on muslin cloth, talcum powder and cheese to observe their applications so as to use these different pigments as coloring agents.

Keywords: Bioprospection, Natural dyes, Dye-yielding plant, Maharashtra.

Introduction:

India has a rich biodiversity with approximately 4, 90,000 plant species. Use of plant resources is great tradition in Indian since Vedic period. Use of natural colours are one of the most important application of the plants, as they are related with cultural practices, rituals, arts and crafts, fabrics and to satisfy personal needs.

Natural dyes are environment-friendly, for example, turmeric, the brightest of naturally occurring yellow dyes is a powerful antiseptic which revitalizes the skin, while indigo gives a cooling sensation (Mahanta and Tiwari, 2005). During the ancient times natural dyes were known for their use in colouring of food substrate, leather, wood as well as natural fibers. Natural dyes possess a wide range of shades, and can be extracted from various plant parts including roots,

bark, leaves, flowers, and fruit. After the accidental synthesis of mauveine by Perkin in Germany in 1856 and its subsequent commercialization, coal-tar dyes began to compete with natural dyes. The advent of synthetic dyes caused rapid decline in the use of natural dyes, which were completely replaced by the former within a century (Singh, 2000). However, research has shown that synthetic dyes are suspected to release harmful chemicals that are allergic, carcinogenic and detrimental to human health. Ironically, in 1996 Germany became the first country to ban certain azo dyes (Singh & Singh, 2002). Since the advent of widely available and cheaper synthetic dyes having excellent colour fastness properties, the use of natural dyes having poor fastness has declined to a great extent. However, recently there has been revival of the growing interest on the application of natural dyes on natural fibers due to worldwide environmental consciousness (Samanta and Agarwal, 2009). As a result with a distinct lowering in synthetic dyestuff costs, the natural dyes were virtually unused at the beginning of twentieth century (Kumaresan *et. al.*, 2011).

Natural dyes are now a days in demand not only in textile industry but in cosmetics, leather, food and pharmaceuticals. 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 (Gokhale *et. al.*, 2004).

Nowadays, fortunately, there is increasing awareness among people towards natural dyes. Natural dyes are preferred because they are non-allergic, non-carcinogenic and have lesser toxicity than the synthetic dyes.

In the present work screening of the plants for the availability of natural dyes, their extraction and some basic applications have been studied.

Materials and Methods:

Collection of Plant Material: Plants based on traditional leads were short listed and collected from different parts of Maharashtra and voucher specimens are deposited in the Herbarium of Deogiri College, Aurangabad.

Extraction: Plant parts were cut into small pieces and after drying in the shade plant material was mechanically powdered. 100 gm of each powder used for ethanol extraction by using Soxhlet apparatus for extraction. Then it was filtered and the filtrate was collected in a separate beaker.

pH studies: The studies like, sensitivity of colour at different pH by using pH meter.

Heat sensitivity: Tests were carried out by mixing the dye in mild and heated on burner for 5 minutes.

Applications: The colours obtained were applied on muslin cloth, talcum powder and cheese to observe their applications so as to use this different pigment as coloring agents.

Results and Discussion:

Out of the nine plant material of 8 plants mentioned in the paper, fruit of *Acacia auriculiformis* and stem of *Paveta crassicaulis* show yellowish colour in ethanolic, and the bark of *Acacia auriculiformis* and fruit of *Connarus monocarpus* show orange shade. While root of *Ocimum americanum*, *Wrightia tinctoria* and flowers of *Leonotis nepetaefolia* show dark brownish shades. The remaining plant species show the reddish brown shades.

pH studies revealed that fruit of *Acacia auriculiformis*, bark of *Mimusops elengi*, *Bauhinia racemosa*, fruit of *Bauhinia racemosa* show no any change in colour. While remaining plants show change in colour at different pH.









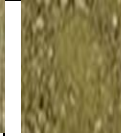




















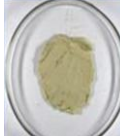





In case of heat sensitivity studies the plant colours were mixed in the milk at heated for 5 minutes in boiling condition the plants *Mimusops elengi*, *Ocimum americanum* and *Leonotis nepetaefolia* species show precipitation.






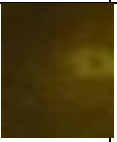




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Plant Name	Plant Part	Application/appearance on				
		In Ethanol	On TLC Plate	On muslin cloth	On Talcum powder	On Chakka
<i>Acacia auriculiformis</i> A. cunn. ex Bth. (Mimosaceae)	Bark					
<i>Acacia auriculiformis</i> A. cunn. ex Bth. (Mimosaceae)	Fruit					
<i>Mimusops elengi</i> L. (Mimosaceae)	Bark					
<i>Bauhinia racemosa</i> Lam. (Caesalpiniaceae)	Bark					
<i>Ocimum americanum</i> L. (Lamiaceae)	Root					
<i>Wrightia tinctoria</i> Br. (Apocynaceae)	Fruit					
<i>Paveta crassicaulis</i> Bramek. (Rubiaceae)	Stem					

<i>Connarus monocarpus</i> L. (Connaraceae)	Fruit					
<i>Leonotis nepetaefolia</i> (L.) Br. (Lamiaceae)	Flower					

pH Studies:

Sr.No.	Plant Code No.	pH	Colour
1.	<i>Acacia auriculiformis</i> A. cunn. ex Bth. Bark	5.94*	Orange
		4.0	No change
		8.9	Dull Yellow
2.	<i>Acacia auriculiformis</i> A. cunn. ex Bth. Fruit	4.9*	Yellow
		4.0	No change
		9.0	No change
3.	<i>Mimusops elengi</i> L. Bark	4.0*	Orange/brown
		7.0	No change
		9.0	No change
4.	<i>Bauhinia racemosa</i> Lam. Bark	7.1*	Brownish orange
		4.0	No change
		9.0	No change
5.	<i>Ocimum americanum</i> L. Root	4.0*	Brown
		6.6	No change
		8.9	Greyish-brown
6.	<i>Wrightia tinctoria</i> Br. Fruit	4.0*	Brown
		6.6	No change
		8.9	No change
7.	<i>Paveta crassicaulis</i> Bramek. Stem	4.1*	Yellow
		6.8	No change
		9.0	Dark yellow
8.	<i>Connarus monocarpus</i> L. Fruit	5.1*	Orange
		7.0	Slightly dark
		9.0	Darker
9.	<i>Leonotis nepetaefolia</i> (L.) Br. Flower	4.8*	Dark Brown
		6.8	No change
		9.0	Slightly brownish

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