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Natural dye: Yielding vegetable sources in Khandesh region (Maharashtra) India

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Abstract
The art of dyeing by natural colours has roots in the dawn of civilization. The paper sheds light on 53 plant species from khandesh region of Maharashtra (India) having potential. It seems that the demand for natural dyes is increasing in recent time due to their safe and anti – allergic effects. The information gathered from khandesh region after comparative study and analysis, will throw more light on plant wealth with particular emphasis of dye –yielding plant species. This, in turn, will be useful to the researchers in connection with R & D work of these plant sources.

Keywords: natural dyes, khandesh

1. Introduction

Man is not only desirous of his daily and basic necessities of his life, he also seeks enjoyment or many-making things in the form of beauty, art, music, shapes, colours, fragrance, etc. The biological kingdom Present on the blue planet affords him practically everything. After food, medicine and shelter, he is naturally attracted towards other aspects of life. Nature be shows a very pleasing things, a d that is a variety of colours manifested through stem, roots, leaves, flowers, fruits seeds plant juice and such other products. He uses dyes to change colour, to increase brightness and to make more attractive of the things of his interest and love.

At the backcross of hazardous synthetic dyes, a wave is discernible in search of natural vegetative dyes. Present author, while during a few decades in northern part of Maharashtra, could observe people using natural dyes for various purposes. Author's literary investigation also added information about such potentialities in the flora of the said region. This paper communicates the detail information on natural dyes available in the region and that borrowed from literature. A status report is presented herewith. The observations made and those borrowed from literature for the current plant taxa in khandesh region in these manner w.r.t. plant and family names, local names, useful part, exotic or indigenous nature, wild or cultivated status, habit, color and pigment know if any.

2. Results and Discussions

Since ancient times, dyestuffs have been used by mankind. Perhaps, there are practice arose as a result of accidental staining from fruits, roots, flowers, juice, etc. They have been in vogue to ward off the spells of evil spirits, to frighten enemies or even as a camouflage in war. There is a record of army soldiers of Alexander to be dyed red their dresses or clothing. This practice deceived the Persian army thinking that army of Alexander had been severely injured. Even coloring on mummy cerements included dyes from saffron, madder and other herbs. Until the middle of 19th century, natural dyes were the only source for coloring fabric. The first artificial dye viz; was discovered aniline by Henry Perkin of London (UK). (cf. Kochhar, 1981; Patil, 2008) [4, 8]. The era of synthetic dyes perforce negated the progress and search for natural dyes. In modern period, dyes are chiefly used in textile industry, for giving fast colors to the fabrics, and for coloring paints, varnishes, leather ink, paper wood, furs, food, cosmetics, medicines and toothpastes (*cf.* Pandey, 2006) [7].

Various plant parts are useful to have these dyes e.g. stem bark, root, heart wood bark tubercles, leaves, fruit-rind, seeds, flowers or corollas, rhizome and scales of bulbs, of these; bark is more commonly available source. This is due to more available of tree species in the region, and these are available throughout the year. Actual pigment type present in the respective part of some species are pointed out in the table 1. Other species, however, need further exploration.

Although, the present attempt earmark totals 43 plant species having potential for dye-yield, all are not traditionally used locally in this region. Of these, the species of *Acacia* and *Cassia* were used to color hides. Presently they are not prioritized as the the synthetic dyes are easily available in market, Dye obtained from leaves of *Lawsonia inermis* is used to color hard-palms, nails foot soles etc. This practice is also being neglected as the said dye is now available in shops and are easily accessible commercially. Dye extracted from flowers of *Butea monosperma* are used only by the tribal's especially at the time of holi festival. As the `bindis` are sold in the market having various colors, shapes and sizes, the dye recovered from fruits of *Mallotus philippiens* is now- a -days not favored. I t was a practice followed by past generation. At the time `Pola festival, tribal girls stain their head-palms using paste of corolla of *Impatiens balsamina.* This is also used by Bhill tribe of Rajasthan (Sharma, 2000) [9], walking sticks are designed using dye obtained from fresh flowers. However

these are rare practices now in tribal region. Likewise, tubercles are removed from bark of *Bombax ceiba* and chewed by the tribal girls and boys to stain mouth red as if they hard chewed betel leaf with *Catechu*, a tradition in this region. Thus all these applications are traditional, presently they are being overlooked because of substitutes easily obtainable at fair cash.

The ambient indigenous people use more than two thousand coloring pigments are yielded by vegetable kingdom, a major segment of them mostly locally. It is said that nearly only 150 of them are commercially significant moreover, very few of these can compete with the modern synthetic dyes (mahanta and Tiwari, 2005) [5]. Very small segment of the dyes associated with the local biodiversity is thus projected for practical and commercial purpose. This is also indicated by present study. It is, therefore, appears plausible to study dye-yielding plants in comparison with other reports published within a country and abroad. This will help bring new light about our plant wealth. Ultimately, the hidden potentialities of our flora will be exhumed and made available for further research. This study includes information about potentiality of dye-yielding species in the prevailing biodiversity of khandesh region of Maharashtra state. Total 53 angiospermic species belonging to 46 genera and 33 families are reported as dye-yielders in a literature. Of these dye yielding nine species (*) are actually employed for various purposes in the Jalgaon, Dhule and Nandurbar districts of Khandesh region. Thus it appears on comparison with available literature source (Siva, 2007; Mahanta and Tiwari, 2005; Singh, 2006; Punjani and Goel, 2007; Shashikant and Dutta, 2005; Anonymous, 1948-1976; Andrew *et.al*, 2013; Vihari, 1995; Kochhar, 1981; Pandey, 2006, Nayyar *et.al*, 1989, 1994; Patil, 2008) [12, 5, 11, 3, 7, 10, 4, 8], that at least 34 more plant species flourish in the region, they are not tapped for dye yielding purpose traditionally. But these additional plant species have potential of dye yield. Of the total 53 species, 11 species are exotic. There are 33 tree species that can be utilized for tapping dyes, apart from shrubs (05 species), herbs (12 species) and two climber species. Tree and shrubby species are obviously perennial bioresources available through a year. Also 22 species are found under cultivation for some other miscellaneous purposes. Another five species viz; *Aegle marmelos, Tectona grandis, Nyctanthus arbor-tristis, Clitoria ternatea and Ficus religiosa* are both wild as well as planted in the region. Range of colors to be manifested by these potential species is wide. They exhibit colors such as brown, dark brown, yellow- brown, creamy- brown, pale-brown, red-brown or brownish-red, yellow, dark yellow, yellow-red, yellow- brown, pale, yellow, orange, black, blue-black, dark blue, light blue, purple, red purple, sandy and green overview warrant the urgency and significance of intensifying scientific research to optimize the promotion of natural dyes and their use as a source of income.

Table 1: Natural Dyes-yielding Vegetable Sources in Khandesh Region (Maharashtra.)

S. No	Plant Name & Family	Local Name	Part Used	Exotic/ Indigenous	Wild/ Cultivated	Habit	Colour	Pigment
1	Acacia catechu willd. Mimosaceae.	Khair	Heart wood	Indigenous	wild	Tree	Brown Dark brown	Catechin, Catechutanic acid.
2	Acacia nilotica (L.) Delile sub sp. Indica (Benth) Brenan Mimosaceae	Babul	Bark	Indigenous	wild	Tree	Dark brown	Hydrolysable tannins, Proanthocyanidins.
3	Allium cepa L. Liliaceae	Kanda	Red Scales	Exotic	Cultivated	Bulbous herb	Dark, yellow	
4	Carthamus tinctorius L. Asteraceae	Kardai	Flowers	Exotic	Cultivated	Herb	Yellow, Red	Carthamin saffor yellow A&b.
5	Cassia auriculata L. Caesalpiniaceae	Awali	Bark, Leaves, flowers & seeds	Indigenous	Wild	Shrub	Yellow	Tannin
6	Cedrela toona Roxb.ex Rottl.	Toon	Sawdust flowers	Indigenous	Wild	Tree	Yellow-red, Pink	
7	Cosmos bipinnata cav. Asteraceae	Surangi	Corollas	Exotic	Cultivated	Herb	Yellow	
8	Curcuma aromatic Salisb Zingiberaceae	Ambe-Halad	Dried Rhizome	Indigenous	cultivated	Rhizomatous herb	Yellow	
9	Curcuma longa L.Zingiberaceae	Halad	Dried Rhizome	Indigenous	cultivated	Rhizomatous herb	Yellow	Curcumin
10	Hibiscus rosa-sinensis L. Malvaceae	Jaswand	corollas	Exotic	Cultivated	Shrub	Red	
11	Jatropha curcus L.Euphorbiaceae	Mogali erand	Bark Leaves Root	Exotic	Cultivated	Small Tree	Dark blue, Purple Yellow	
12	Lawsonia inermis L. Lythraceae	Mehendi	Leaves	Exotic	Cultivated	Shrub	Orange, yellow, Brown, yellow- brown	Lawsone, Hennotanic acid
13	Morinda pubscens J.F.Sm Rubiaceae	Aal Awala	Root,Stem bark	Indigenous	Wild	Tree	Yellow, Red	Morindone
14	Nyctanthes arbortristis Oleaceae	Parijat	Corollas	Indigenous	Cultivated wild	Tree	Yellow Orange	
15	Punica granatum L. Punicaceae	Dalimb	Fruit rind	Exotic	Cultivated	Shrub	Yellow Blue-Black	Petrogonidon 3,S diglucoside
16	Tagetes patula L. Asteraceae	Zendu	Corollas	Exotic	Cultivated	Herb	Dark Yellow	Xanthophyll, Lutein
17	Terminalia arjuna W&A Combretaceae	Arjun	Bark, Fruit rind	Indigenous	Wild	Tree	Sandy	

18	Terminalia chebula Retz. Combretaceae	Hirda	Fruit Rind	Indigenous	Wild	Tree	Dark,blue, Creamy-brown	Anthraquinones, Chebulic acid,Ellagitanins
19	Terminalia crenulata Roxb. Combretaceae	Sadada	Bark,fruit Rind	Indigenous	Wild	Tree	Creamy-Pale yellow	
20	Butea monosperma (Lamk.) Taub. Fabaceae	Pals, Dhak Khakara	Corollas	Indigenous	Wild	Tree	Red	
21	Ampelocissus latifolia (Roxb.) Fabaceae	Randraksa	Fresh Roots	Indigenous	Wild	Climber	Black	
22	Ehretia laevis Roxb. Ehretiaceae	Tandalya	Inner bark	Indigenous	Wild	Small Tree	Red	
23	Grewia subinaequalis D.C.Tiliaceae	Phalsa Athada	Ripe fruit	Indigenous	Wild	Small Tree	Black	
24	Peristrophe paniculata (Forsk.) Brum. Acanthaceae	-------	Entire Plant	Indigenous	Wild	Herb	Green	
25	Mallotus philipiensis (Lamk.) Muell. Arg.	Shendrya Hendra	Fruits	Indigenous	Wild	Tree	Red	
26	Michelia champaka L.	Sonchafa	Corollas	Indigenous	Cultivated	Small Tree	Yellow	
27	Wrightia tinctoria R.Br. Apocynaceae	Dudhkadi	Leaves	Indigenous	Wild	Small Tree	Blue	
28	Impatiens balsamina L. Balsaminaceae	Tiwarya Mehendi	Corollas	Indigenous	Wild	Herb	Red-Purple	
29	Ziziphus xylopyra (Retz.) wild Rhamnaceae	Ghatbor	Bark	Indigenous	Wild	Small Tree	Dark Brown	
30	Clitorea ternatea L. Fabaceae	Gokarn	Flowers	Indigenous	Wild, Cultivated	Climber	Blue	
31	Woodfordia fruticosa (L.) Lythraceae	Dhayti	Flowers	Indigenous	Wild	Shrub	Red	
32	Bombax ceiba L.Bombacaceae	Kate-Sawar Hawari	Bark tubercles	Indigenous	Wild	Tree	Red	
33	Madhuca indica J.F.Gmel. Sapotaceae	Mahu, Mahuda	Bark	Indigenous	Wild	Tree	Black, Dark	
34	Casurina equisetifolia Linn Casurinaceae	Saru	Bark	Exotic	Cultivated	Tree	Colors Brown	
35	Ficus glomerata Moraceae	Umber	Bark	Indigenous	Cultivated	Tree		
36	Ficus religiosa Linn. Moraceae	Pimpal	Bark	Indigenous	Wild, Cultivated	Tree	Black	
37	Mimusops elengi Linn. Sapotaceae	Bakul	Bark	Indigenous	Cultivated	Tree	Pale Brown	
38	Lannea coromandelica (Houtt.) Merr Anacardiaceae		Bark	Indigenous	Wild	Tree	Brown	
39	Psidium guyajava Linn Myrtaceae	Peru, Jamb	Bark, Leaves		Cultivated	Tree	Brownish -Red	
40	Aterocarpus marsupium (Roxb.) Fabaceae	Bibla, Biyo	Bark	Indigenous	Wild	Tree	Black	
41	Soymida febrifuga A.Jues. Fabaceae	Rohan	Bark	Indigenous	Wild	Tree	Brown-Red	
42	Terminalia catappa Linn. Combretaceae.	Deshi Badam	Bark, Leaves & Fruits	Exotic	Cultivated	Tree	Brown	
43	Pithecollobium dulce Benth Mimosaceae	Vilayti Chinch	Bark	Exotic	Cultivated Wild	Tree	Black	
44	Acacia leucophloea (Roxb.) willd. Mimosaceae	Hiwar	Leaves	Indigenous	Wild, Cultivated	Tree	Yellow	
45	Aegle marmelos Rutaceae	Bel	Fruit Rind	Indigenous	Wild	Tree	Brown	
46	Chrozophora rottleri (Geis.) A.Juss.ex.Spr. Euphorbiaceae	Unhali	Fruits	Indigenous	Wild	Herb	Yellow	
47	Eclipta prostrata Asteraceae	Kali makha	Leaves	Indigenous	Wild	Herb	Red	
48	Indigofera cordyfolia Heyne Fabaceae	Godhadi	Flowers	Indigenous	Wild, Cultivated	Herb	Black	
49	Tectona grandis L.F. Verbenaceae.	Sag	Wood	Indigenous	Cultivated	Tree	Light blue	
50	Thespesia populnea (Linn.) Soland.ex.Corr. Malvaceae	Bhendi	Fruits	Indigenous	Cultivated	Tree	Yellow	
51	Semecarpus anacardium Linn.f. Anacardiaceae	Bhilava	Fruits, Bark		Cultivated	Tree	Black	
52	Annona reticulate Linn. Annonaceae	Ramphal	Dry unripe Fruit	Exotic	Cultivated	Tree	Black	
53	Helianthus annuus Linn Asteraceae	Suryaphul	Flowers	Exotic		Herb	Violet	

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4. References

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