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Observation of Natural Dyes in Ficus Species from Hoshangabad District of Madhya Pradesh

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ABSTRACT
The present study explores the Dye yielding potential of barks of some *Ficus* species of family Moraceae, from Hoshangabad district of Madhya Pradesh. 20 species of family moraceae were studied for dyes present in them, out of these four species of genus *Ficus* were observed to contain dyes in them, these were *Ficus carica* Linn, *Ficus cupuleta* Haines, *Ficus racemosa* (Roxb.) Linn and *Ficus retusa* (Linn.) Auct. Syn. *F. microcarpa* Linn. The botanical names, family, vernacular name and parts from which dye is obtained are described in this paper. The dyes were fixed on mercerized cotton after treating with mordents. Different shades of pink were fixed as dyes from these four species.
Key words: Dyes, Ficus sps., Mordents, Hoshangabad, Madhya Pradesh.

INTRODUCTION

Hoshangabad district is situated on the southern bank of river Narmada in Madhya Pradesh. It lies between the parallels of 21°54' and 54° 29' N latitude & the meditarians of 76° 46' to 76° 42' E longitude, with an area of 4,508.23 sq.km. The average height of this region is ±331 meters form sea level. This region has rich biodiversity and four tribal communities residing therein. These tribal communities are Bhil, Bhilala, Gond and Korku. These communities have some traditional methods of dyeing the cotton fabrics. Apart from these communities some traditional dyers also known as 'Rangreja' community does the work of dyeing the clothes. Color is one of the elements of nature that made the human life more aesthetic and fascinating in the world. They are supposed to be associated with emotions, human qualities, seasons, festivals and passion in our life. In the past, at dawn of the civilization, the people tried to ornament their surroundings similar to that of natural colors observed in the plant, soil, sky and other sources. This gave birth to a new science of colors from natural origin. A dye can generally be described as a coloured substance that has an affinity to the substrate to which it is being applied. A substance, which is resistance to light, water and soap, called dye. So it is a fundamental requirement that colored textile should withstand the conditions encountered during processing following coloration and during their subsequent useful life [1]. Colorants derived from root, leaf, bark, trunk, fruit and flowers of plants. In our country 500 plant species, which have been identified as useful sources of dyes.

The genus *Ficus* belongs to family Moraceae. This genus includes some 750 species of woody plants occurring in most tropical and subtropical forests throughout the world, Berg [2]. The genus is remarkable for the large variation in the habits of its species Jander *et al.* [3]. In India, the some important species of *Ficus* are *F. bengalensis ,F.religiosa, F. carica, Ficus racemosa and F. elastic*. The beneficial effects of plant materials typically result from the combinations of secondary products present in them, the components are mostly secondary metabolites such as alkaloids, steroids, tannins, and phenol compounds, which are synthesized and deposited in specific parts or in all parts of the plant. Several plants from Hoshangabad district have been studied to obtain the Natural dyes. Review of available literature shows that dyes yielding plants are not properly studied with reference to Madhya Pradesh, [4], [5]. Today people are opting for natural dyes due to their non toxic properties and less side effect. The present paper aims to explore the dye yielding potential of some *Ficus* species found near Hoshanagabad.

MATERIAL AND METHODS

About 20 plants belonging to family Moraceae, were collected from different places of Hoshangabad district forest of Madhya Pradesh in various seasons. Some important information was gathered from the local and tribal people. Descriptions of species and identification were done with the help of various floras of Madhya Pradesh Vol.-I Verma *et al.*, [6] and Dictionary of Indian folk medicine and ethnobotany. The voucher specimens were deposited in the Herbarium of Botany Department, Government Narmada Post-Graduate College, Hoshangabad, (MP).

Dyes yielding plant materials were collected and dried under shade. Natural dyes of the plant materials were prepared by boiling of plant material like bark, leaves and inflorescence in water, then mordant were added in the dye to fix it on mercerized cotton fabrics by boiling at 100^0 C temperatures for 30 minute. Mordant like, Alum, copper-sulphate was used for fixation of colors and development.

OBSERVATION

Four species of genus Ficus of family Moraceae were studied, common name, plant description, plant parts used, mordant used, and and shades of color fixed on cloth are described below:

1. *Ficus carica* Linn.; Local Name: Anjir

Small tree or bush, branching from the base, Bark smooth, grey or dull white, Trunk with distant, horizontal wrinkles, Leaves about 20 x 18 cm., broad ovate to nearly orbicular or 3 to 5 lobed, condate, crenate-serrate. Receptacles solitary or paired, axillary, about 2.5 x 2.2 cm. globose or pear-shaped, yellowish-purple when ripe.Flowering & fruiting: June to October.

Dyes: - Light pink dye in found in bark of the tree. Alum used as a Mordant for coloring of cotton cloth.

2. *Ficus cupuleta* Haines Local name : Safed Bad

Shrubs or small tree 2-6m high bark, ash colored, wrinkled, tomentosa, aerial root absent. Leaves alternate, ovate 6.5-13x4.9 cm. cuspidate-obtuse at apex cordate at base entire puberulous petioles 2.5-4 cm. long stipules 2mm long receptacles axillary clustered towards apical portion of the branch sessile subglobose 8-10mm. across dark cream colored and silky when young light purple on ripening basal bracts copular shallowly 2-3 lobed mal and gall flowers is one receptacle tapals 4. Female flower in separate receptacle tepals 3-4 a chains tuberculate. Flowering and fruits: April to August.

Dyes: - Light Pink dye found in bark of the tree. Alum and copper-sulphate were used as a Mordant for coloring of cotton cloth.

3. *Ficus racemosa* (Roxb.) Linn. Syn. *F. glomerata* Roxb. ; Local Name: Gular

Evergreen large deciduous tree, Stem smooth, with reddish-brown or dull white bark, Leaves alternate, oblanceolate, base acute or rounded, lateral nerves 8-10 pairs. Figs shortly penduncled, subglobose, red when ripe, generally full of insects.

Flowering and fruits: April to August.

Dyes: - Red dye found in bark of the tree. Alum used as a Mordant for coloring of cotton cloth.

4. *Ficus retusa* (Linn.) Auct. Syn. *F. microcarpa* Linn. ; Local Name- Fefer

Large or medium-sized, evergreen, glabrous tree with a dense crown, Bark dark grey, Leaves elliptic, ovate or obovate, roundedor bluntly acuminate, polished, glossy; nerves not prominent. Receptacles about 6-3 x 6-9 mm., sessile, paired, depressed-globose, smooth, yellowish-reddish, subtended by 3, persistent bracts.Flowering & fruiting: March – October.

Dyes: - Light Pink dye found in bark of the tree. Alum used as a Mordant for coloring of cotton cloth.

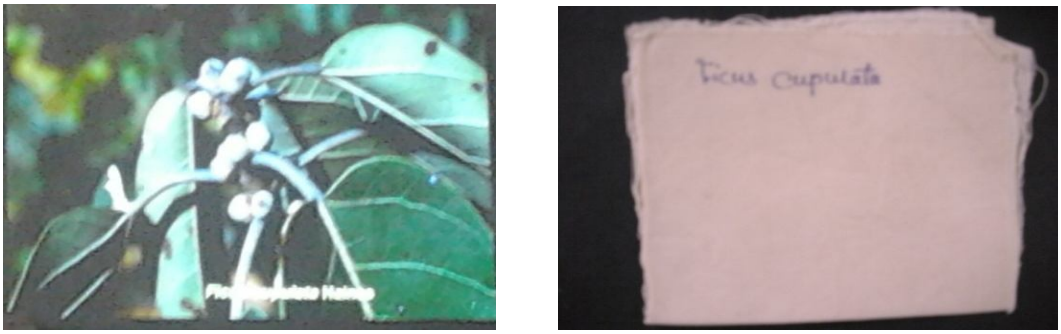
DISCUSSION

The art of dyeing is as old as human civilization. From the historical records, it is learnt that natural colorants were available to people during Greco-Roman periods. Our Vedas, the Atharveda carries description of natural dyes. The use of natural dyeing materials is evident with the wall paintings of Ajanta, Ellora and Sithannvasal and they still demonstrate the efficacy of dyeing craft that had been inherited from ancient times in India. Ancient Egyptian hieroglyphs contain a thorough description of the extraction of natural dyes and their application in dyeing. Natural dyes have been used since ancient times for coloring and printing fabrics. Natural dyes comprise those colorants (dye and pigments) that are obtained from animal and vegetable matter without chemical processing. Plant

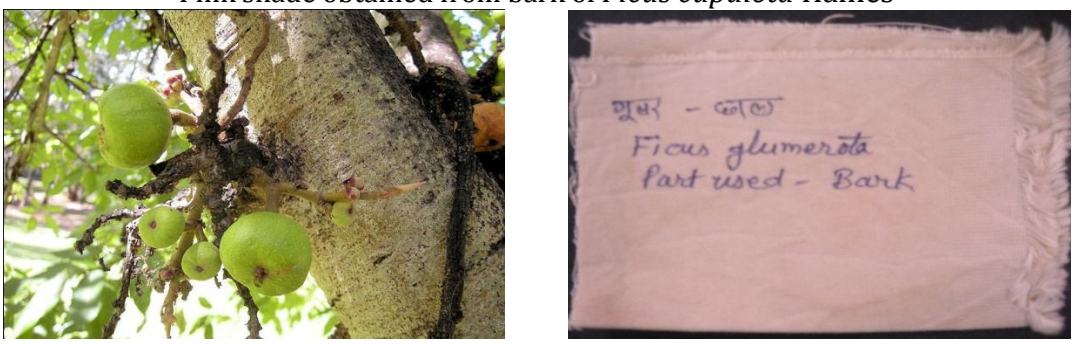
pigments have been used for dyeing textiles, wool and fibers across the world by different human societies Harborne *et al.,* [7]. Several reports of colouring material from various species of Ficus Red colour is observed in *Ficus altissima* Bl. and *Ficus gasperriniana* Miq. of stem, Mahanta and Tiwari [8]. Brown colour in observed in *Ficus exasperata* of root and *Ficus natalensis* of bark Wanyama *et. al.*,[9]. Dyeing of Silk with Ecofriendly Natural Dye obtained from Barks of *Ficus Religiosa.L* by Saravanan and Chandramohan [10]. Almost all parts of a plant such as bark, leaf, seed, fruit, stem and root yield a wide range of colours. The species studied from Hoshangabad had different shades of pink dyes commonly from barks.

Plate No. 1 Images of plant Shades of colour fixed on Mercerized cotton fabric

Pink Shade obtained form bark of *Ficus carica* Linn



Pink shade obtained from bark of *Ficus cupuleta* Haines



Pink shade obtained from bark of *Ficus racemosa* (Roxb.) Linn. Syn. *F. glomerata* Roxb.

Pink shade obtained from bark of *Ficus retusa* (Linn.)

Commercialization of dyes can be successful in the Hoshangabad district with systematic and scientific approach for identification of resources, extraction, purification, chemical structure elucidation and promotion of use of dyes, there by enhancing the economy of the local people. As a

whole, systematic approaches with scientific attitude would help in conserving the economically important plant resources, in addition to the rich indigenous knowledge base available in Hoshangabad district Madhya Pradesh.

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REFERENCES

1. Gulrajani, M. L. (2001), Present status of Natural Dyes, *Indian J. Fibre Text. Res*. Vol. 26, pp. 191 – 201.
2. Berg CC (1989), Classification and distribution of *Ficus,*. Experientia :45: 605-611.
3. Jander EA, Machado KC (2008), CA evolutionary Ecology of figs and their associates: Recent progress and outstanding puzzles. Ann Rev Evol.Syst.:39:439-458.
4. Tiwari SC and Bharat Ajay (2008), Natural dye-yielding plants and indigenous knowledge of dye preparation in Achanakmar – Amarkantak Biosphere Reserve, Central India. *NPR*, 7(1): pp 82 – 87.
5. Choudhary M.S and Upadhyay R., (2011), Observation on natural dye yielding plants of Central Narmada Valley India. *Journal of plant development Sciences*.Vol. 3 (1 & 3), pp. 127-131.
6. Verma, D. M., Balakrishnan, N.P., Dixit, R.D. (1993), Flora of Madhya Pradesh Vol. 1, Botanical Survey of India, department of environment and forest, government of India, Calcutta. pp 69, 50, 72, 74.
7. Harborne, J. B (1984), Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis, Chapman and Hall, London, 2nd edn.
8. Tiwari SC & Mahanta D. (2005), Natural dye yielding plants and indigenous knowledge on dye preparation in Arunachal Pradesh, Northeas *Indina Curr Sci*, 88 (9) 1474 – 1480.
9. Wanyama P.A.G., Kiremire B. T., Ogwok P. and Murumu J. S. (2011), Indigenous plants in Uganda as potential sources of textile dyes African Journal of Plant Science Vol. 5 (1), pp. 28-39.
10. Saravanan P. and Chandramohan G. (2011), Dyeing of Silk with Ecofriendly Natural Dye obtained from Barks of *Ficus Religiosa.L*, Universal Journal of Environmental Research and Technology; Volume 1, Issue 3: 268-273

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