Indigenous knowledge of Bhotiya tribal community on wool dyeing and its present status in the Garhwal Himalaya, India

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I have studied the indigenous knowledge of making natural dye from native plant species, by the Bhotiya tribal community of high-altitude Garhwal Himalaya, Uttaranchal, India. A questionnaire survey was conducted in the Bhotiya-dominated villages for identification and exploration of indigenous methods of wool dyeing using natural plant biomass. Information was also gathered through participatory field research methods. A total of eight plant species which are used as raw material in preparing various natural dyes were documented during the survey. Among them, two are vulnerable and one is endangered according to the new IUCN criteria. The indigenous practice has declined manifold due to invasion of market forces and use of synthetic dyes. The present article deals with documenting the plant species and a method of natural dye preparation developed by the Bhotiya tribal community. It also highlights the economic factors involved in the marginalization of this indigenous practice.

IN India, natural dyes provided by plants and animals have been in use for imparting different shades, generally to wool and cotton, from time immemorial. The various ethnic communities, including Bhotiyas of Chamoli District residing in the border regions of Garhwal Himalaya, are well known for their traditional expertise in making a range of woollen garments and materials, besides processing and colouring of wool[1]. Before 1962, there was trans-border trade between India and former Tibet, and the import of wool was the major source of income for the Bhotiya's woollens-based, indigenous cottage industry[2–4]. But after 1962, trade was stopped due to conflicts between China and India[5,6]. However, due to the visit of a sizeable number of pilgrims and tourists to the Badrinath and Kedarnath shrines in Garhwal region, the Bhotiya community still has a market to sell the woollen products, so that this age-old tradition of preparing woollen products and processes to make them colourful through indigenous methods are alive in the remote areas of Garhwal. The present study explores the indigenous methods of dyeing the woollen products in the higher Himalayan region of Garhwal, and also analyses the ongoing trends.

Methods

Extensive survey was carried out in three villages, Mana, Chhinka and Saldhar of Chamoli District, Uttaranchal, mainly dominated by Bhotiya tribal community. Mana was not included in the analysis due to inadequate information, as it is a migratory village and thus holds most of the activities related to wool dyeing at the winter village. Chhinka and Saldhar are the permanent settlements of the Bhotiya tribe. Yet a few families use these villages during winter, as they migrate to high-altitude villages during the summer and rainy seasons. A questionnaire survey was conducted in each village for identification and exploration of the indigenous methods of wool dyeing and colouring. Information was collected through participatory field research methods such as semi-structured interviews, field inspections, field observations and participation in their social life and events. Apart from this, the local and regional markets were surveyed for use and quantity of sale in synthetic dyes. The quantity of woollen items weaved at home and the income generated through the sale of these items were also monitored. The use and change in pattern of preparing natural dyes at present along with the use of synthetic dyes, were also studied through questionnaire surveys and group discussions.

Results and discussion

Plant material used for natural dye

Plant pigments have been used for dyeing textiles, wool and fibres across the world by different human societies[7]. Almost all parts of a plant such as bark, leaf, seed, fruit,

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stem and root yield a wide range of colours. For instance, in Ghana, about 100 plant species are used to prepare different colours[8]. The Gaddi tribes of Himachal Pradesh, neighbouring Uttaranchal, use nearly 20 plant species for preparing dyes[9]. In the present study area, a total of eight plant species, namely *Rheum australe* (Dolu (Figures 1 and 2)), *Rumex nepalensis* (Khukhuyinya), Bajar Bhang, *Berberis* spp. (Kingod), *Juglans regia* (Akhrot), *Corylus jacquamontii* (Kapasi), *Rheum moorcroftianum* (Archa), *Geranium nepalense* and a few lichens were recorded as being used by Bhotiya ethnic groups in preparing various natural dyes. Among the different parts of the plant, mostly root and fruit cover were used; out of the eight plant species documented, roots of five species and fruit covers of two species were used by the Bhotiya tribes. Normally, yellow, red, camel, coffee and brown colours are extracted from these species (Table 1). By mixing these base colour dyes into different combinations, a number of intermediate colours and shades are produced.

Figure 1. *Rheum australe.*

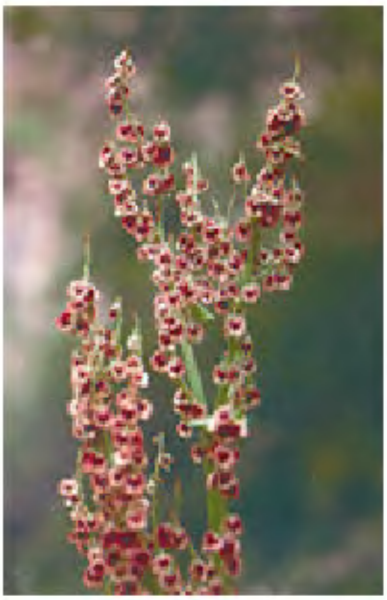

Figure 2. *Rheum australe.*

For example, *J. regia* and *R. australe* are mixed together to produce a red colour. The use of *J. regia* in preparing natural camel colour is also prevalent in the Gaddi tribal community of Himachal Pradesh.

Among the eight plant species used in making natural dyes, *R. australe* and *R. moorcroftianum* are vulnerable and one of the *Berberis* spp., namely *B. aristata* is endangered according to the new IUCN criteria. Both *R. australe* and *R. moorcrotianum* are herbaceous species generally found above the timberline in the Himalaya, whereas *B. aristata* is a shrub and grows in the middle and lesser Himalayan areas. Besides natural dyes, all these three species possess high medicinal properties and thus are in great demand for preparing herbal medicine, by pharmaceutical companies as well as by herbal healers. Since there is a ban on collection of all these three species both from protected and unprotected areas, due to their shrinking population in the wild, the Bhotiya community is facing a problem in obtaining the raw material for continuing the indigenous practice of wool dyeing. Moreover, these species find greater use in medicine compared to use in natural dyes.

Indigenous approach of wool dyeing

The process of wool dyeing starts once the threading of wool is over. Normally, raw wool has two colours, black and white; only the white coloured wool is used for dyeing purpose to give different shades of colours. The woollen material is dusted and washed thoroughly before dyeing. The fruits of *Sapindus mukorosii* (Reetha) are used traditionally for washing the woollen threads. The roots or fruit covers of collected or stored plant species are washed thoroughly with tap water and then sun-dried. The dried plant material is powdered and mixed with water to prepare a solution. The solution is heated in a vessel until it begins to boil. The wool threads are then slowly immersed in the solution for dyeing. For dyeing one kg of wool, around 4 l of water is boiled with approximately 50–60 g of fresh root. The woollen threads are stirred thoroughly for a long time to ensure thorough and uniform soaking. Sometimes, a small quantity of ash is also poured in the prepared solution, for better colouring. Once the dyeing is over, the woollen threads are taken

Table 1. Plants and their parts used in preparing natural dye

Plant species	Part used	Colour produced
Khukhuyinya, *Rumex nepalensis*	Root	Yellow
Dolu, *Rheum australe*	Root	Yellow
Akhrot, *Juglans regia*	Fruit cover	Camel
Kapasi, *Corylus jacquamontii*	Fruit cover	Camel
Kingod, *Berberis* spp.	Root	Yellow
Archa, *Rheum moorcroftianum*	Root	Yellow
Bajar Bhang	Root	Brown
Geranium nepalense	Root	Red

out from the boiling solution for drying. During drying, direct sunlight is avoided for retaining brightness of the colours.

Synthetic dye as an alternative to natural dye

The increasing influx of tourists and construction of road networks after 1962 has resulted in an augmented communication system, better education, and also invasion of modern supply systems and outside products. Correspondingly, knowledge of synthetic dyes was also brought in and slowly the indigenous natural dyes are being replaced by synthetic dyes. The choice of multiple colours, easy availability, and lesser time taken in preparing these dyes have made synthetic dyes more popular. For the past 25 years, the Bhotiya community in Chamoli District, Garhwal region has been using the synthetic dyes purchased from Delhi, Ludhiana, Dehradun and also from local markets of Joshimath, Pipalkoti, Gopeshwar and Badrinath. Market survey indicates that the Bhotiya people purchase mainly eight colours such as black, maroon, yellow, pink, violet, green, sky blue, and navy blue. Black colour is commonly used, followed by maroon and green colours. The sheep in high altitude areas are white, and thus produce more white wool than black wool. Bhotiya women mainly wear a *Pakhi* or *Lawa*, which is always black in colour. Since the demand for black wool is more, they dye the white wool with black colour.

There has been a substantial decline in purchase of synthetic dyes from the local market at Joshimath (a major service and supply centre in the high altitudes of Garhwal) since 1988, due to involvement of traders from outside who bring synthetic colours from Ludhiana, Amritsar, Delhi and Dehradun along with wool and sell them door-to-door. Bhotiya people working in cities also bring these synthetic colours when coming home. In 1988, about 100 kg of black colour was sold at Joshimath market, whereas in 2001 it was reduced to only 30 kg. Similarly, there was a substantial decrease in the sale of other colours from 1988 to 2001 (Table 2). The cost of black colour is lower (Rs 300 per kg) than the cost of the remaining colours (Rs 400 per kg). The total sale of synthetic colours in a single market at Joshimath accounted for about Rs 70,000 (US $ 1520) in 1988. However, it was reduced to about Rs 20,000 (US $ 435) in 2001, due to the availability of readymade coloured wool in the local market.

Table 2. Comparative account of various colours sold over the years at the local market of Joshimath

	Quantity sold (kg/year)		Rate (Rs/kg)	
Colours	1988	2001	1988	2001
Black	100	30	200	300
Maroon	50	10	250	400
Yellow	25	5	250	400
Pink	25	5	250	400
Violet	25	5	250	400
Green	25	10	250	400
Sky blue	25	5	250	400
Navy blue	25	5	250	400

Division of labour by gender and economic return

Both the men and women of the Bhotiya society share the work relating to the production of woollen products. However, women have greater share of work distribution than men. Women are the real keepers of this indigenous knowledge on the making of natural dyes. Experienced women and on some occasions men also collect the plant materials from the wild for making natural dyes. The entire division of labour is based on the internal adjustment of the family, right from the collection of raw material to the marketing of prepared woollen products. The Bhotiyas of Garhwal generally weave more than 10 woollen items such as Gudma, Thulma, Pankhi, Pattu, sweater, cap, muffler, scarf, carpet, Ashan and Pakhi. Among these only four items, i.e. carpet, Ashan, sweater and Pakhi are generally dyed. Bhotiya women weave these woollen items in winter as the rest of the seasons are used in cultivating, harvesting and storing of various crops. It almost takes 20–25 days for a woman to weave a carpet (Dan).

The prepared items are sold in regional markets or nearby areas. People also go to remote villages for selling the woollen material. Men and women from the villages surveyed generally go to Tharali, Narayanbagad, Ukhimath, Ghat, and above for selling the Lawa and Pankhi as local people mainly purchase these two woollen items. Carpets are sold across the highway towns and tourist areas such as Chamoli, Gopeshwar, Badrinath, Joshimath, Karanprayag and Gouchar, since the tourists mainly purchase carpet, Pankhi and Ashan. The annual income generated through sale of woollen items family-wise, is more at Chhinka (Rs 43,000; US $ 935) than at Saldhar (Rs 16,700; US $ 363) (Table 3). Mostly Lawa

Table 3. Average income generated through sale of woollen products per family per year

	Chhinka		Saldhar	
Woollen items	No. of pieces sold	Income generated (Rs)	No. of pieces sold	Income generated (Rs)
Chutka	2		–	–
Pankhi	45	18,000	25	10,000
Pakhi (Lawa)	50	25,000	–	–
Dan	–	–	3	4,500
Ashan	–	–	15	2,200
Sweater	–	–	10	–
Cap	–	–	10	–
Total income		43,000		16,700

Box 1.

Natural dye	Synthetic dye
Prepared from forest biomass such as plants and lichens.	Manufactured in laboratories by use of chemicals.
It is an eco-friendly product, as it is made up of natural substances.	It is not eco-friendly, as the chemicals used in its manufacturing can pollute the air and water.
It has a long life and never loses colour.	It loses colour many times.
It provides limited colours and is less bright compared to synthetic dyes.	It provides multiple colours with bright tint.

and Pankhi are weaved in Chhinka, whereas Pankhi is weaved in Saldhar. Most of the families at Saldhar have their own sheep that yield sizeable quantity of wool at home.

The woollen cottage industry was once the backbone of the Bhotiya tribal economy and the indigenous practices, evolved to maintain this industry, were based on personnel interactions and keen observation of their environment. However, use of natural dyes started to decline gradually after the discovery of synthetic dyes in 1856. In view of the wide availability of colours through synthetic dyes, the traditional natural dyes, which offered only a limited range, suffered a severe setback. Besides, the decline in the woollen cottage industry is also due to lack of vision and ignorance of the traditional heritage and values attached to the indigenous system. Difficulties in getting raw material (desired plants) and preparation of natural dyes are among the many causes for the decline in use of this indigenous technique. However, extraction of natural dyes is low in cost and the natural dyes are user-friendly products (Box 1). It can also lead to employment generation at the village level. If serious efforts can be made, natural dyes can prove to be a boon to the textile industry, which markets its products to the European countries and USA. The abundant forest biomass can be used for manufacturing dyes on small-scale bases, especially in the villages. Unfortunately, this indigenous practice of using natural dyes has almost vanished even from the remote villages of Uttaranchal Himalaya.

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