

Nettle – A Gift of the Himalayas

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Abstract:

India has the world's best handloom sector which provides employment to over 65 lakhs of weavers. It has high potential to grow further as it permits experimentation while weaving the textile and was flexible and versatile. The beauty of textiles made on handloom cannot be replicated on power looms making it sustainable as ever.

*Today the resources were replenishing fast and use of synthetic fibres has increased, we need to move to sustainable alternatives when choosing fibres and fabrics. Himalayan nettle (*Girardinia Diversifolia*) was a fibre-yielding plant and was the sustainable fibre which was found in the state of Uttarakhand. It as a non-commercial natural fibre which has not been explored much. Studies state that the Himalayan Nettle fibre was the only known longest natural bast fibre. Nettle was an all-season fibre as it has a dual thermal property of warmth and cooling due to the physical structure. Nettle was a wild plant which does not use land which was the resource for cash crops and require little water to grow. No pesticides were required for growing up of the Nettle plant and every part of the plant can be used making it the fibre of the future. Studies have found that Nettle can be an alternative fibre to the cotton and does not harm the environment. But over a period due to the influence of fashion and synthetic fibres, people have stopped using natural resources and have actually moved away from Mother Nature. The conception of green, eco-friendly, sustainable fashion has become the preference of conscious producer and textile consumers.*

People have been growing nettle and using nettle, but because of its coarser count and variety, it has not been a part of the fashion seam because of these limitations. Primarily, the people of Uttarakhand were the ones who were producing coarse textile out of nettle plant like ropes, bags, and rugs of this fibre. There has been very less exploration in the weaving of Nettle fabric and therefore the scope of this fibre has been limited. Therefore, as a conscious designer the researcher has endeavoured to bring forward the fibre as a substitute to natural cellulosic fibres and has taken a step forward to bring them back to sustainability which was the future as fast fashion has gripped the entire globe and disconnected us totally from nature. The present study aimed at the development of fabric samples of nettle through exploration in weaving yarn and enhanced it with natural dyes for its aesthetics.

Keywords: Bast Fibre, Cellulosic, Handloom, Himalayan Nettle, Natural Fibre, Natural Dye

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1. Introduction

1.1 Nettle: Indigenous Fibre of Uttarakhand



Figure 1 - Himalayan Nettle

Nettle was a wild plant which does not need to be harvested. The Himalayan nettle was a perennial plant which was found above the sea level approximately between 1300 to 2800 meters. The people of Uttarakhand have been making coarse textiles out of nettle since many years. The people who were traditionally associated with making the nettle textiles were not practising the craft anymore. Bhotia weaver community, at Mangroli village, Chamoli (UBFDB cluster) has learnt and mastered the technique of nettle fibre processing. (Source: *Crafts of Uttarakhand - UHHDC*). The people of Uttarakhand have no idea about the design intervention and because of this they could not produce variety of products and reach the potential market. The study also states that weavers possess skills but due to lack of market requirements of products the potential of the weavers was not explored to the fullest. Today there was a need of alternative textile which was sustainable and such one textile was Nettle which was 100% sustainable.

1.2 History

Nettle fibres date to 2000 years with its traces being found from the late Bronze Age in Voldtofte, Denmark. With the introduction of cotton in the global market, people stopped using natural fibres. During the World War I, the German army used nettle for making uniforms due to the shortage of cotton. Clothing made of nettle fibre was much more comfortable than cotton as nettle fibres were hollow; they were filled.

Table 1: The Composition of Nettle

Constituents	Composition (%)	
	Dry weight	After degumming
Fibre content of stem	3.5 – 13.2 %	3.5 – 13.2 %
Moisture	16 %	11 %
Cellulose	38 %	67 %
Hemicellulose	8 %	8 %
Lignin	8 %	4 %
Ash	7 %	3 %

1.3 Properties of Nettle Fibre

- Himalayan nettle was the longest natural bast fibre, i.e. 1.5 m
- It was cellulosic by structure
- It has high breathability
- High moisture content which results in dielectric insulating capacity
- Nettle fibre was antibacterial, antimicrobial, and fire-retardant
- It has great resistance to wrinkling
- Nettle fibre has high tensile strength as compared to cotton and linen, i.e. 1594 MPa
- Nettle plant does not need pesticides to grow and was 100% organic

Nettle fibre was a hollow natural fibre which was its unique property and makes it a different class. The hollow core of nettle creates insulation which was used for winter clothing and when the yarn lengths were twisted and insulation was reduced it was used for summer clothing

Table 1.2: Physical Properties of Nettle

Property	Value		
	Fibre	Yarn	Fabric
Length (m)	1.5	-	-
Diameter (μm)	2.5	-	-
Elongation (mm)	2.7	-	-
Moisture content	158.8 ± 4.2	-	-
Tenacity	-	1594 MPa	
TPI	-	4 - 7	-
Breathability	-	-	High
Crease resistance	-	-	High

(Source: Original Scientific Article/Izvirniznanstveničlanek)

1.4 The uses of Himalayan Nettle Fibre

The 100% nettle yarn was hand spun from Nettle fibres without any additional of chemicals. Traditionally, the nettle yarns were used to make fishing nets, ropes, bags and coarse textiles. Nettle fibres were also used in making arrow shafts by mixing nettle fibres to birch tar and then attaching it to arrowhead.

1.5 Significance

The people of Uttarakhand produce coarse textile out of nettle fibre. The nettle fibre was considered an alternative to cotton as it was a wild plant, no chemicals were used, does not harm the environment. Over the years people have started using synthetic fibres in place of natural fibres and have polluted the nature. Therefore, as a conscious designer the researcher has endeavoured to bring forward the unconventional fibre as a substitute to natural cellulosic fibres and has taken a step forward to bring them back to sustainability which was the future as fast fashion has gripped the entire globe and disconnected us totally from nature. It was important for the researcher too as a new age designer to take this step. The collection of Nettle fabric was crafted to give a new dimension to this unexplored wealth which the state has. People have been growing nettle and using nettle but its coarser count and variety, it has not been a part of fashion scene because of these limitations, so researcher's endeavour was to bring it forward as a fashion fabric. Weaving and natural dyeing was the traditional craft which was inherited by the people of Uttarakhand but due to modernisation, it was no more in use and the researcher has taken an initiative to use these traditional craft for the collection which may revive it.

1.6 Objectives of the Study

- To develop a color palette of nettle yarns using natural dyes.
- To use the Himalayan Nettle for development of different fabric structures
- To explore the possibility of usage of the Nettle fabric for apparel and home furnishing
- To develop a range of fabric samples by utilizing different warp and weft blends and weave structures
- To create executive wear ensemble

2. Methods and materials

2.1 Phase I

2.1.1 Selection of raw materials

Nettle for weft, organic cotton for warp and natural dyes for dyeing the nettle yarns.

2.1.2 Preparation of yarn for weaving

The preparation of yarn for weaving was done using the following processes:

- Bleaching – Nettle yarns were bleached with Hydrogen peroxide to remove natural color of the fibre.
- Premordanting with alum, Cu and Fe_2Cl_3 at 60 degree for 30 minutes.
- Mordanted nettle yarns were then dyed with alizarin, marigold and pomegranate with various shades ranging from 1% to 9%
- Post dyeing, the yarns were neutralized and finally washed with neutral soap and rinsed and dried.

2.1.3 Development of Weave Samples

The samples were developed on a four shaft handloom. The fabric samples are show in Table 3.1.1

- Warp type : Mill Spun
- Warp Composition: 100% Organic Cotton

- Warp count : 2/40s Ne
- Weft type : Hand-Spun

3.1 The process of making the Nettle fabric: from fibre to fabric

- Weft Composition: 100% Nettle/
- Weft count: 7s Ne

2.1.5 Shortlisting of samples

The developed nettle fabric samples were shown to the panel of internal and external experts at Graphic Era Hill University; Dehradun. The fabric samples were sent to the project sponsor, Raymond, Mumbai for final approval. Finally, the executive wear ensemble was created with the selected nettle fabrics.

2.2 Phase II

Raymond was launching their new range of Khadi as part of “Make in India” initiative with Khadi & Village Industries Commission (KVIC). As the part of that project the current project was undertaken to explore the potential of Himalayan Nettle fibre. In Uttarakhand, the project was given to the researcher to explore the possibility of creating fabric weaves using Nettle fibre of the Himalayan region which is a unique resource of Uttarakhand state. The brief given by the company included:

- Making of an executive wear ensemble with nettle fabric.
- The client was a modern, self-confident, and independent working individual who has the knowledge to appreciate the rich texture and effort put behind a work.
- The theme taken was inspired from the Uttarakhand which has rich heritage and culture.

3. Results and Discussion

The raw material comprised of 100% Nettle yarn and organic cotton yarn. The nettle yarn was sourced from Uttarakhand Bamboo and Fibre Development Board, Dehradun and Organic cotton of 2/40s count from Theba Mill. The shade card for natural dyes was developed. The samples were developed at Bhartiya Gramoththan Sanstha, Dhalwala Rishikesh, Uttarakhand. The production of the Nettle fabric was done at The Jai Shri Phungni Handloom & Handicraft Co-op. Ind. Society Ltd Bhuntar, Himachal Pradesh. 30 samples of Nettle x Organic Cotton were developed in different blend compositions of Nettle and Organic Cotton. Yarns were dyed with natural dyes. The detail of Natural dyes shade card is given in Table 3.1 and of the developed samples is given in Table 3.1.1.

The samples were shortlisted by the internal and external experts of Graphic Era Hill University, Dehradun and then sent to the project sponsor Raymond, Mumbai. Finally, the executive wear ensemble with the selected nettle fabrics was created.

3.1 The process of making the Nettle fabric: from fibre to fabric



Figure 3.1 Processing of fibre to yarn

Figure 3.2 Mordanting process of nettle yarn



Figure 3.3 Natural dyeing of nettle yarn

Figure 3.4 Weaving process of nettle fabric

Table 3.1 Natural Dye Shade Card

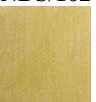
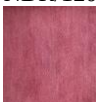
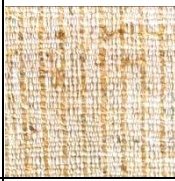
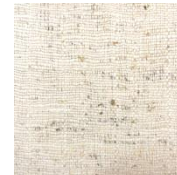
SHADE	MORDANT/DYE	SHADE	MORDANT/DYE	SHADE	MORDANT/DYE	SHADE	MORDANT/DYE
NDS/101 	Alum/ marigold & Pomegranate	NDS/107 	Copper sulphate/ marigold & Pomegranate	NDG/113 	Ferric chloride/ smokey grey	NDG/119 	Ferric chloride/ smokey grey
NDS/102 	Alum/ marigold & Pomegranate	NDS/108 	Copper sulphate/ marigold & Pomegranate	NDG/114 	Ferric chloride/ smokey grey	NDR/120 	Copper sulphate/ alizarin
NDS/103 	Alum/ marigold & Pomegranate	NDS/109 	Copper sulphate/ marigold & Pomegranate	NDG/115 	Ferric chloride/ smokey grey	NDR/121 	Copper sulphate/ alizarin
NDS/104 	Alum/ marigold & Pomegranate	NDS/110 	Copper sulphate/ marigold & Pomegranate	NDG/116 	Ferric chloride/ smokey grey	NDR/122 	Copper sulphate/ alizarin
NDS/105 	Alum/ marigold & Pomegranate	NDS/111 	Copper sulphate/ marigold & Pomegranate	NDG/117 	Ferric chloride/ smokey grey	NDR/123 	Ferric chloride/ alizarin
NDS/106 	Copper sulphate/ marigold & Pomegranate	NDS/112 	Copper sulphate/ marigold & Pomegranate	NDG/118 	Ferric chloride/ smokey grey	NDR/124 	Ferric chloride/ alizarin

Table 3.1.1: Nettle & Cotton Samples

NTL/101 	NTL/106 	NTL/111 	NTL/116 	NTL/121 	NTL/126 
NTL/102 	NTL/107 	NTL/112 	NTL/117 	NTL/122 	NTL/127 
NTL/103	NTL/108	NTL/113	NTL/118	NTL/123	NTL/128

					
NTL/104	NTL/109	NTL/114	NTL/119	NTL/124	NTL/129
					
NTL/105	NTL/110	NTL/115	NTL/120	NTL/125	NTL/130

3.2 Executive Wear Ensemble: Made From Nettle Fabric



Figure 3.2.2 Women executive wear ensemble



Figure 3.2.3 Men executive wear ensemble

4. Conclusion and future scope of study

Further research work is needed in the area of yarn spinning to develop yarn of finer count. Fibre softening can be added process for enhanced feel and appearance. Blending of Nettle fibre with other natural fibres can be done. Hand spinning of the yarn can be improved so that fewer problems are faced while weaving the fabric in handloom. Fastness properties of dyed fabrics (natural dyes) can be quantified and improved if required

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