

Analysis of Shrinkage Effect during Mercerization on Himalayan Nettle, Cotton and Cotton/Nettle Yarn Blends

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Abstract : The Himalayan Nettle (*Girardinia diversifolia*) has been used for centuries as fibre and food source by Himalayan communities. Himalayan Nettle is a natural cellulosic fibre that can be handled in the same way as other cellulosic fibres. The Uttarakhand Bamboo and Fibre Development Board based in Uttarakhand, India is working extensively with the nettle fibre to explore the potential of nettle for textile production in the region. The fiber is a potential resource for rural enterprise development for some high altitude pockets of the state and traditionally the plant fibre is used for making domestic products like ropes and sacks. Himalayan Nettle is an unconventional natural fiber with functional characteristics of shrink resistance, degree of pathogen and fire resistance and can blend nicely with other fibres. Most importantly, they generate mainly organic wastes and leave residues that are 100% biodegradable. The fabrics may potentially be reused or re-manufactured and can also be used as a source of cellulose feedstock for regenerated cellulosic products. Being naturally bio-degradable, the fibre can be composted if required. Though a lot of research activities and training are directed towards fibre extraction and processing techniques in different craft clusters villagers of different clusters of Uttarkashi, Chamoli and Bageshwar of Uttarakhand like retting and Degumming process, very little is been done to analyse the crucial properties of nettle fiber like shrinkage and wash fastness. These properties are very crucial to obtain desired quality of fibre for further processing of yarn making and weaving and in developing these fibers into fine saleable products. This research therefore is focused towards various on-field experiments which were focused on shrinkage properties conducted on cotton, nettle and cotton/nettle blended yarn samples. The objective of the study was to analyze the scope of the blended fiber for developing into wearable fabrics. For the study, after conducting the initial fiber length and fineness testing, cotton and nettle fibers were mixed in 60:40 ratio and five varieties of yarns were spun in open end spinning mill having yarn count of 3s, 5s, 6s, 7s and 8s. Samples of 100% Nettle 100% cotton fibers in 8s count were also developed for the study. All the six varieties of yarns were tested with shrinkage test and results were critically analyzed as per ASTM method D2259. It was observed that 100% Nettle has a least shrinkage of 3.36% while pure cotton has shrinkage approx. 13.6%. Yarns made of 100% Cotton exhibits four times more shrinkage than 100% Nettle. The results also show that cotton and Nettle blended yarn exhibit lower shrinkage than 100% cotton yarn. It was thus concluded that as the ratio of nettle increases in the samples, the shrinkage decreases in the samples. These results are very crucial for Uttarakhand people who want to commercially exploit the abundant nettle fiber for generating sustainable employment.

Keywords : Himalayan nettle, sustainable, shrinkage, blending

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