

Coloured cotton: The future of Textile industry

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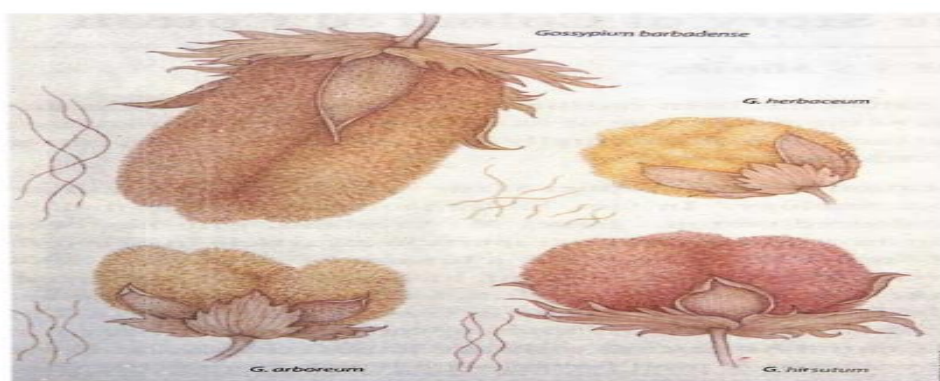
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Introduction

Cotton is known as 'White Gold' which is mainly grown for fiber and cotton seed. It has been used for wide range of apparels and household textiles. Cotton has many inherent properties like softness, breathability, moisture absorbency, strength, drapability, and heat-resistance, high fiber strength, non-allergic and non - irritant. It is also dyeable, easy to handle and sew. Conventional white cotton is the most sought after fibre in the world and fifty-five countries rely upon cotton for a significant percent of GDP. But the production of white cotton has become increasingly associated with severe negative environmental impacts like reduced soil fertility, salinization, loss of a pound of pesticides. In the recent years, concern for environment has taken strong roots in the minds of people. Materials and products that are injurious to the ecosystem and human health are being increasingly discouraged. Nowadays Bt cotton has been raising waves of burst cycle due to break in resistance in India and other parts of the world, one of its old time cousins is making a quiet come back. It is the naturally coloured cotton - yes; cotton endowed with natural colours.

Environment conscious communities especially are demanding cotton textiles bereft of harmful dyes and pesticides. In this context, there is revival of interest in organic cotton and naturally coloured cotton without recourse to dyeing using harmful and polluting chemicals. Naturally coloured cotton totally eliminates the process of colouration as this cotton has a coloured gene present in the lumen of the fibre that imparts natural colour to cotton as it grows and matures. Naturally coloured cotton grown using organic farming methods is the most suitable alternative for a cleaner ecofriendly environment. Coloured cotton was grown and used by mankind as long as 2500 B C and this is evident from excavations at Huaca Prieta on Northern Peruvian coast, S America. The coloured lint obtained from these sites show colours like chocolate, blue, purple, green, tan, mahogany red, red and creamy-white found in four species of genus *Gossypium*. The tetraploid species *G.*

barbadense and *G. hirsutum* were being cultivated in South and Central America as early as 2300 BC. Compared with white cotton, naturally colour lints were short, coarse and weak. They were amenable only for hand spinning. However, with the advent of power looms and ginning machines after the Industrial Revolution, the scene changed. It is reported that in the Second World War, because of the shortage of synthetic dyes, the erstwhile Soviet Union cultivated coloured cotton in large quantities to produce soldiers' uniforms.



However, blue, the colour of the versatile jeans, has eluded cotton breeders. Now genetic engineering has stepped in. Two companies - Argacetus in Wisconsin and Calgene in North California plan to insert the genes which are responsible for the production of blue colour in the indigo plant into white cotton. They expect to produce, in one shot, machine-friendly blue cotton. Coloured cottons have many insect and disease-resistant qualities and are drought and salt tolerant. . Wax content in naturally coloured cotton can also be an advantage as it aids in easy trash removal from fibres.



In recent years there is revival of interest in organic cotton and naturally coloured cotton as its cultivation and processing is bereft of harmful and polluting chemicals. Despite the fact that coloured cottons have a few limitations, there are a number of advantages that go in its favour. These are enumerated as follows: Growers of naturally coloured cotton may find less need for pesticides. Geneticists have been studying the complex inheritance pattern of colour in cotton. The lint colour is determined by a group of genes situated at three loci, LCI, LC2, and LC3. They are dominant over the white alleles and operate in association with modifier genes that are either suppressors or intensifiers. In the presence of strong suppressors, white lint is produced. Often, the genes for lint colour are found to be pleiotropic, i.e., they control more than one trait. This has been the most important problem in the development of economically and technically superior coloured cotton. For example, the gene for brown colour in *G. arboreum* and *G. barbadense* suppresses lint length and its fineness. Similarly, green and brown lints in *G. hirsutum* inhibit fibre development. Generally, all colour genotypes have fibre qualities far below the white variety. However, not all associations are unfavorable. The varieties Hirsutum tashkent (brown) and Arkansas green have high boll weight. In addition, colour development is also influenced by many environmental factors, especially sunlight, soil nutrition, and soil type. Scientists at Dharwad have been studying the time and mechanism of colour formation. Their studies indicate that colour development in the fibre occurs between 30 and 40 days after boll formation. Until 30 days of boll formation, the fibre was white. The 40 days old bolls showed colour fibre. Solvent extraction experiments have shown that the pigment may belong to the flavonoid group. The basic aspects of gene action, their linkages with other attributes, and interaction with environmental parameters in colour production have all to be critically studied from a technical angle.

Some coloured cottons of 'Desi' type are indigenous to our country. Some of these are still being grown in isolated pockets in interior areas like Yerrapatti in Andhra Pradesh and is used by locals for hand spinning and weaving. These varieties are short stapled and not quite suitable for mill processing. In view of the success achieved by Ms. Sally Fox of Fox Fibre Inc. and Natural Cotton Color Inc. USA in developing and marketing coloured cottons, there has been renewed interest in our country for developing good quality coloured cotton. Satyam Committee set up by ministry of Textiles in 1995 also strongly recommended cultivation of



naturally coloured cotton. The committee highlighted that coloured cotton would reduce the use of dyes that cause environmental damage and pose health hazards. The Central Institute for Cotton Research (CICR), Nagpur has about 40 coloured cotton cultures in its Natural Cotton Germplasm Bank, but there is need to develop better strains to overcome low yield and strength by adopting suitable selection and hybridization procedures.

Conclusion

As the above clearly indicates that the interest in naturally coloured cotton is not a mere curiosity but clearly and constructively directed towards bringing this forgotten legacy to the forefront and aimed at providing a niche product to the environmentally conscious 'green-minded' consumer. Naturally coloured cotton movement has just begun and is gaining momentum with China as its leader followed by other countries including India. To achieve desired results, collective efforts would be needed from policy makers, farmers and researchers. Cotton Council of India in this regard has funded research projects and also suggested certain policies and legislative measures for safe, viable and profitable cultivation of coloured cotton. Application of DNA engineering and cloning technology would further help in improving the available colour palette and fibre properties. Consumer education about the fibres' environment friendly aspects and properties like 'nofade', higher flammability etc. would further provide boost in successful marketing of naturally coloured cotton textiles.