

# Advancement of khadi textile: Textile glummer of India

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## ABSTRACT

Khadi fabric is the textile glummer of India and has been started to use in India from at least ten decades ago (from 1920s). Normally it consist of cotton, wool, silk like natural fibre etc. and the concern fabric is made by hand made (by charka spinning technology) yarn and in the traditional handloom process. Normally, different kind of natural dyes (vegetable based, wastage material based, tannin based colour) and the eco-friendly synthetic dyes are used for the coloration of the khadi textile. In addition some traditional printing techniques like hand screen printing, block printing is used for the special effect on the khadi textile. Concerning the value addition, only stiff khadi fabric is marketed which is made by adding starch. However, some special low cost other value addition of the khadi fabric will make it more acceptable to the consumers of the India and also in the other countries. In this respect, bioactive based finish and the mosquito repellent khadi textile is very much important. This kind of functionality will make the fabric hygienic in terms of attack by deadly mosquitoes and also some harmful microorganisms. Apart from it, if it is possible to make UV protective and the fire retardant khadi textile, it will increase its popularity and also gain the socio economic importancy to the consumers and the handloom weavers of India and the other subcontinental countries.

**Keywords:** Khadi; Handloom; Dyein; Printing; Value addition

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## 1. Introduction

Khadi is a handspun, handwoven natural textile clothing using popularly in the various part of the India. Fibres like cotton, wool, silk are come into the domain of the khadi sector. Khadi, fabric (especially dhoti, shawls etc.,) has been used from the 1920s in different parts of the India and it is one of the integral part of the swadeshi movement in our country. Khadi movement initiated by the freedom fighter of India and has promoted the social, economical part of the Indian culture and also promoted the handloom weavers of India. Actually, in the British era, textile materials are very costly as they are value added from the outside country. First time Indian technology (by charka spinning) come into play and has made a soft, comfortable, cheap khadi fabric for the general peoples of India. It was popularised by different local names (Khaddar, tusar silk, puttapaka saree, Muslin etc.,) in the various part of the India. Khadi fabric is also marketed as the name of silk khadi, matka khadi, poly khadi and the Muslin Khadi. Therefore it can be considered as the cultural and the textile glummer of the India. Normally Khadi fabric is made of cotton yarn and it is porous, softer, fuller and comfortable to wear at the summer season. Additionally, most of the khadi fabric has lower cover factor as it is made of handmade yarn and in the handloom. Concerning the processing of the khadi fabric, normally it is dyed by different natural based colour. Moreover some other synthetic colour like reactive dye, direct dye, vat dye, acid and metal complex dyes are also have been used for the coloration of the khadi textile. Concerning printing, tie and dye, Batik printing and the “Damask printing” by using white print paste of the titanium di oxide and the natural based thickener are using popularly. For printing, hand screen and the block printing method was used normally. However, most of the printed khadi fabrics are heavy and coarse, may be due to the curing process it undergoes after printing and also suffer poor rubbing fastness property. Actually till date, no specific research or commercial work has been performed on the functionality of the khadi fabric. Here in this context a short plan on the value addition of the khadi

fabric is discussed with its socio-economic importance in the Indian market.

## **2. Dyeing and the Printing of the Khadi fabric**

Most of the literature found in the concern area is related with the coloration and the printing of the khadi fabric. As far as the reported literature on the coloration (especially in dyeing) of the khadi fabric is concerned, different natural dyes extracted from turmeric (haldi), Babool chilka, Pomegranate peels (Anar chilka), Henna (Mehandi), Catachu (Katha), Madder (Majith), Indigo (Neel), Hararh, Marigold, Onions, Walnut Husks, etc. have been used for dyeing of the fabric along with different natural mordants like Alum, Copper Sulphate, Chrome, Tin, Oxalic Acid, Tartar, Acetic Acid, etc., [Khadi india]. Some of the researchers also have been used extract of Nerium Oleander flower color [Dr. N. Vasugi Raaja], Cordia Sebestena flower [M. Kumaresan et.al.] etc., for the coloration of the khadi fabric. Apart from the natural dyeing of the khadi fabric, some of the synthetic dyes like vat dyes, reactive, sulphur and the metal complex dyes are also have been explored. In printing researcher applied azoic dyes and indigo by batik and tie dye printing method [Saranya et. al.]. Different printing style like patchwork, kantha, phulkare, block printing is very much popular in the printing area. Normally "Damask printing" is popular in the khadi sector which consist white print paste with 20-25% titanium di oxide (TiO<sub>2</sub>) and guar gum thickener. Sometimes pigment colours are also added for colour printing effect. However, most of the printed khadi fabric are heavy, coarse and suffers poor rub fastness property. Additionally, no technical research has been reported on the value addition (adding functional property to the fabric) of the khadi fabric in the finishing stage. Concerning the value addition, only stiff khadi fabric is marketed which is made by adding starch.

## **3. Challenges of the Khadi fabric**

From last few decades popularity of the Khadi textile gradually diminishes as many newer functional textile materials have emerges in the Indian market in low cost. Additionally, apart from the natural dyeing and the printing, the technology involved in the processing of the khadi fabric also not has been improved in that level so that it can be more popularise. Therefore for saving the ancient textile glimmer of India and for the value addition of the khadi fabric some technical steps are mentioned in the following section.

## **4. Bioactive Khadi textile**

Khadi, a porous permeable hand woven fabric (hand loom made fabric), made from hand spun yarn. Generally it is made from natural fibres like cotton, wool and silk. General aspect of the khadi fabric is it has lower cover factor (around 14) and the yarn of the fabric has less twist factor. Less twist factor helps in moisture absorbancy or permeable property of the fabric material. Most of the khadi fabric is fuller and voluminous in nature and normally used in summer season. Normally khadi garments have been used for the apparel purpose in the subcontinental countries like India. Here humidity and the temperature is the major concern of the environment. Therefore, there is ample chance of the microbes attack on the khadi apparel which results in smelling and wear degradation of fibres that's why anti-microbial finish (hygienic property) is an essential concern for the khadi fabric. Concerning the antimicrobial solution, different nano based compound like nano titanium di oxide, nano zinc oxide, nano alumina etc., can be explored for making the hygienic khadi textile.

## **5. Sun protective Khadi textile**

Most of the marketed khadi fabrics are made of plain weave, lower ends and picks per inch (lower cover factor). Therefore there is high chance of the penetration of the UV rays (especially UVB and UVC) throughout the fabric. As a result end users of the khadi fabric may get affected by the adverse effect of the UV rays. However, due to the depletion of the ozone layer, from last few decades, majority of UV-B and UV-C are also reaching to earth and can easily transmitted through the loosely woven textile material. As a result person wearing cotton based khadi textile can easily affected by the harmful UV rays and there are strong chances of the cancer like deadly diseases. Therefore, in order to protect the end users of the khadi material from these harmful UV ray, sun protective finish is required. In this respect it

may be advantageous to use nano based titanium di oxide, zinc oxide etc., for the improvement of the sun protectiveness of the fabric.

## **6. Mosquito repellent khadi fabric**

Normally khadi fabric has been used popularly in the India and the other asian countries. In all those countries the average temperature range is around 30-40°C with high humidity level. In this temperature and the humidity range is very much helpful for the reproduction of the mosquitoes. Additionally, khadi fabric is popular in the rural part of the India where more amount of the dense forests are exist. Apart from it, person wearing khadi fabric is sweated because of the heat and the humid condition of the environment. As a result of unmanageable forest existence, heat, humidity, sweat smell, mosquitoes are attracted to the end users. Recent market survey shows that the Dengue (disease occurred by mosquito bite) is the one of the most deadly disease in India. Therefore if the khadi fabric can be made mosquito repellent it will be more popularise in the rural market as well as in the urban sector. The concern fabric can be made mosquito repellent by using light oil based natural colour which consist aromatic smell and has potential to kill or restrict the mosquitoes. Some of the natural based promising examples are clove oil, citronella oil, eucalyptus oil, castor oil, nirgundi oil etc. All the aforementioned plants contain special aromatic molecule which is harmful for the nervous system of the mosquitoes. Additionally, these plants are easily available in the rural area of India and therefore rural people can easily made mosquito repellent khadi fabric by exploring those products.

## **7. Fire retardant based value addition of Khadi textile**

Fire retardant is ananother important part of the value addition in the Khadi domain. Actually, most of the khadi fabric has been made by pure cotton and there is an ample chance of fire catch up in those fabrics. Therefore it will be very much helpful for the khadi customers if the concern fabric can be made fire retardant. Different fire retardant chemicals are available in the commercial market. However, they are costly and also not eco-friendly and after application the underlying textile materialturn stiffer and lost its aesthetic value. Additionally, lot of chemicals have been consumed for the desired fire resistant effect. Connected with this area, target is to improve the thermal stability of the khadi fabric by using eco-friendly chemicals like ammonium sulphamate, ammonium poly phosphate etc. These chemicals may be deposited on the fabric surface and will help in char mass formation by insulating effect. Apart from it some other products like di ammonium phosphate, urea, borax-boric acid mixture, alluminium tri hydrate, calcium carbonate etc., can be used for making fire retardant khadi fabric. It can save lot of life in the rural area of the India where khadi fabric is used popularly by the consumers.

## **8. Conclusion**

As far as the reported literature is concerned, the dyeing (mainly natural dye, direct dye, metal complex, reactive dye used) and the printing area (mainly block printing, kantha, patchwork, phulkare techniques are used) of the khadi fabric have been well explored by the researchers, handloom sectors and the different textile industries. However, researches on the functionalities of the khadi fabric need to be explore further for the popularisation of the khadi textile in the India and also in the world market.

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