

NATURALLY COLOURED COTTON DESIGNER'S APPAREL: AN EMERGING TREND IN KHADI WORLD

**Thesis submitted to the
University of Agricultural Sciences, Dharwad
In partial fulfillment of the requirements for the
Degree of**

DOCTOR OF PHILOSOPHY

IN

TEXTILE AND APPAREL DESIGNING

By

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INTRODUCTION

The first true Indian designer is Mahatma Gandhiji, who urged the people of India to wear *khadi* garments. *Khadi* or *Khaddar* simply means cotton handspun on charaka and hand woven into a cloth. *Khadi*, the Fabric of Freedom and Fashion, has been a source of livelihood for more than nine lakh people who are engaged in spinning, bobbin winding, warping, sizing and finally in weaving, spread across the country in rural areas. Spinning is mostly done by the girls as well as women in the villages, while weaving is dominated by men. The whole family strives hard to produce a yardage of *khadi*, a complete hand made product when reaches the market invariably expensive than that of the mill or power loom cloth.

“*Swaraj* (self rule) without *Swadeshi* (country made) goods is a lifeless corpse and if *Swadeshi* is the soul of *Swaraj*, *Khadi* is the essence of *Swadeshi* – Mahatma Gandhiji”. Therefore, *khadi* became not only a symbol of revolution and resistance but part of an Indian identity (www.indiaprofile.com).

The KVIC states that Government of India (GOI) and *Khadi* and Village Industries Commission (KVIC) are jointly making efforts to generate employment opportunities, to uplift economic status of rural artisans through various schemes viz., Interest Subsidy Scheme, *Khadi* Karigar, Janashree Bima Yojana and so on to enhance the productivity and competitiveness of *khadi* and finally to build a strong marketing strategy for these products (Mishra, 2008).

The handloom is simply a weaving wooden frame or structure operated manually, relying solely on human metabolic energy, which occupies a space barely of 8 sq.mtrs. Handloom weaving is a decentralized cottage based industry spread throughout the country. The sound of shuttling is the ‘*suprabat*’ of the rural homes wherein the weaver interweaves a harmony of motion and rhythm.

The traditional weaving in India revolves around “*Khadi*”. India is historically famous for its finest quality muslins in the past. Thus, spinning is considered as the lungs and weaving as heart of Indians ever since Mahatma Gandhiji encouraged ‘*Swadeshi*’ concept. *Khadi* is usually referred to cottons as in olden days hand spinning started with cottons only.

Cotton, King of fibre kingdom, is the pride of our nation and gift to the world. The word cotton is derived from Arabian dialect ‘*Kutun*’, ‘*Qutun*’ and ‘*Qutn*’. *Rigveda*, the first of ancient scriptures, mentioned cultivation and processing of cotton under the saint *Gurtasmad*. Cotton fabric is known as king of textiles because of the soft twist imparted by the hand, maintains the hairiness of the yarn to an extent, which gives maximum comfort. The cotton *khadi* is woven in such a way that the interlacing of threads provide maximum exchange of air to the body, thus giving a cooling effect, making *khadi* an ideal summer wear.

After China, India ranked second in production, consumption and export of cotton in the world. The cotton production has increased from 281 lakh bales in 2006-07 to 315 lakh bales in 2007-08. In spite of 10 per cent increase over last year’s production, cotton prices in the country increased by over 35 per cent year after year, because the exports registered an all time high record of 85 lakh bales as against 58 lakh bales last year. The Indian Textile Industry consumes about 62 per cent cotton as its raw material unlike the global textile industry that has 40: 60 mix of cotton and man made fibres (Nair, 2008).

In spite of increase in cotton production and export, it is important to know that growing enough cotton for one shirt requires 257 gallons of water. About 22.5 per cent of total production of insecticides is used for cotton cultivation globally. On top of that, scouring, bleaching, dyeing, printing, finishing and other wet processing create toxins that flow into the ecosystem. Dyeing alone uses upto 85 per cent of all the energy and large quantities of dyes as well as chemicals causing land and water pollution than any other wet processing of textile manufacturing. Further dye effluent water treatment and sludge disposal is still a great problem (www.expresstextile.com).

Therefore, eco-friendly clothing or eco-textiles are vogue in the textile industries. The global warming, air and water pollution and other ecological concerns receive increasing attention on one hand whereas greater population recognizes the need for sustainable fashion in textiles on the other hand. Hence, eco-fashion is a relatively new concept that has sky-rocketed from relative obscurity into the spot light over the past decade.

Eco-fashion is about making clothes that take into account the environment, the health of workers in the industry and the ultimate consumers as well as the working environment provided for the people in the fashion industry. The concept of eco-textiles refers to eco-production, eco-clothing, eco-fashion and that reflects Green Globe (www.dartmouth.edu).

The nonprofit Sustainable Technology Education Project (STEP) defines eco-fashions as clothes “that take into account the environment, the health of consumers and the working conditions of people in the fashion industry.” The eco-fashion market has given a chance for innovativeness to revive an age-old fibre, the Naturally Coloured Cotton (NCC) which existed in nature since 5000 years and produce ecofriendly apparels suitable to the entire population of this millennium (<http://environment.about.com/od/earthtalkcolumns/a/ecofashion.htm>).

Naturally Coloured Cotton is not a product of any recent genetic engineering or biotechnology. Several lint colours-brown, black, mahogany red, red, khaki, pink, blue, green, creamy white and ofcourse white belonged to four species of genus *Gossypium* viz., *arboreum*, *herbaceum*, *hirsutum* and *barbadense*. The species *G.hirsutum* and *G. barbadense* were cultivated in South and Central America as early as 2300 BC. Fibre from these was mainly used for weaving fishing nets. The other two species – *G.arboreum* and *G.herbaceum* were cultivated mainly in Asia and Africa about 4200 years ago. Evidence for its cultivation in India is obtained from the remains of the Indus Valley Civilization. It is also noted in an ancient Indian book Vriksha Ayurveda that they were being cultivated by the tribal people living in Narmada basin in Central India. The coloured cotton species Cocanadas 1 and 2 were commercially cultivated in Andhra Pradesh upto the middle of the 20th century and were exported to Japan. Similarly, cotton of black, brown, khaki and creamy white lint were grown in Assam. Kumta in Karnataka was the home for *G.herbaceum* with dull white lint (Murthy, 2001).

The advantage of Naturally Coloured Cottons is naturally tinted, does not require dyeing, makes it eco-supportive and favourable. Some brown coloured cottons appear brighter and more intense after laundering because the molecules re-orient within the fibre to become smoother. However, the green is found to be least stable to sunlight and fades when exposed to solar light because the molecules in the green cotton orient to reflect less light and produce a lighter appearance.

The yield of Naturally Coloured Cotton is relatively less per hectare but growers are paid higher price for the harvest. In 1996, the world market prices for Naturally Coloured Cottons ranged from \$1.80 to \$5.00 per pound compared to \$0.75 to \$1.15 per pound for conventional white cottons. Also growers of coloured cottons may require less pesticides as many are insect and disease resistant varieties which are drought and salt tolerant and grow successfully with organic farming methods (Vreeland, 1999).

In 1988, Sally Fox, a plant breeder from Wickenburg, Arizona developed colour cotton hybrids with fibres long enough to machine spin successfully which in turn led to establish Natural Cotton Colours, Inc. She markets four varieties viz., Fox Fibre® Green, Coyote Brown, Buffalo Brown and Palo Verde Green under a registered trademark Fox Fibre®. In 1990, another cotton breeder Raymond Bird joined with Harvey Campbell formed BC Cotton Inc. to work with Naturally Coloured Cotton which is currently producing four colours – green, brown, reddish brown and mocha.

Though colour cotton possesses many favourable features, does exhibit some limitations viz., short staple length and coarser structures make machine spinning slightly difficult. The fibre could be spun to 23s – 30s. Moreover, the coloured cottons are presently available in a limited range of colours. Also coloured cotton fields need to be located at a distance safe from the belt of white cotton to avoid cross pollination. In some regions, plucking and ginning are controlled to keep a check on the contamination.

It is possible to develop new designs in Naturally Coloured Cotton fabrics and also increase its demand only when the decentralized handloom / *khadi* sectors and the educational institutes like agricultural universities with textile departments by means of their viable technologies and good infrastructure facilities can impart training to the rural artisans through TOT or lab to land programmes. The vital focus is to be given on continuous education through training programmes for *khadi* spinners and weavers with Research and Development unit to fabricate Continuing Education Centre. The main role of the textile department is to develop constructive designs, to provide intensive training in the need based aspects viz., spinning to finer counts, minimize the wastage, raw material handling, quality control and product development, packaging, display techniques and other promotional measures. On the other hand, the handloom / *khadi* sectors need to have complete infrastructure facilities to improve their condition (Naik, 2007).

The natural trend among consumers and the environmentally conscious society of the early 1990s created an initial demand and niche market for Naturally Coloured Cottons and its textile products. Fashion is constantly transforming to meet the concerns of the time. Now in the present era, it is time for user friendly textile, to lead the mainstream in the eco-fashion.

In other words, even the ecofriendly special finishes or bio-finishes have captured the textile market as a supplementary process to fortify the eco-fashion. The bio-finishes are of great importance since they impart desirable properties viz., soft hand and feel, comfort, easy care and maintenance, durability and aesthetic appearance in the fabric/garment. Today the consumers are much educated and concerned about the quality of the fabric/garment and wish to get more satisfaction for the price they pay.

Bio-finish is mainly applied to the fabric by using enzymes, which are naturally occurring proteins capable of catalyzing specific chemical reactions. Hence used in a small quantity. The enzymes viz., amylases, pectinases, lipases, proteases, catalases etc are used in special finishes like bio-desizing, bio-scouring, bio-polishing, bio-stoning, bio-softening and so on. Therefore, these treatments impart soft handle, smoothness and enhance flexibility, drape and pliability. The bio-finished fabric can be used to produce fashion apparels with good drape and soft handle.

The designers create such eco-friendly clothes which are fashionable and attractive imbibing innovative techniques of garment construction only to attract the consumers. Whereas, the consumers observe the clothes keenly from colour and silhouette to the design of the dress. Thereby it is very essential to consider two types of designs that are important in dress making - structural and decorative design.

The structural design is formed by stitching pieces together like collar, cuff, yoke, pleats, etc. While the decorative design is made after the dress is stitched, e.g., by putting buttons, frills, or lace, etc., by embroidering with different colour threads, patch work, or dyeing in different colours. For designing a dress, different lines, curves, colours, and textures are used. These elements should be blended in such a way as to make the design beautiful. Elements of art are used on the basis of these principles only.

Fashion has played an important role at all times which has created a history in clothing and hence has an impact on consumer behavior in clothing purchasing practices. Due to change in fashion, designers are trying to design the clothes artistically through innovation to suit the consumer demands. The concept of detachable garment components is being used since ages to till date in different contexts.

An article on 'A Brief History of Clothes' states that the Mayans created a great civilization in parts of what are now Mexico and Honduras and in Guatamala. In the 16th century Mayan women wore a kind of petticoat called a smock or shift or chemise made of linen or wool and a wool dress over it. A woman's dress was made of two parts, a bodice or corset like garment and a skirt. Sleeves were held on with laces and could be detached. Working women wore a linen apron. Fashion was very important for the wealthy but poor peoples clothes hardly changed (Lambert, 2012).

These fashion apparels would appear incomplete without the glimpses of rich Indian traditional craftsmanship. The present day textile tradition of India is not simply the reflection of our rich past but also caters to the modern day requirements of the common man. Designers are introducing contemporary craft lore of India from rural and traditional ethos to meet the challenges of modern times. Along with earning valuable foreign exchange, traditional craft of surface embellishment on textiles has achieved the status of a highly organized small and medium scale industry.

Indian handcrafted textiles and allied products are internationally famous. The export of hand printed (including batik, block printed, tie-dye etc) items touched peak of Rs. 870.08 crore, decorated textiles (embroidery, crochet and appliqué work) of Rs.1030.89 crore and zari and zari items of Rs. 91.34 crore in 1997-98. Thus, it may be inferred that enormous potentiality lies in the hands of Indian craftsmen. (www.craftsinindia.com).

Creativity is best expressed through the medium of fashion. Today, fashion has become a passion and the researcher intend to make a qualitative difference in the evergreen field of *khadi* by interweaving Naturally Coloured Cotton and White Cotton to produce stripe and checks designer's *khadi* fabrics with eco-friendly special finishes.

Now-a-days, the consumer wants to buy a quality product at reasonable prices that fulfils all his requirements. For this reason, researcher has made an attempt to design, construct and embellish designer's apparel with the new concept of detachable garment components from specially bio-finished NCC *khadi* fabrics.

Thus, the present study on "Naturally Coloured Cotton Designer's Apparel: An emerging trend in *Khadi* World" is taken up with the following objectives:

1. To explore the possibilities of designing and weaving variegated stripe and checks Naturally Coloured Cotton *Khadi* fabrics
2. To assess the impact of special finishes on Naturally Coloured Cotton *Khadi* fabrics
3. To design, develop and embellish the trendy *Khadi* Apparel and enumerate consumer's acceptance
4. To calculate the cost of production of Designer's *Khadi* Apparel

REVIEW OF LITERATURE

The relevant research articles pertaining to the present investigation on “Naturally Coloured Cotton Designer’s Apparel: An Emerging Trend in *Khadi* World” were reviewed and presented under the following sub headings:

- 2.1 History, problems and development of eco-friendly naturally coloured cottons
- 2.2 The past, plight and prospects of *khadi* fabrics
- 2.3 Physical properties of *khadi* and naturally coloured cotton fabrics
- 2.4 Impact of special finishes on cottons
- 2.5 Documentation on concept of detachable garment components
- 2.6 Dress designing
- 2.7 Importance of eco-friendly fabrics in apparel designing
- 2.8 Value addition with decorative / surface embellishments
- 2.9 Consumer behaviour related to fashion apparels and decorative / surface embellishments
- 2.1 History, problems and development of eco-friendly naturally coloured cottons

The genus *Gossypium* comprises of four cultivated and 45 wild and semi wild species. Most of these species bear colour lint but are non-spinnable (Anon, 1992).

Singh *et al.* (1993) in a study on “A brief review on coloured cottons” while documenting selected genotypes of *Gossypium. hirsutum* L. reported that cotton lint produced extensively in commercial cultivation is mostly white or creamy white. Earlier brown linted *Gossypium arboreum* L. varieties, Cocanadas and Red Northerns were grown on a large scale in Andhra Pradesh, when they were in demand for their dyeing qualities. Other lint colours observed in cotton were dirty white, dirty grey, black, different shades of brown upto almost a mahogany red, khaki or a bright green that speedily faded to greenish rust brown. Some of the USA and ex-USSR germplasm of cotton lint exhibited the shades of pink, red, blue, green and even black. These colour linted cottons were not cultivated because of their low productivity and weak fibres. Some khaki linted types showed colour stability on exposure to sunlight, while others were susceptible to environment leading to colour degeneration.

Burnett (1994) in his study on “Cotton, naturally” revealed that naturally coloured cottons were not new but were been around over 5000 years. The availability of inexpensive dyes and the need for greater cotton production worldwide caused naturally coloured cottons to almost disappear about 50 years ago. The reason for its disappearance may also be because of low yield, short staple length and unable to spin on machine. The present day naturally coloured cottons are shorter, weaker and finer than regular upland cottons and spun successfully into ring and rotor yarns for many applications and can be blended themselves. Thus, the use of dyes can be completely omitted in textile finishing. Naturally coloured cottons can now be either organically or conventionally grown.

Basu (1996) in an article “Need for suitable policy and legislative measures for commercial cultivation of coloured cotton” highlighted that growing of coloured cotton in the vicinity of white cotton would contaminate the latter upsetting the seed production and cotton production process. Contamination may result from outcrossing in the field as well as during the processing after harvest. Isolation at all stages is very crucial to avoid contamination. Thus, appropriate isolation distance should be maintained in the field to avoid outcrossing. Further, the author mentioned that coloured cotton should be handled separately during harvesting, ginning, pressing, spinning, transporting and marketing. As such cleaning the machinery, which will be used to process coloured cotton ginning, is a must.

Federal / State Governments have to bring forth legislation to restrict colour cotton cultivation in best suited identified areas only. Texas and private certification agencies in other states of USA have laid down standards for certification of organic and naturally coloured cotton. Hence, it is necessary to study them for launching certification of organic and naturally coloured cotton in our country.

Charyulu (1996) in a study on “Naturally coloured Asiatic cottons of India” reported that, colour cotton types created interest among researchers in early 1920s and 1950s for study of their inheritance of lint colour genes. Asiatic brown lint cotton varieties i.e. Cocanados -1, Cocanados-2 and Red Northernns were grown on commercial scale in Andhra Pradesh during the first half of the century. But due to low productivity and low fibre strength the cultivation was not continued further. Again in recent past, interest was revived on colour cottons in view of their eco-friendly characters and export potentiality. But lot of monitoring is required in seed production, ginning, processing, distribution, commercial cultivation and their marketing, when high yielding varieties with desirable fibre characters are being developed and released.

Khadi *et al.* (1996) conducted a study on “Coloured cotton: Problems and their prospects”. It was reported that sunlight had great influence on the development and fading of the colour. When the boll bursts, the white lint appears and changes gradually to brown colour in the next few days. It takes almost a week for the complete development of colour whereas the green lint during the time of boll opening starts fading on exposure to sunlight and found to be rapid. The intensity of natural colour on exposure to sunlight is specific for some colours and therefore cannot be generalized.

Narayanan and Sundaram (1996) performed a study on “Basic requirements and breeding procedures for developing naturally coloured cotton in India”. For the experiment, 20 coloured *G. hirsutum* germplasm were grown at CSIR, Nagpur during 1993-94 kharif season in the rainfed conditions for evaluating the technological properties. Only seven germplasm accessions gave sufficient lint yield for conducting fibre quality evaluation that were evaluated at CIRCOT, Mumbai, after ginning.

Results revealed that the five brown linted germplasm possessed inferior fibre quality, but were superior to two green linted germplasm in colour expression. The green linted types needed improvement for intensity, uniformity and strength of colour besides fibre strength, while brown linted germplasm needed improvement for all fibre quality parameters as well as further for colour intensification at various shades of brown through appropriate breeding strategies.

Ravindranath *et al.* (1996) studied on “Development of coloured cottons and properties”. The study was undertaken with American cotton (*G. hirsutum*) and Desi cottons (*G. arboreum*) at Regional Agricultural Research Station, Nandyal. The American cottons selected were NDL HC.1 (dark brown), NDL HC.2 (green) and Narasimha (white) while NDL AC.1 (dark brown), NDL AC.2 (light brown) and Srisailam (white) were the selected Desi cottons. The results revealed that the yield of all the colour varieties was lower with lesser boll weight and inferior fibre characters compared to white linted cotton, Narasimha and Srisailam. Efforts are still in progress to develop a genotype superior in both yield and fibre characters.

Venugopal and Gururajan (1996) mentioned that, genetic expressions of colour in the lint takes place only when the boll bursts and lint exposed to sunlight. It takes about a week for the lint to turn into its natural colour. It is interesting to note that sunlight, essential for the development of colour is also responsible for the fading due to continuous exposure. Green colour is seen to fade more quickly than the brown. Apart from sunlight, the intensity of colour also depended upon, soil mineral content. The shades may differ geographically from place to place and season to season.

A study on “Naturally hued cotton – it is not new for *khadi*” was conducted by Sihna (1998) and reported that the Andhra fine *Khadi* popularly known as “Ponduru” is one of the exclusively naturally hued varieties of *khadi*. ‘Ponduru’ means a hand crafted textile material and the mechanization of any process on ponduru would ruin its exclusive characteristics. The constituent processes from fibre to cloth production being manual; there is no chance of fibre rupture and thus possible to produce superfine counts of upto 120s from short staples. Three varieties of coloured cottons used in the production of Andhra fine *khadi* are Hill cottons, Punasa cottons and Red cottons.

Khadi *et al.* (1999) carried out an experiment at Agricultural Research Station (ARS), Dharwad under rainfed condition to gauge the available variation in *G. hirsutum* genotypes having varying brown shades. The variation observed was very high for characters like yield (243-296 kg/ha), Ginning Out Turn (GOT) (19.04-40.00%) and fibre length (12.25-30.00 mm). For these characters maximum value observed was higher than the white check Abadhita. Thus indicated that some coloured genotypes can perform on par with white. The colour range observed was deep dark brown, medium and long fibre category. It can be concluded that naturally brown colour cottons are potential to perform on par with white cottons along with desirable fibre properties.

Murthy (2001) delivered a note on “story of coloured cottons” and revealed that several lint colours-brown, black, mahogany red, red, khaki, pink, blue, green and white were being cultivated in South and Central America as early as 2300 B.C. Fibres from these were mainly used for weaving fishing nets with an idea that nets made of dark shades were less conspicuous to fish. The two strains *G. arboreum* and *G. herbaceum* were cultivated in Africa and Asia about 4200 years ago. The evidence of its cultivation in India was obtained from the remains of the Indus Valley Civilization.

In the middle of the 20th century, coloured cotton species Cocanada 1 and 2 were commercially cultivated in Andhra Pradesh and exported to Japan. Kumta in South Canara district of Karnataka was the home for *G. herbaceum* with dull red lint and the world famous Dacca muslin was made from white and colour linted *G. arboreum*. The staple length of coloured cotton is short and weak and hence amenable only for hand spinning. The yield of the colour cotton is low and the colour was not uniform. Thus the plant breeder, conducted several research in genetic engineering and tried to produce superior varieties of desirable qualities to make coloured cotton more viable, attractive and machine friendly.

A study on “Growth prospects for coloured cotton” was conducted by Gokarneshan (2003) and reviewed that 0.02 percent of the land is used for coloured cotton cultivation out of 35 million hectares of land used for cotton cultivation globally. One of the most important measure that have to be adopted in India for coloured cotton cultivation in order to prevent mixing and cross pollinations is segregating land to grow coloured cotton.

Finally the author concluded that, as the naturally coloured cotton is available in brown and light green, it is difficult to compete with synthetic dyes that are available in limitless range of colours and the interest on colour cotton may decline in course of time owing to unpredictable changes in fashion trends.

Vattam (2006) in an article “Who says cotton is white?” writes that concerted efforts of the scientists of the Agricultural Research Station, University of Agricultural Sciences, Dharwad for last 15 years have disproved the theory that cotton is white. The first almond coloured desi variety DDCC-1 (Dharwad Desi Colour Cotton-I) has been released and its cultivation on a commercial level has been taken up by a local *khadi* unit to manufacture naturally coloured cotton cloth. The commercial sale of these garments would fetch upto three times higher prices than dyed fabrics.

However a system of contract farming is needed for the commercialization of these cottons. Also a buy back assurance is necessary in order to promote in the open market. Presently, the DDCC-I variety is grown commercially at Uppinbetageri village and the eco-friendly fabrics and garments are available commercially.

Kimmel (2007) in an article on “A new spin on naturally coloured cottons” revealed that two ARS patented methods viz., staple core and filament core spinning have been used to produce composite yarns. Such yarns contain an outer layer of naturally coloured fiber and an inner core of stronger white cotton or synthetic fibers. The resultant was a bi-component yarn that contains two types of fibers that are securely sandwiched instead of merely twisted together. Consequently, the fabrics appeared like solid coloured cotton and were stronger than those made from the same fibers traditionally. The new products developed are towels, blankets and T-shirts with such naturally coloured cotton. Already staple core yarns from red, green, brown and mocha coloured cottons have been produced with great success. These yarns are 20 to 30 percent stronger than yarns made from currently available blends of white and coloured fibers, and the colours are much richer.

2.2 The past, plight and prospects of *khadi* fabrics

Anonymous (2005) seemed in the brochure of “Bharatiya Stree Shakti Industry- a unit under margin money scheme of KVIC” that it is a small step to realize the dream of Mahatma Gandhiji. History speaks that in the year 1913, Gandhiji was convinced that the occupation of weaving can go a long way in empowering the poor by ameliorating the poverty of 74 per cent rural people of the country. This conception further led to *Khadi* Swadeshi Movement and then clothes woven using charaka was called as *khadi* which showed the path of self reliance to India.

The *khadi* movement in Karnataka started in the year 1924 in a village called “Hudali” near Belgaum. Mahatma Gandhi camped in this village. Inspired by Tilak and Gandhiji, Gangadhar Rao Deshpande and his associates under took the task of publicizing *khadi* in nationalism, which spread throughout Karnataka.

In an article "KVI Exhibitions - Needs policy support". Dahiya (2007) enumerates some ideas to strengthen the efforts of KVI for the success and bright future. It is necessary to review the present structure and policies before organizing any kind of exhibition in India viz., suitability of the exhibition place, conducting market study, analyzing earlier experiences, identifying the products to be sold, organizing man power, NOC from concerned authority, planning and designing for window display in stalls, lodging and boarding arrangements for sales staff from outside, documentation and sponsorships, literature with photographs and financial assistance/grants. Most important ones are product designing and packaging, latest fashion trends, highlighting eco-friendly and natural concept, period of exhibition, rebate/MDA, festival/seasonal offers, cultural shows/children's competition and efficient publicity plans.

Naik (2007) expresses in an article "Support system for *khadi* industries: Role of textile institutes and KVIC" that by and large, the plight of the handloom especially *khadi* weavers at the movement is miserable. Being unorganized sector, the weavers lead a life of seclusion in their village affected by illiteracy, ignorance, poverty and deprived of continuous job throughout the year. The most significant problems against this industry are organizational problems, insufficient raw materials, greedy middlemen, technical know-how, diversity in the product, quality control, lack of training, financial assistance, disparity in the price range, finishing for the goods, packing, transportation, marketing and sales promotion.

It was good fortune of the artisans that the chairperson of KVIC, Mumbai-Sushri Kumudben Joshi visited the *khadi* activities in Hebballi Kshetriya Seva Sangh, Garag Kshetriya Seva Sangh, Dharwad Taluk Seva Sangh and *Khadi* Gramodyog Bengeri, Hubli on 10th December 2006 and was very much pleased to witness the villagers working on the handlooms almost more than eight hours per day. Thus the chairperson thought of new horizon in *khadi* industry of connecting the gaps between handloom/*khadi* sectors, the textile research institutes and agricultural university by imparting training to the rural artisans in the form of TOT and lab to land.

Das (2008) enlightens in the article "Consumerism-the retail outlook" that India is a country where the average Indian earns well under \$ 2.00 (Rs.90.00) a day yet. "Things are changing in India" and "Things are changing all the time, and people are enjoying it". Rural consumers demand ideas and solutions that have all the virtues and comforts of their counterparts living in cities and at the same time the solutions are truly 'Rural'. It is this concept that gave birth to the idea of '*Khadi Plaza*' a 'Shop in shop' context in the *khadi* sector. It is a contemporary solution to the modern day metro city hyper markets and malls where the customer finds the best value for money under one roof in an environment where the customer is comfortable while shopping.

2.3 Physical properties of *khadi* and naturally coloured cotton fabrics

Sundarmurthy *et al.* (1994) in their study on "Colour fastness of naturally pigmented cotton" revealed that colour difference between the original colour of the lint and on washing as well as exposure to light showed an improvement in the intensity of the pigment. On scouring there was enhancement in the shades of the respective colour. Naturally coloured cotton exhibited good to very good light fastness and recorded a grade ranging from 4 to 5 on exposure to light indicating the pigment did not suffer due to these treatments.

A study on "Colour changes in naturally coloured cotton due to laundering and pretreatments" performed by Williams and Horridge (1994) aimed to assess the effect of laundering on the naturally linted colour cottons. Naturally coloured cottons are unique in their behaviour because brown lint appeared darker with age and exposure to light whereas unstabilized green turned to be brown when exposed to solar rays. For brown and green cottons, chlorine bleach produced colours that were significantly closer to the untreated fabric i.e. this treatment faded the browns and greens unevenly and significantly reduced the intensity of the pigment.

Chanchal and Dua (1996) performed a study on "Improving aesthetic appeal of *khadi* fabrics – drapability of *khadi*". The results revealed that in subjective evaluation of drapability, cotton both in unlaundered and laundered states proved to be least drapable. In objective assessment of drape, *khadi* showed higher drape coefficient for heavier fabrics followed by medium and light weight, before and after laundering. Sizing enhanced the drape coefficient. The bending length of unlaundered *khadi* fabric was greater than laundered fabric. Thus there existed a positive correlation between drape coefficient and bending length. The stiffness of the fabric and drape coefficient were inversely proportional to the number of nodes. The *khadi* material on regular wear becomes limpy and thus loses its drape quality. Hence in order to improve the texture, fall of the fabric and aesthetic appeal it necessitates to size the *khadi* material appropriately.

A study was conducted by Iyer *et al.* (1996) on "Characteristics of naturally coloured cottons and aspects requiring improvement". In the present investigation various physical and chemical properties of some selected coloured cotton parents and their crosses with white cotton grown at Central Institute for Cotton Research (CICR) regional station, Coimbatore were studied. Fibres from two relatively stabilized strains developed elsewhere in the country, also included in the study, were spun, hand woven and evaluated for fibre and yarn properties.

Although there was a general decrease in colour intensity on crossing but maturity and micronaire fineness showed substantial increase. The improvement in 2.5% span length and tenacity at 3.2 mm gauge length was not much remarkable. It was noted that the coloured parents and crosses have much higher (almost 100% higher) wax content than white strains. Scouring, in general, reduced the colour intensity by 20-40% while soap washing led to an improvement in colour intensity by 25-50%. Thus important aspect that needs attention is improvement in uniformity of the resultant lint with respect to colour and the staple length.

Different solvents *viz.*, acetone, alcohol, xylene, sodium hydroxide, sulphuric acid and chloroform were used to extract the brown pigment from colour lint in a study on "Status of the naturally coloured cotton" performed by Khadi *et al.* (1996). Sodium hydroxide solvent could extract a reddish brown pigment from all the three genotypes *viz.*, Dark Brown Hirsutum (DBH), Light brown Hirsutum (LBH) and Brown Arboreum (BA). It was inferred that the pigment belonged to flavanoid group and cleansing in hot water enhanced the colour intensity in Brown Hirsutum (BH), Green Hirsutum (GH) and Brown Arboreum (BA), which may be due to uniform spreading of the pigment all along the fibre axis on washing.

Maralapannavar *et al.* (1996) in a "Study on stability of colour among naturally coloured cottons to washing" observed that soaking and washing of coloured cotton fibre samples in hot water and detergents increased the intensity of the colour which may be due to spreading of pigment in the fibres. This study indicated that the detergent do not adversely affect the naturally coloured cottons.

A perusal of the study on "Effects of selected laundering and dry cleaning pretreatments on the colour of naturally coloured cotton" conducted by Williams and Horridge (1996) revealed that coloured cotton can be successfully spun into yarn and woven or knitted into fabric by modern mass production methods instead of loosing colour with care procedure. Genetic colour intensity of coloured cotton may be preferable to white or dyed cotton for some end uses. The author concluded that pretreatments may affect the inherent colours of naturally coloured cotton. However, it is remembered that green and coyote cotton fabrics did enhance the intensity in colour with repeated care cycles. Dry cleaning retained the original colour of cotton fabrics more than laundering.

Gandhad and Naik (1999 a) conducted an experiment on "Effect of soda ash scouring on naturally coloured cotton yarns" Dharwad Light Brown Hirsutum-95-1 (DLBH 95-1), Dharwad Medium Brown Hirsutum-95-1 (DMBH-95-1), Dharwad Dark Brown Hirsutum (DDBH-95-1) and Dharwad Green Hirsutum -95-1 (DGH-95-1) were the genotypes selected for the study. These genotypes were scoured with soda ash and later assessed for single yarn strength and change in pigmentation. Results revealed that scouring improved that single yarn strength and deepened the pigment of all the selected naturally coloured cotton genotypes.

Three brown varieties *viz.*, DLBH-95-1, DMBH-95-1 and DDBH-95-1 and one green genotype (DGH-95-1) were first scoured using sodium hydroxide, followed by mercerization with 20 percent sodium hydroxide with 2gpl wetting agent (fibropol levo-100) to assess its effect on single yarn strength and change in pigmentation. The results revealed that Dharwad Green Hirsutum-95-1 (DGH-95-1) showed highest improvement in single yarn strength followed by DMBH-95-1 and DLBH-95-1 and slight increase was observed in DDBH-95-1. Moreover, the strength of natural pigment enhanced remarkably in DDBH-95-1 followed by in DLBH-95-1, DMBH-95-1 and DGH-95-1 on mercerization when observed under four light illumination *viz.*, day light, tungsten, tubelight-83 and tubelight-84. This experiment on "Influence of commercial scouring and mercerization on naturally coloured cotton was carried out by Gandhad and Naik (1999 b).

A study on "Natural colour cotton scouring effect on yarn" was conducted by Gandhad and Naik (1999 c). The naturally coloured cotton genotypes *viz.*, DLBH-95-1, DMBH-95-1 and DGH-95-1 were selected and the treatment was carried out at the yarn stage. The results revealed that irrespective of the scouring agents there was increase in the single yarn strength and pigmentation of all the selected genotypes.

These brown genotypes exhibited better improvement in single yarn strength for sodium carbonate + sodium hydroxide scouring (S_2 , 2%) whereas green genotypes showed improvement for sodium carbonate (S_1 , 2%) scouring. All the brown genotypes exhibited greater enhancement in colour for S_1 scouring whereas green for S_2 .

A study on "Effect of commercial scouring and mercerization on the pigment of Dharwad Desi coloured cotton-1 (*Gossypium arboreum* L.) fabric" carried out by Khyadi and Naik (1999 a) revealed that on scouring and mercerization, DDCC-1 brown genotype showed remarkable increase in the pigmentation.

The purpose of the study on "Effect of p^H of selected cleansing agents on the pigment of Dharwad Desi Coloured Cotton-1 (*Gossypium arboreum* L.) fabric" conducted by Khyadi and Naik (1999 b) revealed that, there was gradual increase in the pigment of DDCC-1 fabric subjected for twenty washes. The cleansing agents irrespective of natural or synthetic origin revealed a trend towards enhancement of inherent colour. Further, the test sample cleansed with ariel detergent exhibited relatively higher colour tone than surf detergent powder. It was inferred by the authors that enhancement in colour may be due to the p^H of respective cleansing agents i.e. higher the alkalinity, greater the colour intensity.

Khyadi and Naik (1999 c) studied on "Effect of soaking on the pigment of Dharwad Desi Coloured Cotton-1 (*Gossypium arboreum* L.) fabric". The test samples were subjected for 25 soakings each in hard and soft waters to assess the change in colour. The test samples were soaked in each water type for 30 minutes at room temperature and shade dried. Results revealed that maximum gain in colour was noticed at 15th soaking in hard water which clearly indicated that the pigment is insoluble in water. Thus, it was concluded that DDCC-1 fabric could safely be soaked along with other white and light coloured cotton during laundering since there is no stripping or running of the pigment.

Gandhad and Naik (2000) conducted a study on "Bleaching cotton". Naturally coloured cotton genotypes viz., DLBH-95-1, DMBH-95-1, DDBH-95-1 and DGH-95-1 were selected and bleached at yarn stage. Before bleaching the test samples were scoured with two scouring agents viz., soda ash (S_1) and a mixture of soda ash and caustic soda (S_2). After scouring in S_1 and S_2 , both the yarns were separately bleached with four bleaching agents at three different concentrations, commonly used on white cotton. The bleaching agents selected for the study were sunlight, calcium hypochlorite, hydrogen peroxide and sodium hydrosulphite. Results revealed that, in general sunlight bleaching improved the single yarn strength of all the brown genotypes but reduced the strength of green genotype (DGH-95-1).

An experiment on "Studies on effect of scouring, bleaching, mercerization and cleansing agent on physical properties of naturally coloured cotton and white cotton yarns" was conducted by Renuka and Shailaja (2003). Hirsutum Cream Cotton (HCC-1), Hirsutum Colour Cotton-7 (HCC-7), Dharwad Brown Hirsutum-12 (DBH-12) and one white cotton, Jayadhar were selected for the study and were assessed for single yarn strength and change in pigmentation after scouring, bleaching, mercerization and 5th and 10th washings. It was found that there was increase in single yarn strength among all genotypes on scouring but the colour genotypes showed better improvement when scoured with caustic soda and soda ash. The pre treatments like scouring, mercerization and washings did enhance the inherent pigment of colour genotypes.

An attempt was made by Sujata and Naik (2006) to study the "Effect of softener treatment on physical properties of naturally coloured cotton *khadi* fabric" in which the said fabric was subjected to cationic and silicone softeners separately at 40°C for 30 minutes and dried at 120°C with MLR 1:10. The results revealed that the bending path, elongation per cent, tensile strength and drapability improved significantly. Though there was reduction in abrasion resistance, a remarkable improvement in pilling resistance was noticed. Among the two softeners, cationic softener exhibited positive results with respect to mechanical and functional properties.

Ying and Xinyuan (2006) conducted a study on "Effect of colouring materials on microstructure of naturally coloured cotton" by using advanced testing methods of x-ray diffractometer, solid state Cross Polarization / Magic Angle Spinning (CP/MAS) and C-Nuclear Magnetic Resonance (C-NMR). It was shown that the colouring material in cotton affected crystallization of the fiber. The degree of crystallinity and crystal dimension would increase after colouring material was extracted. The colouring material in the cotton distributed mainly in cell, some distributed in secondary cell wall.

However, supercritical CO₂ extraction showed that the colouring material in green cotton was extracted more easily than brown cotton was extracted more easily than brown cotton. Thus the bonding effect between colouring material and fiber molecules was different for green and brown cotton.

2.4 Impact of special finishes on cottons

Gulrajani *et al.*, (1998) performed a study on “Kawabata evaluation of enzyme treated cotton knitted fabric”. It was reported that industrial trial of the cellulase treatment on cotton knitted fabric under optimized conditions improved the surface smoothness and hand feel properties of the fabric.

Gulrajani *et al.* (1998) conducted a study on “Enzymatic treatment of cotton knits”. Knitted bleached cotton fabric having ribbed weave was treated with cellulose enzymes. The experiments were carried out according to the Box and Behnken response surface design. Further it was apparent from the study that weight loss increases rapidly on increasing treatment time upto 45 min and then it levels off. The strength loss increases rapidly with increase in enzyme concentration beyond 10% owf and the increase in treatment time from 15 to 75 min has linear positive effect on strength loss.

Chattopadhyay *et al.* (1999) conducted a study on “Studies on formaldehyde – free crease resistant finishing of cotton fabric using citric acid and selective chemical additives. Desized, scoured and bleached poplin cotton fabric was given cross linking finish in two phases i.e. treatment with citric acid and treatment with finish KVSI (DMDHEU). Later it was concluded that 4 percent concentration of citric acid with 2 percent sodium salt of maleic acid and 1.5 percent triethanolamine was found to be most suitable recipe. Free or releasable formaldehyde content in citric acid treated material is low as compared to that of KVSI finished cotton fabric.

A study on “Wrinkle free technology for shirting materials” was done by Robers (2000). The study focused on the two basic methods of Wrinkle Free Technology for cottons i.e. pre-curing and post curing. The pre-curing finish is applied at fabric stage and in post curing for the ready garment (i.e. after cutting, sewing and pressing).

Edward (2001) reported on “Permanent press / wrinkle free finish”. It was revealed that the finish may be applied to cottons either by pad or exhaust method. Where in latter case, the garment was machine washed, followed by tumble drying, hot pressing and curing. In pad application the garment was cured first and then hot pressed. The garments subjected to wrinkle free finish maintained the desired crease after repeated use and several washings with good dimensional stability.

A study carried out by Raje *et al.* (2001) on “Finishing of cotton fabrics with cellulase enzyme” revealed that the medium and heavy weight cotton fabrics showed considerable improvement in smoothness and softness after enzymatic treatment. Prolonged enzymatic treatment led to more serious fabric damage viz., higher loss in weight and strength. Enzyme treatment followed by softener treatment enhances the smoothness and softness of the cotton fabrics.

A paper on “Enzymes in textile wet processing” was presented by Verma (2002), which highlighted preliminary information on properties and uses of enzymes in wet processing of textiles. Chemically enzymes being protein complex are affected by variation in temperature, P^H activators like metallic cations, inhibitors like some of the alkalies and antiseptics. In textile wet processing, enzymes were used to desize, bio-polish, scour, denim wash, dye and so-on. Further the author concluded that, inspite of many advantages; enzymes are still in limited use. Thus hope that in future use of enzymes may increase as they minimize negative environmental effects.

Aly Sayed *et al.* (2004) carried out a research on “Utilization of Chitosan citrate as crease resistant and anti-microbial finishing agent for cotton fabric”. Plain woven, scoured, bleached and mercerized cotton fabric was treated with chitosan citrate at different curing time and temperature. Further chitosan citrate showed satisfactory results with respect to crease resistance and anti-microbial properties. The fabrics treated with chitosan citrate showed high anti microbial property with repeated laundering as compared to that of the fabrics treated with chitosan only.

Etters (2004) and his team from the University of Georgia and The Georgia Institute of Technology are collaborating on a state funded textile chemical project that has potential to reduce textile effluent, while improving the quality of the textile substrate. Researchers in an article “Research note on enzymatic preparation / bleaching / finishing of cotton” concluded that an extremely powerful alkaline pectinase has recently been insolated from which the cellulose is not degraded, resulting in less weight or strength loss than occurred with either caustic scouring or cellulase treatment.

In addition, the amount of wax removed is also less resulting in a improve hand. The usage of this bio-preparation greatly decreased effluent discharge, improved cost savings in cotton processing and an improved value added cotton textile product.

A report was made on "An overview of softening agents for textiles" by Malik *et al.* (2004) and highlighted on the properties and types of softeners used at industrial level. The main purpose of softener is to improve the desired handle and smoothness of synthetic fabrics. The textile softener needs to be non-toxic, sprayable, biodegradable and dermatologically safe.

Amphoteric, anionic, cationic and reactive softeners are popularly used as the softening agents in the textile finishes. The author concluded that, textile softening agents are of great importance in textile finishing and processing to impart better hand and feel. Further these softeners are used to influence the functional properties *viz.*, antistaticity, hydrophilicity, elasticity, sewability and abrasion resistance.

A study on "Biopolishing of cotton fabrics - Changes in its comfort properties" conducted by Yadav *et. al* (2004) and revealed that overall effect of biopolishing on thermal insulation value was just a marginal increase. Whereas time taken for moisture transfer with respect to control for light weight fabric showed increasing trend and that of heavy weight showed decreasing trend. All together biopolished heavy weight fabric showed higher comfort than similarly treated light weight cotton fabric.

A study on "Bio-softening to improve hand values of cellulosic fabrics" was conducted by Thilagavathi *et.al.* (2005) and the results showed that enzyme treatment improved the hand values of cotton fabric in terms of the softness, smoothness and stiffness. It is evident from the study that bio-finishing process improved the overall hand value of the fabric.

Sarvani and Balakrishnaiah (2007) experimented on "Wrinkle recovery treatment to *khadi* and handloom fabrics" by using *khadi* cotton, *khadi* polyvastra, handloom cotton and handloom polyester/cotton blend treated with DMDHEU. From the findings of the study it was concluded that there is increased crease recovery upto 152 angles, increased tensile strength and increased stiffness. Thus in order to develop market viable new products, *khadi* and handloom fabrics can be given special functional finishes to improve its maintenance, comfort and durability.

Tarafder (2012) revealed in a study "Functional finishes for textiles and apparels" that specialty or functional finishes means fragrance release, wrinkle free finish, skin care additives, insect repellent, deodorizing fragrance, cool finish and thermal insulation finish, water proofing finish and UV stabilizers.

Among them, wrinkle free finish is mainly given for 100 per cent cotton, P/V, P/C blended fabrics. Cotton has two important regions, namely crystalline and amorphous and during the wear the hydrogen bonds at the junction of crystalline and amorphous region, leads to the formation of free – OH groups. More the number of free –OH groups more the creases.

Resins react with the OH groups of successive cellulose chains resulting in less or no free – OH group in amorphous region. That means less H-bonding and no creases. However, it means increase in brittleness. Application of easy care finish results producing cross-linking agent to avoid crease formation. Especially suitable for shirts, bottom weights, furnishings fabrics like bed sheets, curtains, pillow covers etc.

Vigneswaran *et al.* (2012) in their study revealed that the organic cotton fabric for its wet processing needs the use of minimum safe chemicals to health and for this the alternative way is to go into enzyme technology, because enzymes are substrate specific bio-catalysts and they operate best at an ambient pressure, mild temperature and often at a neutral pH range. Enzymes are going and increasingly important role as a tool in various wet textile pretreatment and finishes processes. In this study on "Prediction and process optimization of pectinolytic reaction on organic cotton fabrics for bioscouring with alkaline pectinase", the polyvinyl alcohol (PVA) sized 100 per cent organic cotton fabrics were treated with alpha-amylase by varying enzyme concentration, temperature and reaction time.

The enzymatic desizing process was carried out at pH 6-7. Further alkaline pectinase and purified pectatase were selected for the degradation of cotton pectin. The results revealed that it is possible to employ alkaline pectinase to scour the organic cotton fabric to achieve better water absorbency rate of < 5s and 52.5 per cent wax removal by higher pectin degradation of 75-80 per cent using 6 per cent enzyme concentration, 60°C temperature and 60 min reaction time with 3.2 per cent fabric weight loss.

2.5 Documentation on concept of detachable garment components

Clemens, S.L. (1871) in his patent no. 121,992 on "Improvement in adjustable and detachable straps for garments" elucidates that the vest, pantaloons, or other garment upon which the strap is to be used, should be provided with buttons or other fastenings on which the strap is to be detached and adjusted. When changing garments, the strap may readily be detached from one and put on another. As an article of manufacture, the adjustable and detachable back-strap for garments is being provided with devices for adjusting its length; and with button-holed ends for direct attachment to the clothing.

Gipson *et. al.* (1990) in their patent numbered 049648608 on "Absorbent garment" explains about a detachable two piece garment having a reusable belt and a disposable assembly. The reusable belt has receiving material substantially along its length and at least one patch of complementary hook type material disposed near an end of the belt. The hook type material is adapted to be refastenably attached to the receiving material of the belt. The disposable assembly comprises a liquid pervious top sheet, a liquid impervious back sheet atleast partially peripherally joined to the top sheet, and an absorbent core intermediate the top sheet and the back sheet. The disposable assembly further has liquid impervious flaps overlaying the top sheet and defining four corners. A patch of complementary hook type material may be disposed on the flaps near each corner of the disposable assembly and adapted to be refastenably attached to the receiving material of the belt.

Lurry, C. A. (1998) in her patent no. 5717999 on 'Modular clothing' explains that she designed an active wear garment which has sleeves, leggings, a collar, and a hood which are detachably connected to vest and pants portions. The components can be attached and detached to form outfits covering as much or as little of the body as desired. The sleeves are segmented to provide long and short sleeve configurations, and the leggings can be attached and detached to provide either long or short pants configurations. Zippers are provided down the length of the sleeves, leggings, and vest to provide ventilation and flexibility. The hood, cuffs, and pants portion is provided with elastic or drawstring closures.

Dan (2012) in his article on "Doublets" describes that, doublet was the most frequently worn torso-covering garment by English men. It is similar to the modern coat or jacket, but meant to be worn all the time rather than just during cold weather, though a doublet might be removed if heavy work like harvesting or blacksmithing was being done. Doublets almost always fastened down the front with buttons and had fully attached sleeves as our coats and garments do. They usually had a collar, and could have a combination of decorative skirting or tabs at the waist and/or shoulder. Based on contemporary artwork, sleeves were found to be detachable, removable, or interchangeably in men's doublets. There existed doublets with different colored sleeves than the torso of the garment, as this is indicative of wearing a jerkin (like a vest) over the doublet for decoration or warmth.

The only other existing male garment with detachable sleeves in patterns of fashion is a jerkin/doublet intended for fencing. Garments meant for martial, but not necessarily military use seem to exist in their own realm. Removable sleeves for a sport-fencing garment make sense as comfort while practicing or sparring might be desired, but given their padding and patterning, they are not something someone might wear out of that context.

Kirin Rinehart (2012) in her article on "Carry on Closet - Offers Multifunctional Garments for the Green Jet-Setter" says that Renée Lacroix and Zahra Ash-Harper have devised the 'Carry-On Closet,' a trans-seasonal 10-piece capsule collection such as a cape becomes a one-shoulder blouse or skirt, a dress morphs into a top, and a coat unzips into a cropped jacket or vest designed in such a way that each piece would function in multiple ways for versatility, comfort, and style. By creating garments that do more with less, Lacroix and Ash-Harper aspire to whittle the prodigious amount of textile waste that enters landfills each year.

Most people are familiar with the principle 'reduce, reuse, and recycle,' but not everybody is aware that it's a three-step pyramid where most of the impact happens at the base: to reduce as told by Lacroix. Based on the constructivists' use of geometric shapes, particularly the circle and the square, the designs are characterized by adjustable drawstrings, non-fraying materials (to minimize finishing), removable parts, and a consistent palette that allows for easy mixing and matching. She added that with an increasing percentage of the global population living in large cities, most workers need to transit for long periods, making it very difficult to go back home in between activities. They are targeting on urban, busy professionals seeking a simpler lifestyle.

Syuzi (2012) in her article on "Fashioning Spacesuits: Part Two" enumerates that on a mission to improve the usability and wearability of spacesuits, the students at the University of Minnesota were given design briefs by NASA to solve current problems with flight suit design. From the design of modular (and comfortable) flexible displays and controls to multi-modal alert systems, the students came up with novel solutions that used detachable garment components, magnets, crimp fasteners, conductive fabrics and threads. Kaila Bibeau, Ashton Frith, Lucie Mulligan (students) expressed their views that detachable components on garments allow for freedom of movement as well as ease of reach for the users. Backpacks and other means of holding accessories add unneeded bulk and can interfere with the users' movements. Swatches have the ability to attach at different locations allows for customization of needs/tools for the user at any time.

2.6 Dress designing

Chakravarty and Kaur (2000) did study on "Designing of kurtas using line as an element of design". In this study the kurtas were designed on the basis of elements of designs, the Line. Thirty kurta designs were developed of which 15 designs were illustrated and finally five sketches most preferred by the college girls, were chosen for construction. All the five kurtas were designed using the vertical and diagonal lines with yoke attached to the neckline. From the study it was concluded that, line can be successfully used as a major element of design in designing kurtas, which were preferred by young girls.

Chauhan and Saboo (2000) conducted a study on "Designing and construction of dresses taking inspiration from Gothic Cathedrals featuring stained glass patterns". The greatest visual art of stained glass windows of the gothic cathedrals and unique art was used by the researcher as an embellishment on the ladies wear. Silver coloured artificial tissue and grey coloured velvet were selected for painting the stained glass motifs. Twenty designs were sketched with the categorization of one piece dress. The three best designs from each category were selected and the dresses were constructed and embellished with the motif of gothic cathedrals. The authors concluded that, designing the dresses taking inspiration from the stained glass of the gothic cathedrals were very well incorporated and was a novel, artistic and unique notion with a lot of creativity and imagination.

Chauhan and Rosy (2003) performed a study on "Designing and construction of garments with peplums". Peplum was an outer tunic, while the modern peplum is usually a short top over skirt, suspended from the bodice, having extra flare, pleats, gathers and other decorative details along the edges of each seam, imparting a snug fit. The garments designed were classified into five categories, viz., geometric, closure, gathered, pleated and flared. In each category 15 sketches were drawn, out of which 3 from each category were selected for construction and presented through a show. The order of preference was geometric pattern (91.80%) followed by flared, closure, pleated and gathered garments.

Patel and Gupta (2003) carried out a study on "Designing and construction of garments inspired from the elements of life". In this study the researcher considered only three elements of life viz., Air, Fire and Water and constructed high fashion Indian and western outfits. The air, fire and water were further studied for their respective properties and on their basis, the methods and techniques of representing each of them through dress were decided upon and four garments in each of the selected elements were constructed. Twelve models were selected to display the twelve dresses. It was concluded that the styles, fabric, texture, colour and print on the fabric all contributed immensely to the aesthetic appeal and acceptance of garment design. The element 'fire' was best projected and received excellent rating. The design displayed created strong impact of exclusiveness, originality, elegance and beauty in design.

Pandey and Kaur (2008) conducted a study on "Designing and value addition on stylized choli for young women". It was noticed that women prefer to don garments, which are not only comfortable but also functional and impart smart look on the wearer as well. Technically speaking choli is a bodice like garment which covered simply the breasts. It is also a short sleeved bodice worn especially by Indian women, but with creative designs these have earned an important market in International arena too. Six stylized cholis were designed, each featuring the common factors "comfort" and "design uniqueness". The cholis were constructed using flat pattern technique in raw silk and taffeta and embellished with zardosi work. The cholis were designed with several style features such as collars, sleeves, placket opening and princess line which have been incorporated to give a touch of international look, yet cater to the Indian appeal with zardosi work were highly accepted.

Vimala and Ramalakshmi (2008) revealed a study on "Designing comfort garment for children", and concluded that the children's garments should be soft, comfortable, easy to put on the take off, comparatively loose, non-flamamable, light in weight, non-irritating and should allow quick transmission of sweat. Therefore these fabrics and need to be treated with some of the special finishes like anti-sttaic, anti-bacterial, anti microbial, crease-retentive, moth and mildew resistant, anti-shrink, anti-stretch and so on. Thus, the selection of cloth for children should be suitable to their acts and enjoyment of health. Therefore, the constructional features of children's garment should be simple and comfortable in order to keep them safe and happy.

2.7 Importance of eco-friendly fabrics in apparel designing

Anonymous (2008) in an article "'Cutting a Dash' with Eco Friendly Clothing" mentioned that the growing concern for global warming boosts the demand for organic products. With chemicals taking a toll on human health and environment, more and more people are becoming conscious of living life; the 'organic way'. Organic clothing is gaining popularity in countries like Britain, Japan, US, and EU. 'Green clothing' is becoming accepted in the world just like organic cotton. India, Turkey, Tanzania, China, Syria, Peru, Egypt, USA, and Burkina Faso are the leading organic cotton producing countries the world. According to a report from the Texas Organic Exchange, organic cotton cultivation has zoomed to 152% during 2007-08. This shows the increasing awareness of organic clothing among the consumers. Brands like Nike, Timberland, Marks and Spencer, and Wal-Mart have already started selling organic products blazing a trail in the market. Other key players including Target and Reebok have also entered the organic market. 'Del Forte' Denim is made with 99% organic cotton and 1% of spandex. This makes the jeans environmentally friendly and stretchable to go with the movements of the user. Going green includes more than just wearing organic clothes. Apart from apparels, other accessories like hats, handbags, wallets and jewellery are also manufactured in an 'organic way'.

Echavarria and Johnston (2008) in the article on "Socially Conscious Ethical Consumerism Is the New Cool" explained that Bamboo, soy, and hemp fivers are eco-friendly because their production requires lower levels of herbicide and pesticide usage compared to conventional cotton. Similarly organic cotton, a natural, certified organic fiver, is also eco-friendly for this reason. All of these fibers also bio-degrade at a faster rate than petroleum-based fibers such as polyester and nylon, and come from resources that may be renewed. These fibers, as well as others, make up a large portion of the new "green" fibers used for fashion, and their usage is an important step in the right direction. The government should also promote the use of eco-friendly fashion when possible.

Amandeep (2011) in his research article on "Clothing Industry-How We Can Make It Eco-Friendly" reported that in organic clothing, the crops that are used as raw materials are grown without the use of pesticides. When fibers are derived from such crops, they go through the regular process of producing clothes; however there is one major difference. These clothes are woven, spun, sized, de-sized, scoured and finished without the use of chemicals and do not have finishing coats applied. If there are any dyes used in the process, they are derived from environmentally friendly products such as flowers pigments. Another aspect of eco-friendly clothing is using clothes made out of jute and hemp because these are plants does not absorb a lot of chemicals. The government is trying to help eco-friendly clothing businesses by giving them tax concessions so as to promote this green clothing business.

Gunther (2012) in his article on "Behind the scenes at the Sustainable Apparel Coalition" presented that in a letter written by John Fleming, who was then Walmart's chief merchandising officer, and Yvon Chouinard, Patagonia's founder to get the attention towards the story of the Sustainable Apparel Coalition which read as 'Creating a single approach for measuring sustainability in the apparel sector will do much more than accelerate meaningful social and environmental change. Standardization will enable us to maximize sustainability benefits for all buyers without investing in multiple sustainability technologies and certification processes, and ultimately empower consumers to trust claims regarding sustainably sourced apparel.' Consumers won't see labels with scores attached to their T-shirts, dresses or sports jackets for years, but some companies are already using the tool to measure the energy use, greenhouse gas emissions, water consumption, chemical use and waste of their factories around the world.

Martinez (2012) in an article on "Eco-friendly fashions" explains that times have changed though, and so many people now have learned that living on Earth entails a bit more social responsibility. Irreparable damage to the environment is happening every day, and if nothing is done about it, our natural resources will all be exhausted eventually.

Eco friendly fashions are growing in popularity recently, along with other eco friendly products. Eco friendly clothing should be made with a high percentage of organic materials or reusing fabric scraps. Examples of eco-friendly fabric are organic cotton, soy, hemp clothes and bamboo.

2.8 Value addition with decorative / surface embellishments

Mirror work or 'shishadur' was coined from the Hindustani word 'shisha' (mirror) that was one of the several traditional embroidery techniques from the Indian subcontinent. Shisha embroidery was worked by village women, using colours and designs that have changed very little over the centuries. The work was thought to have originated from the old practice of sewing shiny bluish- green beetle wings onto fabric as a decoration.

During the sixteenth century, small mirrors were used not only for embroidery, but also for decorating jewellery or covering the walls of a room. The export market is gradually providing room for the mirror work, the embroidery externally used on bags, cushions, T-shirts and slippers and traditional clothing accessories. Because of the demand for intricate mirror work, the government training centres have encouraged the production of traditional designs and quality work that earns better wages for the women of poorer sector on one hand and tries to keep alive the centuries old craft on the other (Kindersley, 1995).

Edwards (1996) in the article 'Embroidery: the vanishing heritage of the Nomadic Rabaris' explored that in the Rabari community, embroidered clothing played an integral role in the twin system of dowry and bride price. Blouses, veil clothes, quilts and bags in particular were important inclusions in the series of gift exchanges enacted as a part of the whole system of Betrothal and marriage.

Stitched embellishment on clothing and household items became a marker of group identity, marital status, function and also a testament to the skill of the maker. Stitched details revealed many aspects of daily existence viz., stylized women carrying water pots, flowers, parrots and peacocks compete for space with camels.

Mary (1996), in her article, "Salwar kameez; Winds of change", mentions about embellishing salwar kameez. The term embellishment implies surface decoration to an already established form. From ancient ages embroidered garments have always been status symbols. Embroidery done with darker or lighter shades of thread imparts richness to the garment. Different states of India have traditional embroidery reflecting their socio-cultural traits. Besides embroidery, kameez is also adorned with sequins, salma work, pearls, beads, zari work and lace.

According to Shailaja (1996) in her book "Traditional embroideries of India", embroidery is a beautiful thread work on a variety of fabrics, which makes the fabric more attractive. Due to wide diversity in people and customs we find innumerable varieties in embroidery used for decorating cotton, silk, wool and velvet cloth.

The author also suggests that the taste for embroidered garments in the modern society is in increasing demand due to the fast changing fashions and their gracious look. Some of the traditional embroideries used to be popularized and developed into an industrial craft in order to save the reminiscent beauty of the past and everlasting art.

'Embellishments and Trimmings'- an article in which, Jacob (1998) described, Zardosi as a heavier and more elaborate stitchery worked on almost all heavy coats, cushions, curtains, canopies, shoes and similar kind. The ground material employed was heavy silk, velvet or satin cloth. The precious metals were turned into "salma" or "sitara" and stitched into the cloth with silk thread. Once zardosi glittered on the robes of royals but now applied as embellishment on synthetic sarees and dresses. The wires may be straight, spirally twisted or coiled to suit particular design.

Vastrad (2003) depicted in her thesis 'Weaving computerized Negi motifs in traditional Lakkundi Sarees' that 'Kasuti' the word derived by combining two vernacular words of Karnataka viz. 'kara' meaning hand and 'suti' is the cotton thread, which in totality explains the handwork with cotton thread. Kasuti has resemblance with tattooing and floor decorations that reflect the folk culture of that region.

The designs for floor decorations and motifs used in embroidery were almost similar i.e. the geometrical patterns with dots, lines, squares, circles, swastika, lotus, fish, conch shell, creepers, leaves, flowers, animals, birds, and, anthromorphic figures. The Kasuti embroidery comprised of four types of stitches viz. gavanti, murgi, negi and menthi.

A study on 'Splendid *kasuti* embroidery on variegated made-ups' conducted by Naik and Shejwadkar (2004) mentioned that *kasuti* embroidery comprised of four stitches viz., *gavanti*, *murgi*, *negi* and *menthi*. '*Gavanti*' produced straight lines whereas '*Murgi*' produced staircase effects. '*Negi*' resembled woven motifs and '*Menthi*' the cross stitch. The basic ground fabric used for *kasuti* work was the Ilkal sarees and *khanas* (choli material) of Guledgudda. Apart from sarees and *khanas*, the stitchery was extended on *Kunchinge* (cap), *Kulai* (bonnet), *Parakara* (lenga or lehenga) and *Choli* (saree blouse). The motifs used were *gopuram*, palanquin, chariot, lampstand, *shivalinga*, crown of Shiva, orn, *swastika*, sun, conch shell, *asana*, Rama's cradle, Hanuman, horse, elephant, squirrel, parrot, sparrow, peacock, swan and deer.

Anonymous (2006) seemed in the brochure 'Sandur – an Oasis' of Sandur Kushala Kala Kendra, Bellary district (Karnataka) that a unique fact of the traditional costume of the Lambani women was its elaborate embroidery. This was usually combined with mirror work, coins and costume jewellery to produce the glitter and colour that were integral parts of the Lambani costume. Exquisite purses, dresses, bedspreads, bags, pillow covers, tablemats, and wall hangings were made with intricate needlework. These articles came from the experienced and deft artistic creations of traditional craftswomen of Sandur Kushala Kala Kendra.

Naik and Vastrad (2008) made an attempt to revive the *negi* motifs of *kasuti* embroidery by way of automation mentioned in an article on 'Protection and revival of traditional hand embroidery, *kasuti* by automation'. The authors cited that among the four types of stitches of *kasuti* embroidery viz., *Gavanti*, *Murgi*, *Negi* and *Menthi*, *negi* was the stitch which is rarely used and is gradually becoming extinct since it involves skill, patience, expertise and intricacy. GC Kala 2000 with interface Paint Shop Pro (PSP) software was used for automation and handloom with jacquard attachment of 180 needle capacity was employed for incorporating the automated *negi* motifs on the sari. It was concluded that the technology of computerizing *negi* motifs and woven with the help of jacquard shedding mechanism on the handloom, that hastened production rate as well as retained the traditionality.

2.9 Consumer behaviour related to fashion apparels and decorative / surface embellishments

Geeta (1990) completed a study on "Preference of textile material among Home-Science students". A total of 100 respondents of Home-Science college degree students of Dharwad, were interviewed. Most of the respondents preferred chudidhar kurta for daily wear, which may be due to custom, fashion and style in vogue.

Dhillon and Kaur (1990) studied on the "Role of husbands in selecting wives apparel" and hundred husbands residing in Ludhiana city were interviewed. Results revealed that majority of the husbands purchased salwar suit materials, sarees and dupattas. And the factors considered while purchasing clothes in order were quality, price, appearance and colour, durability, brand name, fibre content and ease of care.

Jacob (1992) made a study on "Clothing selection and fashion adoption by adolescent boys". The study was conducted on boys of the age group 17-19 years and was divided into three groups on the basis of the income of their parents. The results of the study showed that type of fabric, price, style and design of the material were the important factors considered by majority of the respondents irrespective of their background. However, blend composition and brands were the least considered factors, while purchasing readymade garments. Style and design of the dress were the most important factor, but least importance was given to the wearability and workmanship.

Sidhu and Bajwa (1996) conducted a study on "Kurtas for school going daughters-what do mothers prefer". The samples comprised of 150 mothers, randomly selected from rural and urban areas of Ludhiana district. The preference regarding type of kurtas and factors considered while purchasing materials for kurtas were recorded by employing questionnaire method. It was found that almost all the respondents preferred the designer kurtas of cotton material having soft texture and decoration with embroidery. The respondents who preferred home made kurtas gave the season as, it would include growth allowances while stitching followed by economical and personal interest in stitching.

Gogoi (1998) conducted a study on "Preference of adolescent girls regarding salwar kameez". The study was administered on 150 college girls by employing an interview schedule and recorded their preferences for type of salwar-kameez, kurta-style, type of decoration, fabric texture, colour and design of fabric. The findings highlighted that, tailor made salwar kameez followed by readymade and home made, princess line, kurta embellished with embroidery, cotton for informal and silk for causal wear were preferred. Majority preferred soft texture, plain material of single colour.

Reddy (2000) mentioned in her thesis 'Embellishment of Indian Outfits with the Art of Appliqué' that appliqué is applied on a garment to hide a faulty section or portion and is rarely used in today's fashion industry especially on traditional Indian outfits. Hence, efforts are made by the researcher to revive appliqué work by designing 10 appliqué outfits by applying the basic elements of designs, which were then evaluated by 100 college girls and 25 boutique owners in Bangalore city.

The researcher concluded, that the college girls opined appliqué as an art, which enhanced the appearance of the outfit. Egyptian motifs used for appliqué were well accepted by the college girls. Appliqué made by using various fabrics and materials created different visual and textural effects.

A study was conducted by Patil *et al.* (2001) on 'Decoratives on Salwar suits and sarees' in Belgaum and Dharwad cities with sample size of 160 to know the preferences by college going girls. The authors analyzed that appliqué work, Sindhi taropa and tie-dye were simple and most suitable for salwar suits and were easy to maintain.

Beadwork and glasswork being embossed mainly added gorgeous appearance but were difficult to care and maintain. On the whole, about 81 percent of the respondents expressed that handwork was more durable and elegant than that of machine work.

Patil *et al.* (2001) studied on "Factors considered while garment purchases". IN this study 20 each girl students were randomly selected from 8 colleges making a total sample size of 160. Data was analysed by using frequency tables and percentages. Greater per cent of the respondents irrespective of professional and traditional colleges, opined that comfortability, suitability and easy care as the main reasons quality and fibre content as the main factors; cellulose and blended fabrics were the most comfortable and durable fabric respectively.

Saini *et al.*, (2005) conducted a study on 'Existing trend of embroidery on feminine garments' with a view to study the fashion trend of embroidery on feminine garments like saree, kameez, gown, nighty and lehenga for further improvement of styles and techniques. The results revealed that stylized mode of design, modern appearance, flat texture, hand embroidery, floral motifs were prevalent trend of embroidery. Chain stitch, French knots and satin stitch (machine) were the existing and most preferred stitches of embroidery. Window displays was one of the promotion techniques.

Yadav and Sangwan (2008) conducted a study on "Stylized functional salwar-kameez for working women". In this study 100 working women were interviewed and a total of 50 kameez styles and 8 salwar styles were prepared. The most preferred 25 styles of kameez and 5 styles of salwar were selected for further study and constructed.

From the study it was concluded that the working women preferred salwar-kameez having the provision of pocket to keep the belongings, collars, back yoke, Velcro tape to fix dupatta, use of loop/shoulder strap, inbuilt dupatta, use of press studs to secure dupatta, princess line and kalidar styles with additional features like neck or cowl front opening. Some of the additional constructional features for salwar were pocket, front opening fastened with zipper, belt at waist, elastic at the back, all-around elastic, belt with loops fullness with pleats were the most accepted by working women.

Babel and Rani (2012) conducted study on "Clothing purchase decision of college girls". Sixty college going hostler girls in the age group of 18-24 years were selected from Udaipur city of Rajasthan. The results revealed that girls usually want to purchase garments with their parents. Various factors affecting the purchasing of cloths are arranged in the order of influence as follows: quality of clothes, budget, current fashion, need, colour, fit, price, brand name, material, advertisement and care of garment. Also the clothing purchase decision increases with age. Older age groups clothing purchase decision was good as compared to younger age group.

Kaur *et al.* (2012) conducted a study on "Consumer awareness and problems with respect to purchase of textiles/electrical appliances" with the study sample of 480 consumers, who were randomly selected from rural and urban areas of Ludhiana and Moga districts of Punjab. The results indicated that majority of rural as well as urban respondents experienced the problem of over changing, followed by poor quality while purchasing textiles.

Further, short measuring, defective material, brand imitation, poor printing/finishing, sale gimmicks, deceptive packaging/labeling, incomplete labeling and lastly false labeling were the problems of consumers. The results revealed that inspite of standardization and quality approval of textiles materials, many sub-standard textiles items are on sale in the market because of poor inspection and enforcement.

Mariyappanavar *et al.* (2012) conducted a study on "Clothing preference for children among rural and urban mothers". The study was done in areas of Hubli-Dharwad district of Karnataka. The sample comprised of 60 mothers, 30 each from rural and urban background, on the basis of having school going daughters of 6-13 years of age. The results revealed that readymade garments were preferred by both always, but sometimes option was open for tailor-made too.

Friends and relatives had influenced the purchasing practices of mothers of both the localities. Before clothing purchases, the mothers pre planned for amount to be spent, fibre content and garment style. The annual expenditure on clothing for each school going girl of rural families ranged from Rs.200 to Rs.1000 irrespective of daily, casually and occasionally wears; whereas it was almost double for urban girls. Mothers did have some knowledge on reversible attires and made-ups like sweater, rainy jackets, pull over, jersey and shawls.

MATERIAL AND METHODS

The present study on “Naturally Coloured Cotton Designer’s Apparel: An Emerging Trend in *Khadi* World” was carried out at the Department of Textiles and Apparel Designing, College of Rural Home Science, University of Agricultural Sciences, Dharwad.

The methodology adopted for the study is presented under the following headings:

- 3.1 Selection of raw material
 - 3.1.1 Naturally Coloured Cotton (NCC) lint
 - 3.1.2 White Cotton (WC) lint
- 3.2 Hand spinning and yarn doubling
- 3.3 Weaving designer’s *khadi* fabric
 - 3.3.1 Weave details for designer’s *khadi* fabric
 - 3.3.2 Loom particulars
 - 3.3.3 Types of *khadi* fabric produced
- 3.4 Application of special finishes to designer’s *khadi* fabrics
 - 3.4.1 Bio-desizing
 - 3.4.2 Bio-polishing
 - 3.4.3 Silicon softener wash
- 3.5 Quality assessment of designer’s *khadi* fabrics
 - 3.5.1 Yarn parameters
 - 3.5.2 Fabric parameters
 - 3.5.2.1 Structural properties
 - 3.5.2.2 Performance properties
 - 3.5.2.3 Durable properties
 - 3.5.3 Variables included for physical testing
 - 3.5.3.1 Independent variables
 - 3.5.3.2 Dependent variables
- 3.6 Designer’s *khadi* apparel: Designing and prototype product development
 - 3.6.1 Criteria set for designing and developing *khadi* apparel
 - 3.6.2 New concept of detachable garment components
 - 3.6.3 Pattern sketching with adaptations in designer’s *khadi* apparel
 - 3.6.4 Specification sheet (spec sheet) and cost sheet
 - 3.6.5 Drafting
 - 3.6.6 Marker plan and cutting
 - 3.6.7 Sewing and finishing
- 3.7 Surface embellishments on designer’s *khadi* apparel
 - 3.7.1 Selection of type of surface embellishments
 - 3.7.2 Motifs selection
 - 3.7.3 Application of surface embellishment on detachable garment components
- 3.8 Consumer acceptance of designer’s *khadi* apparel
- 3.9 Cost of production of designer’s *khadi* apparel
- 3.10 Statistical analysis
- 3.11 Hypotheses set for the study

3.1 Selection of raw material

Raw materials are the basic components required to manufacture a final product. In the present study, cotton fibre is the main raw material to produce hand spun yarn for further weaving the fabric on handloom.

3.1.1 Selection of naturally coloured cotton lint

The DDCC-1 (Dharwad Desi Colour Cotton-1) naturally coloured cotton (*Gossypium arboreum*) released by University of Agricultural Sciences, Dharwad in the year 2000 formed the raw material for the present study.

It was procured from *Khadi* Nekar Sahakari Sangh Niyamita Uppin Betageri, Dharwad and was transformed into hand spun yarns.

Criteria for selection of DDCC-1

1. DDCC-1 has stable almond brown colour with staple length of 22.9 mm; spun upto 24s and most suitable to produce a wide range of *khadi* fabrics
2. DDCC-1 is user and eco-friendly as well as resistant variety which is available in sufficient quantity; also recommended for commercial cultivation
3. DDCC-1 genotype has good wash and light fastness; colour improvement after commercial scouring, mercerization and home laundering which is best suited for summer apparels

3.1.2 Selection of white cotton lint

Jayadhar white cotton variety lint was procured from *Khadi* Nekar Sahakari Sangh Niyamita, Uppina Betageri, Dharwad and was made into hand spun yarns.

Criteria for selection of white cotton

1. Jayadhar variety is a desi cotton with a staple length of 21-23mm spun upto 25s and is in par with DDCC-1 in stability and resistance, hence best suited for weaving stripe and checks fabrics in combination with DDCC-1
2. Lint is available in sufficient quantity

3.2 Hand spinning and yarn doubling

The selected white and colour cotton lints were pre-processed and made into rove at Dharwad Taluk Hebballi Kshetriya Seva Sangh, Hebballi, Dharwad Taluk.

Finally the rove was charaka spun into single yarn and doubled to form 2-ply yarn by the local spinners in *Khadi* Nekar Sahakari Sangh Niyamita, Uppina Betageri, Dharwad.

3.3 Weaving designer's *khadi* fabric

Khadi is a hand spun, hand woven cloth recognized for its purity, genuineness, affordability and integrity of ethnic rural products which are eco-friendly.

In the present study, two control fabrics viz., white cotton and naturally coloured cotton fabrics were woven with plain weave.

Then variation in plain woven naturally coloured cotton *khadi* fabric was brought about by creating two variegated stripe designs viz., pin stripe (2 yarns each of DDCC-1 and White cotton in warp) and medium stripe (8 yarns of DDCC-1 and 4 yarns of White cotton in warp) by interweaving DDCC-1 with white cotton yarns.

Later corresponding two checks designs viz., small and medium checks were produced by using the same warp beam.

Weaving of designer's *khadi* fabric was carried out in *Khadi* Nekar Sahakari Sangh Niyamita, Uppinbetageri, Dharwad.

3.3.1 Weave details for designer's *khadi* fabric

The general information about the constructional parameters of each designer's *khadi* fabric is given in the Table 1.

3.3.2 Loom particulars

All the variegated designer's *khadi* fabric were woven on pitloom with reed count 40 and denting order of 2 threads / dent.

The width of the fabric was 28" (70 cm) woven by using reed width of 30".

3.3.3 Types of *khadi* fabric produced

Plate 1 illustrates the different types of designer's *khadi* fabrics produced from DDCC-1 and white cotton yarns which are listed as below:

1. Control – 1 : White Cotton (WC)
2. Control – 2 : Dharwad Desi Coloured Cotton (DDCC-1)
3. Stripe – 1 : Pin Stripe
4. Stripe – 2 : Medium Stripe
5. Checks – 1 : Small Checks
6. Checks – 2 : Medium Checks

3.4 Eco-friendly special finishes to variegated designer's *khadi* fabrics

Every consumer invariably gives stress on durability, comfort, care and maintenance, aesthetic appeal above all user friendly features when retailing the fabric or garments.

Thus, it becomes imperative for the manufacturer to make available the textile materials as per the demand of the consumers.

Today's trendy garments have enzymatic special finishes that are both user and eco friendly. Cotton *khadi* fabric being coarse, rough, harsh in handle and considerably stiff in texture definitely requires certain special finishes improving upon its properties.

In this study, the exclusively designed *khadi* fabrics were subjected for enzymatic desizing also called as bio-desizing followed by bio-polishing and finally silicon softner finish at Bio-care Garment Processors Pvt. Ltd., Bangalore.

The following standard method is viable commercially. After final finishing the treated fabrics were then run in hydro extractor machine for 15 minutes to remove excess finishing solution and tumble dried below 120⁰ C.

Different machineries used to special finish the designer's fabrics are shown in the Plate 2.

3.4.1 Enzymatic Desizing / Bio-desizing

Removal of size from the fabric by enzymes is bio-desizing. Prior to weaving it is compulsory to size warp yarns for efficient insertion of shot at right angles but needs to desize after weaving to impart special finish effectively.

Recipe:

MLR	-	1:10
Treatment time	-	20 min
Temperature	-	40 ⁰ C
Enzyme used	-	Clariant Desize (30 ml/kg of fabric)
Lubricant used	-	Refnol lubricant (25 ml/kg of fabric)
Finishing machine	-	Drum washer
Method incorporated	-	Hot method

The variegated designer's fabrics were immersed in 40⁰C hot water at dip level. Known quantity of Refnol lubricant and Clariant desize enzyme were added to the liquor and the machine was run for 20 minutes.

Later, the liquor was drained and the treated fabrics were rinsed in cold water.

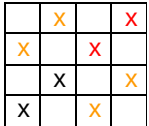
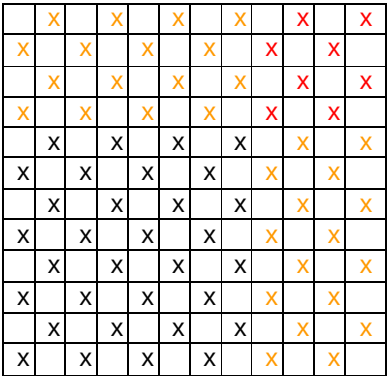
3.4.2 Bio-polishing

Bio-polishing is a technique first adopted by the Danish firm Nova Nordisk to treat vegetable fabrics with cellulase enzymes.

Table 1. Weave details for designer's *khadi* fabrics

Sl. No.	Fabric Details	Direction	Fibre Content	Yarn Type	Twist Direction	Yarn Count	Threads / Inch	Cover Factor	Cloth Cover	Weave Type	Design Repeat Unit with colour weave effect																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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Weave	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></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Table 1: Contd....

Sl. No.	Fabric Details	Direction	Fibre Content	Yarn Type	Twist Direction	Yarn Count	Threads / Inch	Cover Factor	Cloth Cover	Weave Type	Design Repeat Unit with weave colour effect
III.	Checks Fabrics										
1.	Small Checks	Warp	DDCC-1, WC	2 Ply	Z-S, Z-S	2 / 6s, 2 / 7s	22, 20	9.02, 7.55= 16.57	20.64	Plain Weave	
		Weft	DDCC-1, WC	2 Ply	Z-S, Z-S	2 / 8s, 2 / 9s	15, 14	5.30, 4.67= 9.97			
2.	Medium Checks	Warp	DDCC-1, WC	2 Ply	Z-S, Z-S	2 / 6s, 2 / 7s	30, 12	12.30, 4.52= 16.82	20.52	Plain Weave	
		Weft	DDCC-1, WC	2 Ply	Z-S, Z-S	2 / 8s, 2 / 9s	14,13	4.95, 4.33= 9.28			



**1. Control-1
White Cotton (WC)**



**2. Control-2
Dharwad Desi
Coloured Cotton-1 (DDCC-1)**



**3. Stripe-1
Pin Stripe**



**4. Stripe-2
Medium Stripe**



**5. Checks-1
Small checks**



**6. Checks-2
Medium checks**

Plate 1. Variegated designer's *khadi* fabrics



Drum Washer



Inner View of Drum Washer



Hydro Extractor



Tumble Drier

Plate 2. Machineries used for softener and enzymatic finishes

Bio-polishing is a permanent finish which helps to remove the protruded fibres from the fabric surface thus improves the hand feel, colour, drapability and reduces the formation of pills; in turn fetches better price for the fabrics and makes it more attractive for customers.

Recipe

MLR	-	1:10
Treatment time	-	45 min
Temperature	-	50 ⁰ C
pH	-	4.5-5
Acid	-	Acetic acid
Enzyme used	-	Nova Nordisk (30 ml/kg of fabric)
Lubricant used	-	Refnol Lubricant (25 ml/kg of fabric)
Finishing machine	-	Drum washer
Method incorporated	-	Hot method

Immerse the bio-desized fabrics in 50⁰C hot water at dip level and add acetic acid to maintain pH of 4.5 to 5. Add know quantity of Novo Nordisk enzyme and Refnol lubricant to the liquor and run the machine for 45 minutes. Drain the water and rinse the treated fabrics in cold water.

3.4.3 Silicon Softener finish

The hand of a fabric is a subjective sensational experience by the skin when a fabric is felt with the finger tips and gently compressed. The silicon softener finish imparts soft handle, smoothness and enhances flexibility, drape and pliability.

Other properties improved by softeners include the feeling of added fullness, antistatic properties and sewability.

Recipe

MLR	-	1:10
Treatment time	-	20 min
Ph	-	4.5-5
Acid	-	Acetic acid
Enzyme used	-	Resil Silicon (25 ml/kg of fabric)
Lubricant used	-	Pidilite Softner (50 ml/kg of fabric)
Finishing machine	-	Drum washer
Method incorporate	-	Cold method

The bio-desized, bio-polished fabrics were finally subjected to silicon softener finish. The treated fabrics were immersed in cold water at dip level and acetic acid was added to maintain the pH of 4.5 to 5.

Known quantity of Resil Silicon and Pidilite Softner were added to the liquor and machine was run for 20 minutes, finally rinsed thoroughly in cold water.

3.5 Quality assessment of designer's *khadi* fabrics

Quality assessment plays a major role in determining the durability, hand –feel and texture of the fabric. After finishing, there will be drastic improvement in the physical parameters of the fabric.

Hence, physical testing was carried out in Testing Laboratory, Department of Textile and Apparel Designing, College of Rural Home Science, UAS, Dharwad and at Demonstration cum Training Centre (DCTC), Central Silk Board, Rayapur (Dharwad dist.).

The following are the physical parameters listed:

3.5.1 Yarn Parameters

After spinning, the naturally coloured cotton and white cotton yarns in raw form were subjected to physical testing to determine the quality parameters of the yarn.

a. Yarn twist

Twist is the measure of spiral turns given to a yarn in order to hold the constituent fibres or threads together. The strength and durability of a fabric depend on tpi. The tpi also determines properties related to dyeing and finishing as well as hand-feel and texture of the fabric.

In the beginning, increase in tpi gradually enhances the strength and reaches optimum level; further increase in tpi beyond this point adversely affects the strength. Yarn twist is expressed in terms of twist per inch (tpi) or twist per meter (tpm).

Length of specimen : 10 inches

Number of specimen tested : 25

Name of the instrument : Uster single yarn twist tester

b. Lea strength

A hank of yarn, with its starting and finishing ends knotted, is placed over the hooks of a lea tester. As the lower hooks descend, a load is imposed on the loops of yarn constituting the hank. At some point one of the threads breaks, yet the hank remains intact and capable of sustaining further loading.

The hank suffers a succession of thread breaks and ultimately becomes unable to sustain any further increase in load. When this happens, the pendulum stops moving and the maximum load is indicated on the dial. The end point of the test is determined by the rate at which the hank unravels as the threads break.

Length of the specimen : One lea

Number of specimen tested : 15

Name of the instrument : Pendulum lever machine, the lea tester

c. Count Strength Product (CSP)

When assessing the character of cotton yarns, the product of the count and the lea strength is a useful measure. The count strength product (C.S.P.) enables comparisons to be made between yarns of similar, but not necessarily identical count.

The concept of the C.S.P. may be used to derive an index by which the spinning quality of a cotton may be judged or the spinning efficiency of a particular system. Standard C.S.P. values have been chosen, 2000 for carded and 2250 for combed yarns. As the count of a yarn becomes finer the C.S.P. falls.

3.5.2 Fabric Parameters

After weaving variegated designer's *khadi* fabric, special finishes were applied to improve the physical parameters. Later, physical tests were conducted to know the structural, performance and durable properties of the control and softener finished fabrics.

3.5.2.1 Structural properties

When deciding on a fabric it is imperative to consider certain fabric properties to infer on its end use. The geometry of the fabric is nothing but its structure and in a woven fabric ends and picks per unit area, cloth thickness and GSM are the three features invariably decide on the cloth configuration. These parameters do form a base for the performance and durability properties of a woven fabric. Hence, an effort was made to find out the impact of softener and enzyme treatment on the structural properties of the test sample.

a. Yarn count (tex)

The yarn number or count in the tex system is defined as weight in grams of 1000 km of yarn. However, to assess the yarn count, the warp and weft yarns were drawn separately from the test sample and cut to a size of the template. The size of the fabric samples indicates the length of the specimen to be taken for testing.

The drawn warp and weft yarns were weighed on Beesley's balance separately and cotton count was calculated. Finally the cotton count is expressed in tex by using the formula,

$$\text{tex} = \frac{590.5}{\text{Cloth count}}$$

Number of readings taken : 10 each warp way and weft way
 Method of sampling : Yarn drawn from woven cloth
 Name of the instrument : Beesley's balance.

b. Cloth count (Numerical expression)

Cloth count of a fabric is the number of ends and picks per unit area while the fabric is held under no tension and is free from folds and wrinkles. The number of ends and picks per unit area is determined by using a suitable magnifying pick glass.

The number of warp and weft yarns in one square inch of the fabric is counted at ten randomly selected places across the width and the length of the test samples, so that a different set is counted each time. Further, the mean values of ends and picks per inch were calculated.

Number of specimen tested : 10 each warp way and weft way
 Method of sampling : Direct counting, threads per unit area (1 inch)
 Device used : Magnifying counting device, the pick glass

c. Cloth Weight (gsm)

Cloth weight is expressed as mass per unit area in g/sq mt. A sample of 5x5 cm was cut and weighed on electronic weighing balance to determine the weight per square meter (g). Further warp and weft threads were separated and weighed to calculate respective percentages. The percentage composition of warp and weft is calculated as follows:

Weight of 5 x 5 cm sample : Xg
 Weight of warp yarns : Yg
 Weight of weft yarns : Zg

$$\text{The percent warp} : \frac{Y - Z}{X} \times 100$$

$$\text{The percent weft} : \frac{X - Y}{X} \times 100$$

Number of readings taken : 5

Name of the Instrument : Electronic weighing balance

d. Cloth thickness (mm)

Thickness is the distance between the upper and under surface of the material, measured under a specified pressure, expressed in mm. The specimen was tested as directed in ASTM test method D 177-1975.

The average thickness of the material is determined by observing the linear distance that a movable plane is displaced from a parallel surface by the textile material while under a specified pressure. The test specimen was free from abnormalities like folds, crushing or distortions. Place the specimen on the anvil of the test apparatus and bring the pressure foot in contact with the upper side of the test material and record the thickness in mm.

Shape of the anvil : Round
 Area of the anvil : 1cm diameter
 Shape of the presser foot : Round
 Number of readings : 15
 Name of the instrument : Shirley's thickness tester

3.5.2.2 Performance properties

The performance of the softner and enzyme treated sample was assessed for cloth bending length (cm), crease recovery angle (degree) and drape coefficient (%) for both the yarn directions to measure the result of softner and enzyme treatment.

a. Cloth crease recovery angle (degree)

This test determines the crease recovery of the cloth. The specimen was tested as directed in AATCC test method 66-1975. The test specimen is artificially creased for a definite period of time at a known load and then allowed to recover or to regain its crease. The recovery is measured in terms of the extent of angle to which it has been recovered.

Size of the test sample : 5 x 2.5 cm

Weight / load applied : 2 kg

Creasing period : 5 minutes

Recovery period : 5 minutes

Number of samples tested : 5 each warpway and weftway

Name of the instrument : Shirley's crease recovery tester

Further, cloth crease recovery is determined by using the formula.

Cloth crease recovery = $\sqrt{\text{Warpway angle}} \times \sqrt{\text{Weftway angle}}$

b. Cloth stiffness (cm)

Cloth stiffness is the resistance of the fabric to bending. Bending length is the length of the fabric that bends under its own weight to a definite extent. It equals to half the length of rectangular strip of fabric that bends under its own weight to an angle of 41.5°. It is also equal to the length of a rectangular strip of material that bends under its own weight to an angle of 7.1°. Bending length is expressed in centimeters. This parameter is one of the factors that determines the manner in which fabric drapes i.e., the cloth having high bending path tends to drape stiffly. The test samples were tested as directed in BS test methods 3356-1961. Place the test sample on the platform with the scale on top of it lengthwise, so that zero of the scale coincide with the leading edge of the test sample. Push the sample along with the scale slowly and steadily when the leading edge projects beyond the edge of the platform. The increased part of the sample over hangs and starts bending on its own weight.

When two inclined lines (inclined plane making an angle of 41.5 with the horizontal) of the tester coincide, the length of the over hanging portion from the scale was recorded. Four readings from each were taken, two each from right and reverse sides of the test sample.

Size of the test sample : 25 X 2.5 cms

Number of samples tested : 2 (Four readings from each sample)

Name of the instrument : Shirley's stiffness tester

Further, the bending length was calculated by using formula,

Bending length = $\frac{1}{2}$ cm, where mean length is the average value of over hanging portion in cm.

c. Cloth drapability (%)

Drape is one of the subjective characteristics of fabric that contributes to aesthetic appearance. Fabric drape is the extent to which a fabric deforms when it is allowed to hang under its own weight. The specimen were tested as directed in IS test method 8357-1977. Drape co-efficient is the area covered by the shadow of the draped specimen expressed as percentage of the area of the annular ring of fabric. A specimen is cut by means of a circular template which is sandwiched between two horizontal discs of smaller diameter and unsupported annular ring of fabric is allowed to hang freely. On switching the lamp, it gives a circular parallel beam of light that falls on the cloth. Place the ammonia sheet (printing paper) of known dimension on the bare platform with sensitive side up, laying flat. The line of vision was kept along the base board and the height of the lower fringe of specimen was adjusted to 4 inch.

The green pilot lamp lit up, when the buzzer alarm rings, the ammonia paper is removed rolled and placed in the developing box where strong ammonia solution was kept. The lid was shut airtight. After 4 minutes the drape pattern was ready.

Further, drape co-efficient is calculated by using the formula,

$$F = \frac{W - a / w}{(A - a)} \times 100$$

Where,

W : Weight of the drape pattern in gram
w : Weight of 1 sq. cm of the paper in gram
A : Area of the specimen (cm²)
a : Area of supporting disc (cm²)

Size of the specimen : 25cm diameter

Size of the printing paper : 29 x 29 cm

Name of the instrument : BTRA drape meter

3.5.2.3 Durable Properties

Any fabric applied with special finish is expected to improve its serviceability and meet the expectations of the consumers in terms of comfort, absorbency, durability, easy care and maintenance.

a. Cloth tensile strength (kgf)

Tensile strength is the ability of the material to resist or rupture induced by external force. It is expressed as force / unit cross sectional area of the specimen at the time of maximum load. The specimen was tested as directed in ASTM D 5035.

The method employed to determine the breaking load of the material is by using the 'ravelled strip test'. The specimen is 5 cm wide prepared, initially by cutting the material to a width of about 7cm and ravelled the yarns of 1 cm from both sides until the width attained to 5 cm. The test length is 20 cm in between the jaws but extra length of 10 cm was taken to grip the samples between the jaws.

Size of the test sample : 20 x 5

Number of sample tested : 5

Test method : Ravelled strip test

Gauge length : 200 mm

Load applied : 250 kgf

Jaw return load : 20%

Rate of Extension : 300 mm / min

Name of the Instrument : MAG Unistretch machine

b. Cloth abrasion resistance (cycles)

Cloth abrasion is the wear out of any part of textile material by rubbing against another surface. The specimen is abraded by rubbing multi-directionally against an abradant having specified surface characteristics held in a fixed position without any creases.

The pills of matted fibres interfering with proper contact between the specimen and abradant during the test were removed, as they would cause marked vibration of the abradant plate. The specimen was abraded until the breakage of 2-3 threads and the number of cycles was noted.

The sample was tested as directed in IS test method 12673-1989.

Size of the specimen : 13.5 cm diameter

Number of specimen tested : 5

Type of abradant : zero emery paper

Type of abrasion : 30g/cm² pressure on specimen

Determination of end point : Breakage of 2 to 3 threads

Name of the instrument : Martindale abrasion tester

c. Cloth pilling (rating)

Pills are the balls or bunches of tangled fibres that are held on the surface of a fabric by one or more fibres. Pilling resistance is the resistance to form pills on a textile fabric. This method covers the determination of resistance to the formation of pills and other related surface changes on textile fabrics.

The specimen was tested as directed in IS test method: 1097 / 1984.

The fabric sample measuring 5 x 5 sq. inch is sewn so as to fit firmly when placed around a rubber tube measuring 5 inch long, 1 ¼ inch diameter and 1/8 inch thickness, which is then rotated for 60 revolutions/min for a total of 18,000 revolutions, continuously for five hours. After tumbling, the extent of pilling is assessed visually by comparing with the arbitrary standards – 1, 2, 3, 4 and 5.

Rating scale

1 – No pilling

2 – Slight but tolerable pilling

3 – Moderate pilling

4 – Severe pilling

5 – Extremely high pilling

Size of the specimen : 12.5 x 12.5 sq. cms

Number of specimen tested : 4

Name of the instrument : Heal's pilling tester

3.5.3 Variable included for the physical study

The variables included for the physical study includes the independent and dependent variables as follows:

3.5.3.1 Independent variables

1. Cloth count (Numerical expression)
2. Cloth weight (GSM)
3. Cloth thickness (mm)
4. Cloth crease recovery angle (degrees)
5. Cloth stiffness (cm)

3.5.3.2 Dependent variables

1. Cloth tensile strength (kgf)
2. Cloth drapability (%)

3.6 Designer's *khadi* apparel: Designing and prototype product development

The simplicity and naturalness of *khadi* has inspired many people to adopt it as high fashion clothing. Meanwhile, *khadi* production does not merely focus on weaving the fabric but is a means for economic empowerment of rural artisans. *Khadi* is highly valued and it makes a fashion statement.

'Fashion' today is defined as an exhaustive methodological process that produces utility clothing. To understand this process, it is very essential to know the concept of line planning. The term line planning primarily indicates a range of collection of garments falling in a predetermined category viz., casuals, formals, bridal wears, lingerie, ethnic wears and so on.

3.6.1 Criteria set for designing and developing *khadi* apparel

Fashion is the term most frequently used by college going adolescents in their peer group inspired especially by the fashion slogans advertised through media. Keeping in mind and considering the zeal for trendy clothes by college students the researcher thought of designing and developing trendy clothes using naturally brown colour cotton fabric. These apparel were planned for young adolescents, both girls and boys between the age group of 16-22 years. The criteria set for type of garments developed from *khadi* fabric:

- Garments commonly worn by college going boys and girls
- Suitability of *khadi* fabric
- Garments which can easily be adapted into new style where adaptation is simple and easy
- Suitability of surface embellishments on *khadi* fabric

The researcher did observe the type of garments commonly worn, the dressing sense, accessories used and behaviour in the peer group of the college going students and concluded as:

- Upper garments commonly worn by college going boys are shirts, T-shirts and kurtas
- Upper garments commonly worn by college going girls are short tops, kurtas and kameez
- Upper garments are more adaptable to adaptation than lower

Thus, the researcher selected shirt and kurta for boys; short top for girls to introduce a new concept of detachable garment components and produce trendy garments.

3.6.2 New concept of detachable garment components

The garment components are nothing but garment parts that require two or three layers as a composite unit to be assembled. Garment components are the basic sections of a garment including top fronts, top backs, bottom fronts, bottom backs, sleeves, collars / neckline treatments, cuffs / sleeve treatments, plackets, pockets, and waistline treatments.

Hems may be completed as a part of a component or as part of final assembly. Stitches, seams, and / or bonding are used to assemble the components and complete the garment structure. (<http://www.textileguides.com/garment-components-styles-and-designs.html>).

Components such as collars, cuffs, and pockets are small parts that are usually constructed independently for final assembly. Many small parts are attached to the major garment components (tops, bottoms, and sleeves) before final assembly. For example, sleeve plackets may be attached to sleeves prior to final assembly, but cuffs may be added after the sleeve is attached and the underarm seam is sewn. The particular treatment given to a component involves consideration of functional use, aesthetics, quality, complexity, materials, component shape, sequence of assembly operations, and costs.

The concept of garment components is incorporated in the present study and adapted them as detachables. The garment components of both ladies and gents designer's *khadi* apparel are made in such a manner that they can be attached or detached according to individual's choice, liking, preference, interest, fashion and occasion. However, while planning the detachables greater importance is given for both decoration as well as functionality of the composites.

3.6.3 Pattern sketching with adaptations in designer's *khadi* apparel

In this study, efforts were made to set new fashion trends in specially finished eco-friendly naturally coloured cotton *khadi* fabrics by introducing a new concept of detachable garment components for ladies top, gents shirt and gents kurta. According to 3.6.1, two men's garments i.e. shirt and kurta and one ladies garment i.e. short top were chosen for construction; and fabric sourced is five types of *khadi* materials designed by the scholar viz., plain woven brown colour cotton, two varieties of stripes (pin and medium) and two varieties of checks (small and medium); in all fifteen garments were constructed and further drawn for adaptation.

Table 2. Detachable components adapted in designer's *khadi* apparel

Sl. No.	Designer's Apparel	Significance before attaching detachable	Detachable Features Designed			Significance after attaching detachable
			Detachable	No. of Detachable units	Fasteners Used	
1.	Ladies Wear					
	Ladies Top	Regular wear which can be worn on jeans pants	Lower panel for increasing the length to make kurta	1	Open Zipper	Occasional wear which can be worn on jeans pant or salwars. The length of the apparel can be adjusted according to individual's interest. Detachable units with different surface embellishments can be attached according to fashion and occasion.
			Matching necklines	3	Cloth Buttons	
2.	Gents Wear					
	Gents Shirt	Common upper garment worn on pants as regular wear	Shirt collar	1	Open Zipper	Occasional wear which can be worn with different surface embellishments according to individual's interest, fashion and occasion
			Cuffs	2	Open Zipper	
			Button stand	1	Buttons	
	Gents Kurta	Simple attire worn on jeans, pyjamas or dhoti	Stand Collar	1	Open Zipper	Occasional wear which can be worn with different surface embellishments according to individual's interest, fashion and occasion
			Button stand	1	Buttons	

Note: The detachable units are designed in such a way that they could be easily and completely detached from the garment

The detachable garment components were adapted in both ladies short top and gents shirt and kurta to bring about an emerging trend in *khadi* world. The details about detachable components adapted in designer's *khadi* apparel are presented in the Table 2. Fig.1 shows the adaptation of detachable components viz., necklines and lower panel in ladies top. Fig. 2 refers the adaptation of detachable components in gent's shirt viz., cuff, collar and button stand and Fig. 3 indicates the adaptation of detachable components in gent's kurta viz., collar and button stand.

3.6.4 Specification sheet (spec sheet) and cost sheet

A spec sheet is a sheet that gives complete information about a construction or manufacturing process. It includes details about technical diagrams, construction notes, measurements, fabric information and trims. Further, provides instructions to follow while designing the clothing or fashion accessories. Cost sheet is a simple, one-page document that gives detail information about the raw material cost, trimming cost, constructional and value addition cost for which 30 per cent profit margin is added to get the selling price.

3.6.5 Drafting

The designer's *khadi* apparel for both ladies and gents were of medium size (M), the measurements were taken from British Standard Measurements (Aldrich W., 1999). The basic blocks were developed for each garment and necessary adaptations were made to incorporate the detachable garment components (Zarapakar, 1994). Measurements, draft pattern and drafting procedure of ladies top-cum-kurta, gents shirt and gents kurta are presented in Appendix 1.

3.6.6 Marker plan and cutting

The markers were drafted and developed separately for each pattern, keeping the basic bodice block as the base. The fabric was spread on the flat table, over which the markers were arranged economically and systematically following the necessary layout methods. The pattern pieces were cut and kept ready for garment sewing by bespoke method.

3.6.7 Sewing and finishing

The designer's *khadi* apparels were sewn by bespoke (couture) method. The necklines, collars, hemlines were finished with neatly by hemming and the detachable garment components were attached to the garment with open zipper and buttons as planned. Drafting, cutting and construction of designer's *khadi* outfits is presented in the Plate 3, 4 and 5.

3.7. Surface embellishment on Designers *khadi* apparel

Embellishments and trimmings have come a long way to form an integral part of textile to enrich the fabrics and garments giving them an elegant look.

3.7.1 Selection of type of surface embellishment

The surface embellishments were selected based on the ranking given by the respondents in the survey conducted to know the opinion of the consumers for type of surface embellishments on ladies and gents apparel. A self structured schedule was administered to elicit the information from randomly selected sample. The survey was conducted in Dharwad city of Karnataka state with a total sample size of 300 respondents which consisted of each 120 adolescent boys and girls between the age group of 16-22 years who were on roll in the local colleges.

College going students (16-22 years) are always inspired by fashion who in turn demand change. The sample also consisted of 60 Home Scientists comprised of staff and post graduate students of College of Rural Home Science, UAS, Dharwad. The questionnaire on preference for type of embellishments on ladies and gents apparel by the respondents is presented in Appendix 2.

The first three most preferred embellishments for ladies garment and the first two most preferred for gents garments were finally chosen for embellishing the detachable garment units. The surface embellishments were planned only on the detachable units which can be changed according to the individual's choice, fashion and occasion.

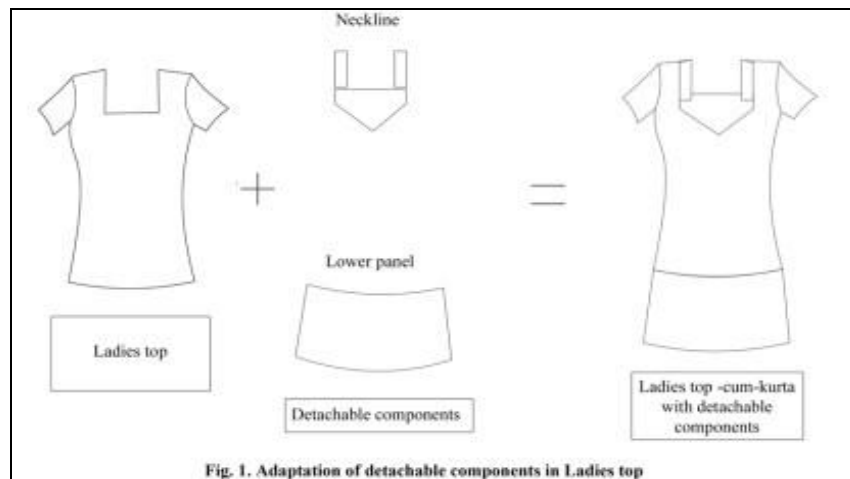


Fig. 1. Adaptation of detachable components in Ladies top

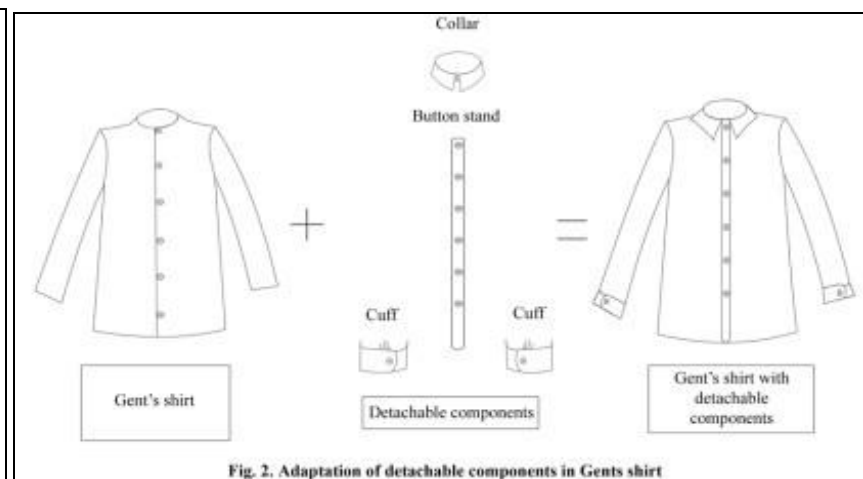


Fig.2. Adaptation of detachable components in Gents shirt

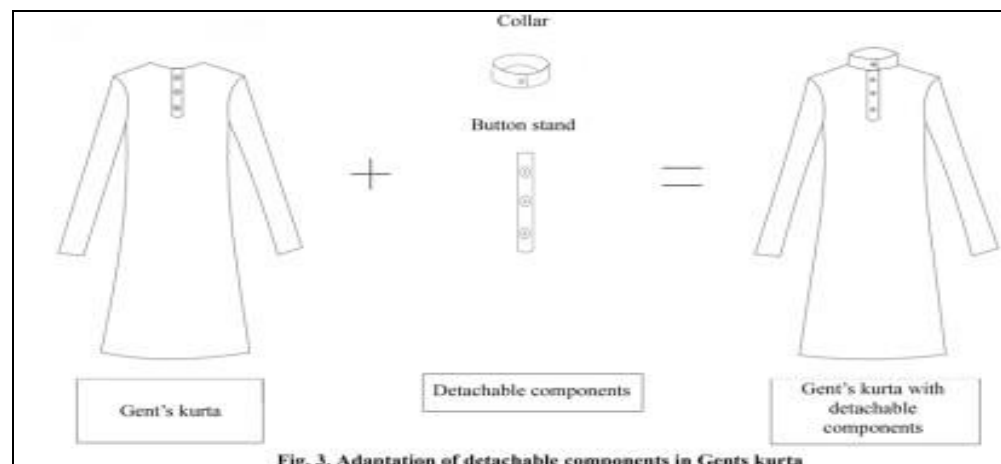


Fig.3. Adaptation of detachable components in Gents kurta



Plate 3. Drafting the designer apparel



Plate 4. Bespoke method of cutting



Plate 5. Construction of designer's *khadi* outfit

3.7.2 Motifs selection

Fashion is made of trends that spring and disappear along time. Fashion is all about appearance, and fashion designers always look for inspiration to kindle their creativity. Nature is a perfect way to recharge one's soul. Attractive colors, shapes, textures, and patterns are all around in nature. Taking inspiration from nature gives a fresh perspective on design. Fashion is an artwork in itself. Observing nature enables a designer to elicit motifs and incorporate them as new elements into their design. Hence an effort was made to select the elements of nature such as flower, leaf, bud, twig, creeper, peacock etc as a motif and then arrange them to form a design on the detachable components of ladies top, gent's shirt and kurta. The motifs selected for embellishing the detachable components of ladies top are illustrated in the Fig. 4 and of gent's shirt and kurta in Fig. 5.

3.7.3 Application of surface embellishment on detachable garment components

Different designs were selected for different techniques of surface embellishment. According to the technique, the designs were worked on the detachable garment components which were of different dimensions. The designs selected for the ladies and gents designer's apparel were different though the techniques were common. For instance, in ladies apparel, the dimension of lower panel is much larger than the yoke. Keeping this in mind, the entire design was worked on the lower panel where as a part of design was repeated on the neckline to bring about harmony in the designer's *khadi* apparel. But in case of gents apparel, the collar, cuff and button stand were of smaller size hence same designs were repeated on all the detachable garment components. Different designs were used on gents shirt and gents kurta depending on the suitability with the outfit. Table 3 clearly shows the placement of various motifs of Karnataka kasuti, machine embroidery and zardosi on different detachable components of the designer wear.

3.8 Consumer acceptance of designer's *khadi* apparel

In this study, consumer acceptance of designer's *khadi* apparel was enumerated by conducting a survey on the similar sample as mentioned in 3.7.1 and with a same sample size and locale. A self structured questionnaire was used to collect the data from a randomly selected sample by conducting an exhibition of the designer's *khadi* apparel. The questionnaire on consumer acceptance for naturally coloured cotton *khadi* designer's apparel is presented in Appendix 3.

3.9 Cost of production of designer's *khadi* apparel

The cost of production of the designer's *khadi* apparel was calculated taking into account the raw material cost, finishing cost, constructional cost and embellishment cost for which 30 per cent profit margin was added to get the selling price. Further comparison was done between the cost of production of different ladies and gents apparel based on type of fabric used and type of embellishment done on them to know the price difference.

3.10 Statistical Analysis

The statistical tools such as average, means, percentages and frequency tables were employed wherever found appropriate to draw valid inferences.

Weighted Average Ranking (WAR) was used for subjective evaluation. The formula used to calculate WAR was:

$$\text{Weighted Average Ranking (WAR)} = \frac{\text{Rank} \times \text{No. of respondent}}{\text{Total no. of respondent}}$$

Here, higher the value, higher would be the rank

To know the individual effect of all the independent variables of the physical parameters on the corresponding dependent variable, multiple linear regressions was carried out using the formula,

$$Y = a_0 + a_1x_1 + a_2x_2 + \dots + a_nx_n + E$$

Where	y	= Dependent variable
	$x_1, x_2, \dots, x_n$	= Independent variables
	E	= Random variable showing error
	x_n	= Independent dummy variable (value=0 for before treatment; value=1 for after treatment)

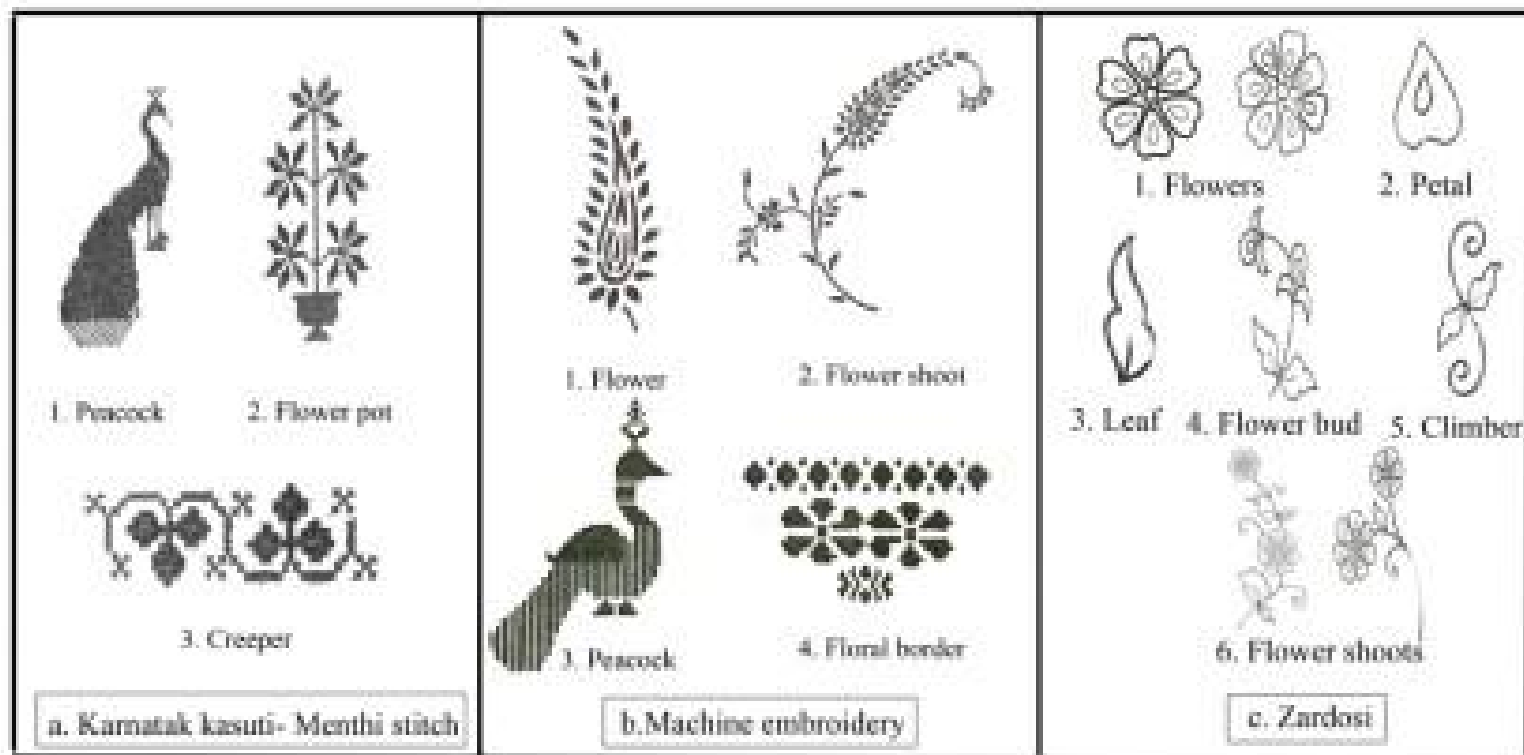


Fig. 4. Motifs applied on detachable components of ladies top

Fig.4. Motifs applied on detachable components of ladies top

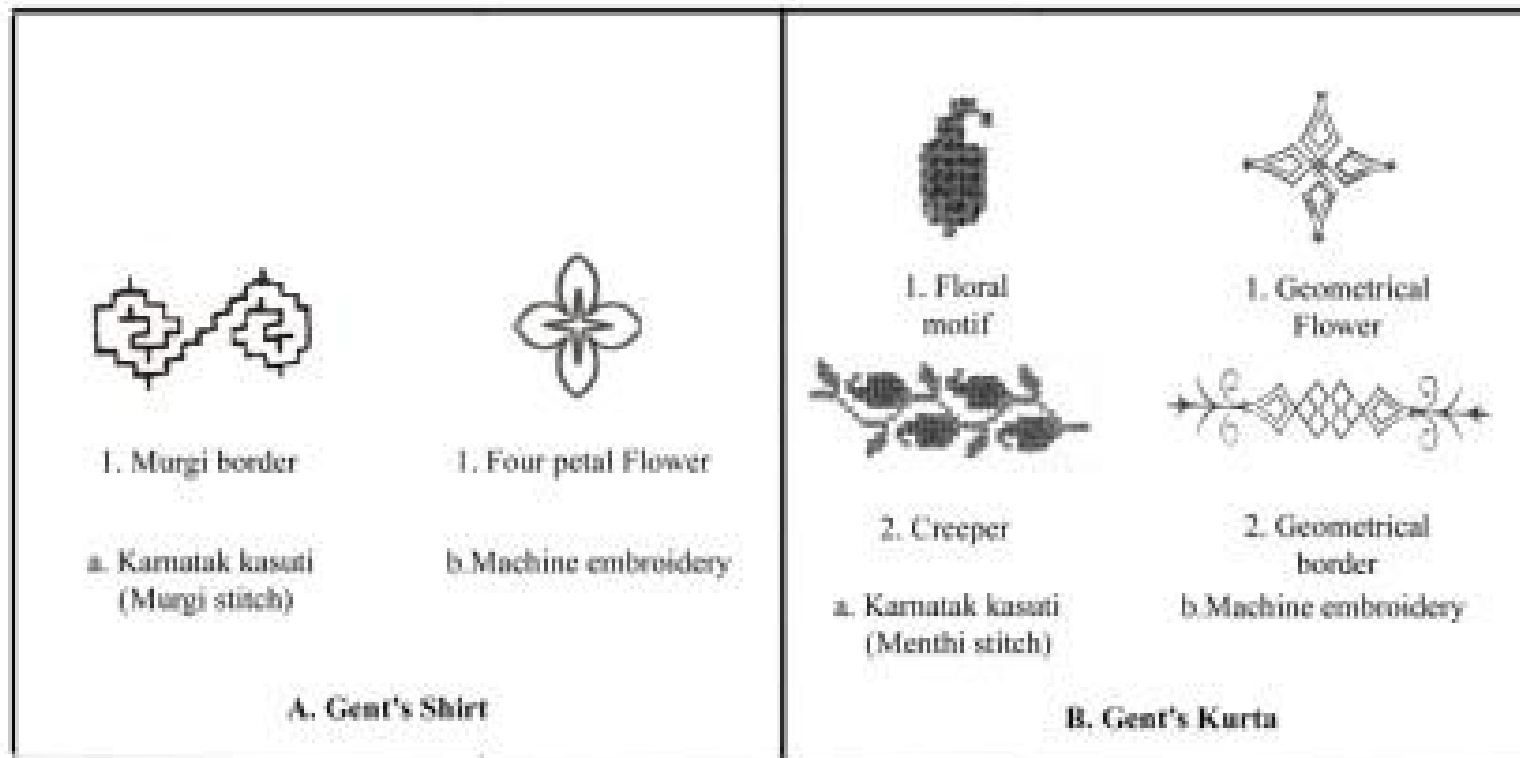


Fig. 5. Motifs applied on detachable components of gent's shirt and kurta

Fig 5. Motifs applied on detachable components of gent's shirt and kurta

Table 3. Placement of motifs on different detachable components

Sl. No.	Designer's wear	Embellishment type	Detachable components	Motifs applied
1	Ladies top-cum-kurta	Karnataka kasuti – Menthi stitch	Lower panel	Peacock, creeper, flower pot
			Neckline	Creeper
		Machine embroidery	Lower panel	Peacock, flower shoot, flower, floral border
			Neckline	Flower shoot, flower, floral border
		Zardosi	Lower panel	Flowers, petal, leaf, flower bud, climber, flower shoot
			Neckline	Flowers, petal, flower bud, climber
2	Gent's shirt	Karnataka kasuti – Murgi stitch	Collar	Murgi border
			Cuff	Murgi border
			Button stand	Murgi border
		Machine embroidery	Collar	Four petal flower
			Cuff	Four petal flower
			Button stand	Four petal flower
3	Gent's kurta	Karnataka kasuti – Menthi stitch	Collar	Creeper and floral motif
			Button stand	Floral motif
		Machine embroidery	Collar	Geometrical border, geometrical flower
			Button stand	Geometrical border

Co-efficient of determination (R^2) was calculated to know the effect of independent variables on the corresponding dependent variable using the formula,

$$R^2 = \text{Sum of squares due to multiple regression}$$

3.11 Hypotheses set for the study

- Structural and performance properties do not influence the durable properties of designer's *khadi* fabric
- The detachable garment components do match the designer's *khadi* apparel
- The ladies and gents designer's apparel with trendy detachable components are relevant for adolescent age group
- The surface embellishments do give a trendy look to the designer's *khadi* apparel

RESULTS

The results of the present study entitled “Naturally Coloured Cotton Designer’s Apparel: an emerging trend in *khadi* world” are presented under the following headings:

- 4.1 Spinning and doubling of white cotton and naturally coloured cottons
 - 4.1.1 Quality assessment of yarn parameters
 - 4.2 Weaving designer’s *khadi* fabric
 - 4.2.1 Pre-loom processes
 - 4.2.1.1 Sizing of warp yarns (*Ganji Hakuvudu*)
 - 4.2.1.2 Twisting and joining the new warp with previous warp ends (*Hanagi Kechuvudu*)
 - 4.2.1.3 Gaiting the loom (*Gadidara Kattuvudu*)
 - 4.2.1.4 Pirn winding (*Kandaki Suttuvudu*)
 - 4.2.2 Loom processes
 - 4.2.2.1 Loom and weaving particulars
 - 4.2.2.2 Cutting and doffing
 - 4.2.3 Post loom processes
 - 4.3 Impact of special finishes on fabric quality parameters
 - 4.3.1 Structural properties
 - 4.3.2 Performance properties
 - 4.3.3 Durable properties
 - 4.4 Consumers’ preference for type of surface embellishment
 - 4.5 Designing and construction of *khadi* outfits with a new concept of detachable garment components
 - 4.6 Designing and embellishing the detachable garment components
 - 4.7 Consumers’ acceptance for designer’s *khadi* apparel
 - 4.7.1 Consumers’ choice for naturally coloured cotton
 - 4.7.2 Consumers’ acceptance for *khadi* fabrics
 - 4.7.3 Consumers’ view on the concept of detachable garment components
 - 4.8 Cost of production of designer’s *khadi* apparel
- 4.1 Spinning and doubling of white and naturally coloured cottons

The selected white and coloured cotton were ginned and bale was opened on opener machine, formed into a lap on hopper machine, then further made into rove after carding and combing, drawn into parallel strands on draw frame machine and formed the sliver on simplex machine. Later the sliver was spun on new model charaka with 8 spindles and bundled into a hank (ladi). The single yarn hanks were further soaked in water for 3 days, beaten with laundry beater and sun dried. After drying, two singles were twisted together on hand reel to form doubled yarn; the twisted yarn is wound on bobbin and further used for weaving. Plate 6 shows fibre to yarn process from bale opening to twisting and doubling of yarn.

4.1.1 Quality assessment of yarn parameters

The quality parameters viz., yarn count, lea strength, count strength product and yarn twist of both white cotton (WC) and Dharwad Desi Coloured Cotton -1 (DDCC-1) doubled yarns were assessed. Table 4 shows that white cotton yarn was relatively finer (2/10s) with higher lea strength value (157.33 lbs) than DDCC-1 (2/8s with 105.6 lbs).

Thereby, count strength product of white cotton (1573.30) was remarkably higher compared to DDCC-1 yarn (844.80). So also twist per inch was higher in white cotton yarn (73 Tpi) than DDCC-1 (62 Tpi).

4.2 Weaving designer's *khadi* fabric

The test fabric was woven by interlacing warp and filling yarns at right angles to each other according to the prearranged design on handloom. And the weaving process include pre-loom, loom and post loom processes elaborated as below:

4.2.1 Pre-loom Processes

The important operations carried out prior to weaving, grouped as pre-loom processes are sizing of warp yarns, twisting and joining the new warp to previous warp ends, gaiting the loom and pirn winding. Plate 7 clearly shows the pre-loom processes.

4.2.1.1 Sizing of warp yarns (*Ganji Hakuvudu*)

After doubling, the warp sheet (*Hasu Maduvudu*) was prepared as per the width of the fabric to be woven. The warp sheet was first made wet in plain water and then spread on the washing stone; about 18-20% of viscous solution of jowar starch is applied to the yarn package by gentle patting technique, occasionally beaten with beater to facilitate even spreading and better pick up of size by the entire hank.

The sized warp hanks without rinsing are street dried in the form of sheet. Two wooden posts are permanently posted into the ground, across which the sized warp sheet is stretched and dried. The distance between the two posts is slightly extra than the length of sheet to be spread out on each wooden stave on either ends. Care was taken to maintain the lease by inserting the lease rods.

Brushing was done from one end of the warp sheet to other continuously to separate the yarns, promote quick drying, brush off extra size and even spread of size. After drying, the cotton warp sheet is folded to form vonki (*Vonki hooduvudu*).

4.2.1.2 Twisting and joining the new warp with previous warp ends (*Hanagi Kechuvudu*)

It is customary to cut and separate the fabric ends from the loom by retaining old warp sheet; to which the new warp ends are joined by twisting both ends individually and finally a new warp sheet shall be prepared. Twisting and joining is a very important step in the pre-loom processes carried out manually as per the pre-determined design i.e. plain, stripe and checks. Occasionally a pinch of ash powder was smeared to the finger tips to facilitate twisting and joining.

4.2.1.3 Gaiting the loom (*Gadidara Kattuvudu*)

It is also known as dressing the loom, means preparing the loom for weaving. The harness and reed were appropriately tied into sequence according to design to be woven.

The main feature of pitloom is without warp beam i.e. the warp sheet is simply divided into eight sections and is tied to the bamboo stave and in turn to the peg posted in the ground at the back of the loom and held tightly to facilitate weaving.

The warp sheet is properly spread to the correct width of the cloth, combed with the coir brush to remove any twists or over lapping of the threads and moved the lease rods as far back as possible in order to complete the gaiting preparation.

4.2.1.4 Pirn winding (*Kandaki Suttuvudu*)

Pirn winding is a process of transferring the weft yarns onto the pirn using a simple hand operated pirn winding charaka. The pirn releases weft during weaving.

4.2.2 Loom processes

Loom processes include weaving of test samples, cutting and doffing. Plate 8 illustrates weaving of naturally coloured cotton fabric.



Bale opening on Opener machine



Lap preparation on Hopper Machine



Combing (Comb Silver)

Plate 6. Fiber to yarn process



Drawing on Draw Frame machine

Roving on Simplex Machine



Preparing hank on New Model Charaka with 8 spindles

Twisting and Doubling



Plate 6. (Contd..) Fiber to yarn process

Table 4. Yarn parameters

Sl. No.	Quality parameters	White cotton (WC)	Dharwad Desi Coloured Cotton -1 (DDCC-1)
1.	Yarn count (Ne)	2/10s	2/8s
2.	Lea strength (lbs)	157.33	105.6
3.	Count Strength Product (CSP)	1573.30	844.80
4.	Twist per inch (Tpi)	73	62



**Street drying of sized
Warp sheet**



Folded warpsheet (Vonki)



**Twisting and joining the new
Warp to previous warp ends**



**Tieing the other end of
warp sheet to bamboo stave**

Plate 7. Pre-loom processes



Brushing the warp sheet
Plate 7. (contd...) Pre-loom processes



Weaving
Plate 8. Loom processes

4.2.2.1 Loom and weaving particulars

Table 5 clearly indicates that two control fabrics viz., white cotton (WC) and Dharwad Desi Coloured Cotton -1 (DDCC-1) were woven with plain weave. Further the researcher made an effort to create variegated structural designs in control fabrics by altering the sequence of white and DDCC-1 yarns warpway interwoven with brown coloured DDCC-1 in weft to produce stripe fabrics of two types viz., pin stripe and medium stripe. Further keeping the same warp sheet, two types of checks viz., small and medium were produced by interweaving white and DDCC-1 yarns in the similar sequence as that of warp.

In total six varieties of fabrics were woven i.e. control (2), stripe (2) and checks (2) on pitloom with reed count of 40, reed width of 30", cloth width of 28" having denting order of 2 threads / dent. However, except white cotton control fabric which was produced 15mts, rest of the test samples were produced to 30mts each.

4.2.2.2 Cutting and doffing

After weaving 15mts of fabric, an extra length of approximately an inch was woven and separated from the beam with knife. This helped to prevent the slippage of yarns through the dents.

4.2.3 Post loom processes

The woven fabrics were examined for flaws, folded and packed neatly.

4.3 Impact of special finishes on fabric quality parameters

In the present study, six designer's fabrics viz., two each control, stripes and checks fabrics were procured from the loom in the grey form and were further subjected to bio-desizing, bio-polishing and silicon softener finish specially to remove the size and fuzz on the fabric surface to impart softness and pliability to the fabric. These special finishes apart from improving the feature do have impact on structural, performance and durable properties of the fabrics. Hence, it was felt necessary to study the impact of these special finishes on such properties before and after treating with special finishes was assessed and compared between two control fabrics. Similarly comparison was made between two stripe fabrics and further between two checks fabrics.

4.3.1 Structural properties

The yarn count, cloth count, thickness and GSM are the basic yet foundation parameters under the umbrella of structural properties.

4.3.1.1 Yarn count (Ne) of hand woven *khadi* fabric

The yarn count is a numerical expression which defines its fineness. The count of spun yarn is measured in Indirect system where higher the count finer the yarns. The yarn count for both warp and weft yarns were determined separately, drawn from test samples. Table 6 depicts the yarn composition where, in both the control fabrics viz., white cotton (WC) and DDCC-1, the weft way count (2/9s and 2/8s) was higher than their corresponding warp way count (2/7s and 2/6s) respectively. However, after enzyme + softener finish, yarn count of both the test samples i.e. WC and DDCC-1 became finer both in weft (2/10s and 2/8s) and warpways (2/9s and 2/8s) respectively which indicates a slight increase in the yarn fineness when subjected to special finishes.

4.3.1.2 Cloth count (Numerical expression) and cloth thickness (mm) of hand woven *khadi* fabric

Cloth count of the woven textile is the number of ends and picks per unit length as counted, while the fabric is under zero tension and free from folds and wrinkles. Cloth count is influenced by the respective yarn density and fabric set.

Table 7 represents the cloth count of six types of newly designed *khadi* fabrics. It is observed from the Table that irrespective of type of fabric, the warp density is relatively greater than the weft. After treatment, all the fabrics have become compact and this compactness is more in weft than warp.

Further when the comparison is made between the two control fabrics, it was found that increase in warp density of DDCC-1 (04.88%) was slightly higher than that of white cotton (02.44%); whereas an increase in weft density of white cotton (13.33%) was relatively greater than that of DDCC-1 (07.41%).

Table 5. Loom and weaving particulars

Sl. No.	Designer's fabrics	Loom particulars						
		Warp X Weft	Type of loom	Reed count	Reed width	Threads / dent	Cloth width	Cloth length
Control Fabrics								
1.	White cotton	WC X WC	Pit loom	40	30"	2 threads /dent	28"	15 mts
2.	DDCC-1	DDCC-1 X DDCC-1						30 mts
Stripe Fabrics								
1.	Pin stripe	2 DDCC-1, 2WC X DDCC-1	Pit loom	40	30"	2 threads /dent	28"	30 mts
2.	Medium stripe	8 DDCC-1, 4WC X DDCC-1						
Checks Fabrics								
1.	Small checks	2 DDCC-1, 2WC X 2DDCC-1, 2WC	Pit loom	40	30"	2 threads /dent	28"	30 mts
2.	Medium checks	8 DDCC-1, 4WC X 8DDCC-1, 4WC						

Table 6. Yarn composition of hand woven *khadi* fabric

Sl.No.	Designer's Fabrics	Yarn direction		Yarn Count (Ne)			
		Warp	Weft	Control		Enzyme + softener finish	
				Warp	Weft	Warp	Weft
1.	WC Control	WC	WC	2 / 7s	2 / 9s	2 / 9s	2 / 10s
2.	DDCC-1 Control	DDCC-1	DDCC-1	2 / 6s	2 / 8s	2 / 8s	2 / 8s
3.	Pin Stripe	DDCC-1 : WC 2 : 2	DDCC-1	2 / 6s, 2 / 7s	2 / 8s	2 / 8s, 2 / 9s	2 / 8s
4.	Medium Stripe	DDCC-1 : WC 8 : 4	DDCC-1	2 / 6s, 2 / 7s	2 / 8s	2 / 8s, 2 / 9s	2 / 8s
5.	Small Checks	DDCC-1 : WC 2 : 2	DDCC-1 : WC 2 : 2	2 / 6s, 2 / 7s	2 / 8s, 2 / 9s	2 / 8s, 2 / 9s	2 / 8s, 2 / 10s
6.	Medium Checks	DDCC-1 : WC 8 : 4	DDCC-1 : WC 8 : 4	2 / 6s, 2 / 7s	2 / 8s, 2 / 9s	2 / 8s, 2 / 9s	2 / 8s, 2 / 10s

Note: WC – White Cotton and DDCC-1 – Dharwad Desi Coloured Cotton-1

Table 7. Cloth count (Numerical expression) and cloth thickness (mm) of hand woven *khadi* fabric

Sl.No.	Designer's Fabrics	Cloth Count (Numerical expression)				Cloth Thickness (mm)	
		Control		Enzyme + Softener Wash		Control	Enzyme + Softener Wash
		Warp	Weft	Warp	Weft		
1.	WC Control	41	30	42 (+02.44)	34 (+13.33)	0.58	0.56 (-03.45)
2.	DDCC-1 Control	41	27	43 (+04.88)	29 (+07.41)	0.73	0.69 (-05.48)
3.	Pin Stripe	42	27	44 (+04.76)	30 (+11.11)	0.74	0.70 (-05.41)
4.	Medium Stripe	42	26	44 (+04.76)	30 (+15.38)	0.75	0.71 (-05.33)
5.	Small Checks	42	27	44 (+04.76)	30 (+11.11)	0.72	0.68 (-05.56)
6.	Medium Checks	42	27	44 (+04.76)	31 (+14.81)	0.76	0.72 (-05.26)

Note: WC – White Cotton and DDCC-1 – Dharwad Desi Coloured Cotton-1
 Figures in parenthesis indicate percentage change over control

The increase in warp density of both stripe types was same (04.76%) but the increase in weft density was slightly higher with medium stripe (15.39%) than the pin stripe (11.11%). However, a similar trend of increase in weft density was observed among medium checks (14.82%) fabric and is higher than that of small checks (11.11%).

Cloth thickness is the distance between one surface to its opposite. In textiles, it is the distance between the upper and lower surface of the material, measured under a specified pressure.

It is evident from Table 7 that irrespective of type of fabric, the cloth thickness has reduced after giving enzyme and softener wash. Among the two control samples, DDCC-1 (00.73 mm) was remarkably thicker than white cotton (00.58 mm) before treatment. And the percent change over control after wet treatment is relatively higher in case of DDCC-1 (05.48 %) to that of white cotton (03.45%)

Among the striped samples, the sample with medium stripes (00.75 mm) appeared to be slightly thicker than pin stripe (00.74 mm) before treatment. And after the treatment there was slight increase in the value of pin stripe (05.41%) when compared to medium stripe (05.33%).

Further on comparison among checks, medium checked sample (00.76mm) was relatively thicker than small checks (00.76 mm) before treatment. It is interesting to note that after wet treatment a reversible trend of increase in thickness is observed i.e. slight increase in small checks (05.56%) and relatively low thickness in medium checks (05.26%).

4.3.1.3 Cloth weight (GSM) of hand woven *khadi* fabric

The weight of the fabric depends on the fibre composition, yarn type, yarn twist, thread density, method of fabric construction and finish applied.

In general, it was depicted that the warp density of control and treated sample was found to be relatively greater than its corresponding pick density. Meanwhile, it is evident from Table 8 that the softener finish did enhance the weft density than its corresponding warp density.

The GSM of WC and DDCC-1 at control was 11.69 per cent and 08.90 per cent respectively. After the treatment; both the control fabrics in turn lead to decrease in warp percentage (04.18%, WC and 07.44%, DDCC-1) and an increase in weft percentage (04.18%, WC and 07.44%, DDCC-1).

A decrease in the GSM (07.12 %) of pin stripe sample was observed with an equal amount of decrease and increase in warp and weft percentages (0.82%). Similarly there was a decrease in the value of GSM (06.62%) with decrease in warp percentages (06.10%) and increase in weft percentages (06.10%) of medium stripe fabric, on treating with enzyme + softener finish.

Similarly, a decrease in the GSM (06.89%) of small checks is observed with a decrease in warp percentages (02.54%) and an increase in weft percentage (02.54%). Likewise, a slight increase and decrease in weft and warp percentages (each 01.48%) was observed in medium checks; however, the total GSM indicate a slight decrease (06.31%).

4.3.2 Performance properties

Every fabric manufactured has definite end use, thus has all intrinsic qualities or characteristics to perform better as per the specification. Therefore, several varieties and qualities of fabrics are produced and made available in the market for the consumers to select wisely for clothing, bed linen, furnishing and industrial purposes.

Cotton being universal fabric has innumerable end uses of which clothing is the most focused one since it forms the basic necessity of human kind. Cotton cloth is produced in varied GSM that helps the people to select material for variegated end uses. There are several parameters of a cloth that determine its performance viz., bending path, crease recovery and drape coefficient. Hence, an effort was made to assess the impact of softener and enzyme finish on these parameters and evaluate its performance.

4.3.2.1 Cloth crease recovery (Degrees) and cloth stiffness (cm) of hand woven *khadi* fabric

Creasing is the formation of folds or deformations that are not remarkable or recoverable completely. The recovery or resistance for creasing depends on the resistance and elastic property of the material. The fabric must be resilient, which possess certain amount of resistance to creasing but yet has a power and rapid recovery. Cellulosics are most susceptible for creasing.

Table 8. Cloth weight (GSM) of hand woven *khadi* fabric

Sl.No.	Designer's Fabrics	Cloth Weight					
		Control			Enzyme + Softener Wash		
		Cloth Weight (GSM)	Warp percentage	Weft percentage	Cloth Weight (GSM)	Warp percentage	Weft percentage
1.	WC Control	217.60	64.16	35.84	192.16 (-11.69)	59.98 (-04.18)	40.02 (+04.18)
2.	DDCC-1 Control	240.88	69.13	30.87	219.44 (-08.90)	61.69 (-07.44)	38.31 (+07.44)
3.	Pin Stripe	230.48	58.94	41.06	214.08 (-07.12)	58.12 (-00.82)	41.88 (+00.82)
4.	Medium Stripe	234.48	66.38	33.62	218.96 (-06.62)	60.28 (-06.10)	39.72 (+06.10)
5.	Small Checks	228.64	61.82	38.18	212.88 (-06.89)	59.28 (-02.54)	40.72 (+02.54)
6.	Medium Checks	239.52	60.36	39.64	224.40 (-06.31)	58.88 (-01.48)	41.12 (+01.48)

Note: WC – White Cotton and DDCC-1 – Dharwad Desi Coloured Cotton-1
Figures in parenthesis indicate percentage change over control

Table 9. Cloth crease recovery (Degrees) and cloth stiffness (cm) of hand woven *khadi* fabric

Sl.No.	Designer's Fabrics	Cloth Crease Recovery (Degree)						Cloth Stiffness (cm)			
		Control			Enzyme + Softener Wash			Control		Enzyme + Softener Wash	
		Warp	Weft	Cloth crease recovery	Warp	Weft	Cloth crease recovery	Warp	Weft	Warp	Weft
1.	WC Control	74	77	75.51	80 (+08.11)	86 (+11.69)	82.87 (+09.75)	2.40	2.51	1.67 (-30.42)	1.77 (-29.48)
2.	DDCC-1 Control	76	79	77.52	81 (+06.58)	92 (+16.46)	86.31 (+11.34)	3.49	2.19	1.54 (-55.87)	1.53 (-30.14)
3.	Pin Stripe	78	81	79.47	83 (+06.41)	92 (+13.58)	87.36 (+09.93)	2.84	2.26	1.64 (-42.25)	1.59 (-29.65)
4.	Medium Stripe	81	85	82.98	89 (+09.88)	97 (+14.12)	92.89 (+11.94)	3.13	2.31	1.50 (-52.08)	1.52 (-34.20)
5.	Small Checks	77	79	78.05	82 (+06.49)	91 (+15.19)	86.43 (+10.74)	2.48	2.14	1.61 (-35.08)	1.56 (-27.10)
6.	Medium Checks	80	88	83.86	88 (10.00)	99 (+12.50)	93.33 (+11.29)	2.51	2.48	1.58 (-37.05)	1.44 (-41.94)

Note: WC – White Cotton and DDCC-1 – Dharwad Desi Coloured Cotton-1

Figures in parenthesis indicate percentage change over control

Table 10. Cloth drapability (%) of hand woven *khadi* fabric

Sl.No.	Designer's Fabrics	Cloth Drapability (%)			
		Control		Enzyme + Softener Wash	
		No. of nodes	Drape Coefficient	No. of nodes	Drape Coefficient
1.	WC Control	3	130.64	6	61.23 (-53.13)
2.	DDCC-1 Control	2	135.64	5	71.30 (-47.43)
3.	Pin Stripe	3	113.24	5	62.47 (-44.83)
4.	Medium Stripe	2	132.27	5	64.31 (-51.38)
5.	Small Checks	4	117.55	5	63.14 (-46.29)
6.	Medium Checks	4	121.20	5	65.38 (-46.06)

Note: WC – White Cotton and DDCC-1 – Dharwad Desi Coloured Cotton-1
 Figures in parenthesis indicate percentage change over control

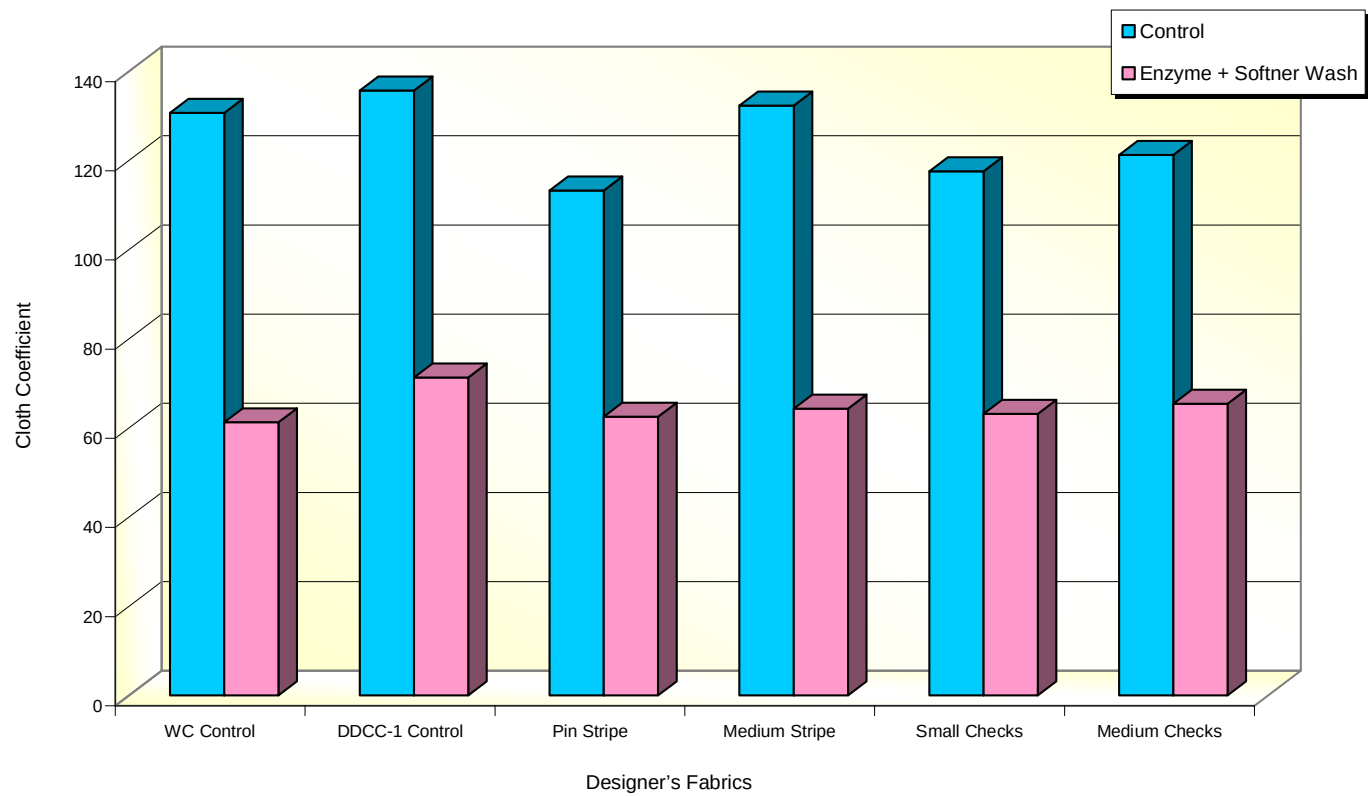


Fig. 6. Cloth Drapability (%) of hand woven khadi fabric

Fig. 6. Cloth Drapability (%) of hand woven khadi fabric

Table 9 narrates the results of crease recovery of six designer's *khadi* fabrics. In general, it is evident that the weft crease recovery of all the test samples was greater than the corresponding warpway at control and after wet treatment. Nevertheless, all the test fabrics have shown an improvement in crease recovery after softener finish.

It is found from this Table that the cloth crease recovery is better in WC control (75.51%) after treatment than DDCC-1 (77.52%). Similarly, among the stripes, pin stripe (79.47%) exhibited better cloth crease recovery after the wet treatment than medium stripe (82.98%) as well as small checks (78.05%) showed greater cloth crease recovery than medium checked fabrics (83.86%).

The stiffness of a fabric is defined as its resistance to bending. The bending length is the property of the fabric that depends on the energy required to produce a given bending path under its own weight. The constructional features affecting the stiffness of a cloth is mainly its nature of the fibre, yarn type, yarn count, fabric geometry, cloth weight, cloth thickness and finish applied.

Table 9 depicts the results of bending path of the test samples before and after treatment both warpway and weftway. All the test samples showed longer bending path in the warpway compared to weftway, except white cotton at control where the values are inverse at both control and after treatment. On comparison DDCC-1 showed longer warpway bending length (03.49 cm) than white cotton (02.40 cm) at control; whereas this feature in weft way is higher in white cotton (02.51 cm) compared to DDCC-1 (02.19 cm).

A trend of decrease in cloth stiffness was observed after the wet treatment warpway and weftway of both control samples (WC and DDCC-1). Further it is noticed that both warpway (03.13 cm) and weftway (02.31 cm) bending length of medium stripe was relatively higher than that of corresponding warpway (02.84 cm) and weftway (02.26 cm) of pin stripe. A trend of similar results with the percent change over control was observed in the treated fabrics, when compared to untreated samples. Among the checks, warp bending length of medium checks decreased (01.58 cm) by 37.05 per cent and as well weft (01.44 cm) by 41.94 per cent; similarly a trend of reduction in warp and weft bending length of small checks found to be (01.61 cm) 35.08 per cent and (01.56 cm) 27.10 per cent respectively.

4.3.2.3 Cloth drapability (%) of hand woven *khadi* fabric

Drape is an important property of textile materials, which allows fabric to orient itself into graceful folds or pleats as a result of force of gravity. The style of garment and its type determines the amount of drape that is required and accordingly the fabric is selected. Graceful fall of the fabric is the result of interaction of warpway and weftway characteristics. The objective evaluation of cloth drapability is expressed in terms of drape co-efficient; however, the drape quality of some of the fabrics may be evaluated subjectively and expressed in terms of number of nodes.

Table 10 and Fig. 6 narrate on the drape quality of designer's *khadi* fabrics, before and after treatment. It is noticed from this Table that DDCC-1 control showed poor drapability (2 nodes and 135.64%) when compared to white cotton (3 nodes and 130.64%). A similar trend of results is observed after subjecting the samples for special finishes. Among the stripes, the medium stripe sample showed relatively poor drapability (2 nodes and 132.27%) than pin stripe (3 nodes and 113.24%). However, relatively a poor drapability was exhibited by medium stripe (64.31%) than pin stripe (62.47%) but both draped with 5 nodes.

Further, a similar trend of drape was noticed among medium and small checked samples each with 4 nodes and a meager variation in drape co-efficient values i.e. 121.20 per cent and 117.55 per cent respectively; higher the value, lower the drape characteristics. A similar trend of results is observed even after subjecting the samples for enzyme and softener finishes. Nevertheless, all the test samples irrespective of their constructional designs draped with 5 nodes after the wet treatment except WC control which draped with 6 nodes which indicates better drapability after the treatment.

Influence of cloth count, cloth weight, cloth thickness, cloth crease recovery and cloth stiffness on drapability. A multiple linear regression analysis was carried out to study the influence of different cloth parameters like cloth count, cloth weight, cloth thickness, cloth crease recovery and cloth stiffness on drapability. An attempt was also made to study the influence of these factors on cloth drapability before and after the treatment by introducing a dummy independent variable. (Value 0 for before and value 1 for after treatment). The cloth parameters like cloth count, cloth crease recovery and cloth stiffness have two dimensions viz., warp and weft.

The two dimensions are likely to influence the drapability. Hence they were added to get their combined effect on drapability. The results of the multiple linear regression analysis are presented in the Table 11.

In case of white cotton, the drape co-efficient was 183.76 per cent before treatment which came down by 78.42 per cent after the treatment. The drapability was found to be negatively influenced by cloth count and cloth stiffness and positively influenced by cloth thickness and cloth crease recovery. However, these parameters failed to exert a significant influence on drapability. Whereas, the cloth weight exerted a significant negative influence on drapability. The increase in cloth weight by 1 GSM would reduce the drapability by 0.31 per cent. The variation in independent variables explained 99.5 per cent variation in drapability. The R^2 value was found to be significant at 1 per cent level.

The variation in drapability was explained to the tune of 99 per cent by the variation in the cloth parameters ($R^2 = 0.992$) in case of DDCC-1. The dummy variable was significant at 1 per cent level. This indicated that the drape co-efficient has decreased by 59.95 per cent after the treatment. The drape co-efficient was 192.08 per cent before treatment in DDCC-1. The drape coefficient was found to be negatively associated with cloth count, cloth weight and cloth crease recovery and positively associated with cloth thickness and cloth stiffness. However, none of these parameters were found to exert a significant influence on drapability.

In case of pin stripe fabric, the regression model explained 99.8 per cent of variation in the drapability due to variation in cloth parameters. The regression model was significant at 1 per cent. Only count crease recovery was found to significantly and positively condition the drapability. One degree increase in cloth crease recovery would increase the drape co-efficient by 0.24 per cent. Cloth weight and cloth thickness were having negative influence while cloth count and cloth stiffness were having positive influence. However, these influences were statistically not significant. The drape co-efficient was found to decrease by 55.09 per cent from 99.56 per cent because of the treatment.

About 99 per cent of variation in drapability was found to explain by the variation in independent variables in the case of medium stripe fabrics. The F-value was very high indicating that the regression model was a good fit. The cloth weight was found to positively and significantly condition the drape co-efficient. An increase of 1 GSM of cloth weight will increase 0.39 per cent drape co-efficient. Similarly, 1 degree increase in cloth crease recovery would increase the drape co-efficient by 0.33 per cent. Cloth thickness and cloth stiffness were found to influence drape co-efficient negatively. While cloth count produced a positive influence on drape co-efficient. However, these influences were statistically not established. The drape co-efficient came down by 74.79 per cent due to the treatment.

In small checks, the drape co-efficient was 164.10 per cent before treatment which came down by 60.94 per cent after the treatment. The drapability was found to be negatively and significantly influenced by cloth crease recovery and positively influenced by cloth count. However, cloth weight and cloth stiffness were found to be negatively related and cloth thickness was positively related but were statistically non-significant in their results. The increase in cloth count and cloth crease recovery by one unit would increase the drapability by 0.46 per cent and reduce it by 0.26 per cent respectively. The variation in independent variables explained 99.3 per cent variation in drapability. The R^2 value was found to be significant at 1 per cent level.

In case of medium checks fabric, the regression model explained 97.4 per cent of variation in the drapability due to variation in cloth parameters. The regression model was significant at 1 per cent. Only cloth count was found to significantly and positively condition the drapability. One unit increase in cloth count would increase the drape co-efficient by 0.87 per cent.

Table 11. Influence of cloth count, cloth weight, cloth thickness, cloth crease recovery and cloth stiffness on cloth drapability

Sl. No.	Designer's fabrics	Intercept	X1 Cloth count	X2 Cloth weight	X3 Cloth thickness	X4 Cloth crease recovery	X5 Cloth stiffness	X6 Dummy variable	R ²	F-value
1	WC Control	183.76** (45.72)	-0.26 ^{NS} (0.19)	-0.31** (0.11)	8.25 ^{NS} (17.87)	0.18 ^{NS} (0.17)	-0.04 ^{NS} (3.29)	-78.42** (6.96)	0.995**	832.63
2	DDCC-1 Control	192.08** (35.17)	-0.09 ^{NS} (0.40)	-0.10 ^{NS} (0.06)	1.80 ^{NS} (15.48)	-0.21 ^{NS} (0.11)	0.81 ^{NS} (1.90)	-59.95** (7.16)	0.992**	474.07
3	Pin Stripe	95.56** (16.71)	0.01 ^{NS} (0.11)	-0.08 ^{NS} (0.05)	-9.02 ^{NS} (8.86)	0.24** (0.05)	0.73 ^{NS} (1.59)	-55.09** (3.45)	0.998**	1581.38
4	Medium Stripe	-36.82 ^{NS} (61.00)	0.49 ^{NS} (0.32)	0.39** (0.12)	-2.82 ^{NS} (16.03)	0.33** (0.11)	-1.62 ^{NS} (2.54)	-74.79** (6.60)	0.994**	653.78
5	Small Checks	164.10** (63.04)	0.46* (0.23)	-0.14 ^{NS} (0.13)	25.05 ^{NS} (14.73)	-0.26** (0.08)	-5.41 ^{NS} (6.63)	-60.94** (9.39)	0.993**	569.05
6	Medium Checks	19.11 ^{NS} (80.93)	0.87** (0.41)	0.01 ^{NS} (0.16)	-40.35 ^{NS} (43.27)	0.36 ^{NS} (0.26)	2.02 ^{NS} (6.02)	-64.52** (13.56)	0.974**	142.40

Note: *Significant at 5 per cent level, ** Significant at 1 per cent level, NS- Non-significant
Figures in parenthesis indicate standard error

Cloth weight, cloth crease recovery and cloth stiffness were having positive influence while cloth thickness had negative influence. However, these influences were statistically not significant. The drape co-efficient was found to decrease by 64.52 per cent.

4.3.3 Durable properties

It is true that the fibre structure and its strength, and yarn structure and its strength are commonly regarded as criterion of quality. However, the flexibility, resiliency, moisture adsorption and other similarly characteristics do assess the quality of a textile material. In other words, the quality of a yarn depends upon the quality of the fibre and spinning operation; quality of cloth depends upon the quality of fibre, spinning operation, weaving operation and finishing process. Similarly strength is the result of several variables and is rather complex. Nevertheless, measure of tensile properties is an important part of textile testing that determines the fabric strength including elongation that focuses on durable aspects of the fabric.

'Wear' is net result of a number of agencies which reduce the serviceability of an article. Some of the important agencies are bending, stretching, tearing, abrasion, laundering and cleansing. The laboratory approach to assess the durability of the test samples in this study are abrasion resistance, pilling, tensile strength and its corresponding elongation.

4.3.3.1 Cloth tensile strength (kgf) and cloth elongation (%) of hand woven *khadi* fabric

The tensile strength is the fundamental ability of the fabric to resist strain or rupture induced by tension. The tensile properties of the fabric depend upon the fibre, yarn and fabric parameters like fibre content, yarn type (single, ply or filament), yarn number, yarn crimp, yarn twist, threads per unit area, cloth cover and weave density. However, the yarn strength ultimately cannot be greater than the sum of maximum strength of its component fibres, which determines the strength of the fabric.

In general, the warpway tensile strength of all the six samples is greater than its corresponding weftway strength as well as after softener finish. However, the softener finish has reduced the tensile strength of the samples both warp and weftways.

Table 12 and Fig. 7 clearly indicates that among the two control samples, maximum tensile strength in warp (26.50 kgf) and weft (20.00 kgf) was observed in white cotton compared to DDCC-1 (warpway, 26.00 kgf and weftway, 15.10 kgf) after the special treatment. Of the two stripe samples, maximum tensile strength in warp (26.50 kgf) and weftway (21.37 kgf) was observed with medium stripe than pin stripe (warpway, 24.03 kgf and weftway, 17.30 kgf). However, medium checks sample showed better tensile strength both in warpway (25.90 kgf) and weftway (20.00kgf) when compared to small checks (warp, 24.90kgf and weft, 17.83 kgf). Table 12 depicts the elongation percent of test samples. In general, the warpway elongation was higher than weftway at control; the elongation percentage gradually decreased both in warp and weftways after treating the samples with special finishes.

Among the control samples, greater percent of increase in warp (10.66%) and weftway (7.04 %) elongation was observed in DDCC-1 compared to warp (9.88 %) and weftway (7.00%) elongation of white cotton after finishing. The same trend was observed among the two samples before treatments. On the other hand, pin stripe sample showed higher elongation percentages in warp (11.31%) and weft (7.49%) direction compared to warp (8.10%) and weft (6.42%) elongation percentages of medium stripe. Furthermore, the warpway (10.70%) and weftway (7.53%) cloth elongation was maximum in small checks than medium checks (warpway, 9.37% and weftway, 6.50%).

Influence of cloth count, cloth weight and cloth thickness on tensile strength

A multiple linear regression analysis was carried out to study the influence of different cloth parameters like cloth count, cloth weight and cloth thickness on cloth tensile strength. An attempt was also made to study the influence of these factors on cloth tensile strength before and after the treatment by introducing a dummy independent variable. (Value 0 for before and value 1 for after treatment).

The cloth parameter like cloth count has two dimensions viz., warp and weft. The two dimensions are likely to influence the cloth tensile strength. Hence they were added to get their combined effect on tensile strength. The results of the multiple linear regression analysis are presented in the Table 13.

Table 12. Cloth tensile strength (kgf) and cloth elongation (%) of hand woven *khadi* fabric

Sl.No.	Designer's Fabrics	Cloth Tensile Strength (kgf)				Cloth Elongation (%)			
		Control		Enzyme + Softener Wash		Control		Enzyme + Softener Wash	
		Warp	Weft	Warp	Weft	Warp	Weft	Warp	Weft
1.	WC Control	48.28	39.88	26.50 (-45.11)	20.00 (-49.85)	12.70	7.17	9.88 (-22.20)	7.00 (-02.37)
2.	DDCC-1 Control	42.88	25.54	26.00 (-39.37)	15.10 (-40.88)	13.15	7.22	10.66 (-18.94)	7.04 (-02.49)
3.	Pin Stripe	43.10	26.84	24.03 (-44.25)	17.30 (-35.54)	14.18	8.62	11.31 (-20.24)	7.49 (-13.11)
4.	Medium Stripe	45.36	31.20	26.50 (-41.58)	21.37 (-31.51)	13.40	7.12	8.10 (-39.55)	6.42 (-09.83)
5.	Small Checks	42.16	30.10	24.90 (-40.94)	17.83 (-40.76)	14.21	7.58	10.70 (-24.70)	7.53 (-00.66)
6.	Medium Checks	48.82	33.76	25.90 (-46.95)	20.00 (-40.76)	13.69	6.68	9.37 (-31.56)	6.50 (-02.69)

Note: WC – White Cotton and DDCC-1 – Dharwad Desi Coloured Cotton-1

Figures in parenthesis indicate percentage change over control

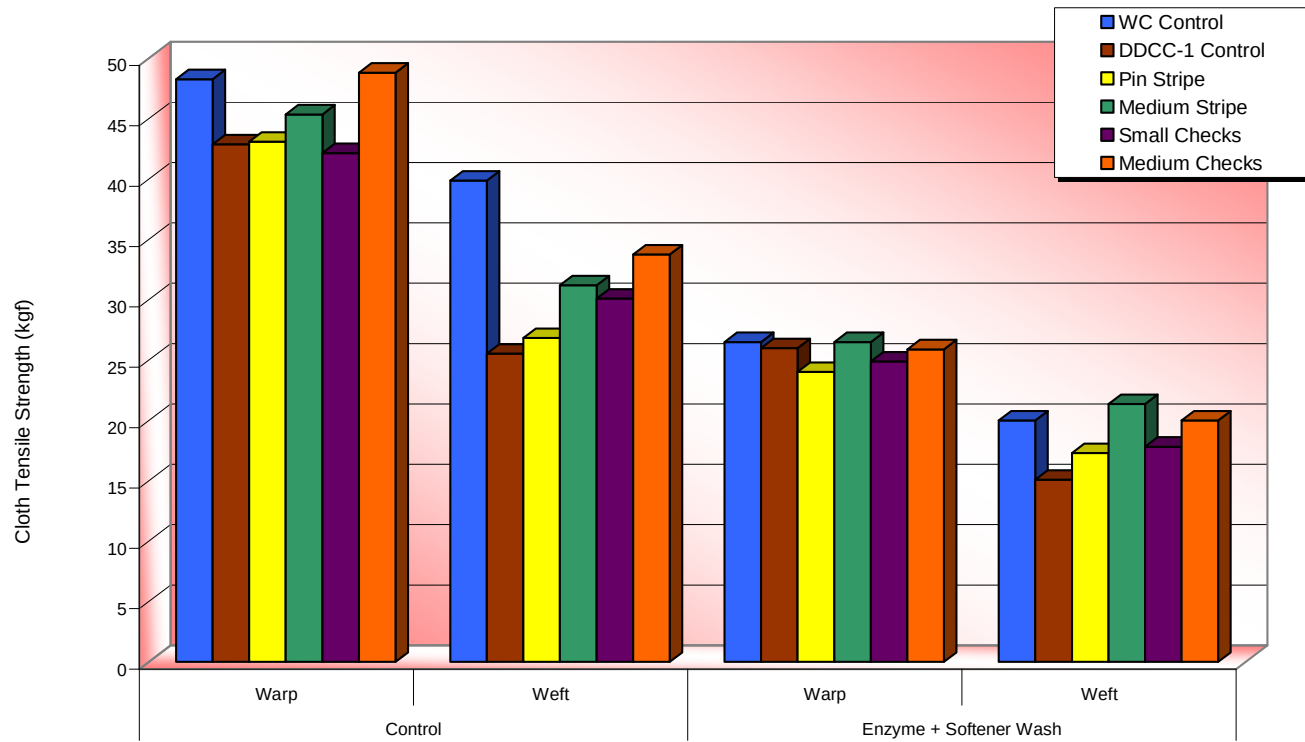


Fig. 7. Cloth Tensile Strength (kgf) of hand woven khadi fabric

Fig. 7. Cloth Tensile Strength (kgf) of hand woven khadi fabric

Table 13. Influence of cloth count, cloth weight, and cloth thickness on cloth tensile strength

Sl. No.	Designer's fabrics	Intercept	X1 Cloth weight	X2 Cloth count	X3 Cloth thickness	X4 Dummy variable	R ²	F-value
1	WC Control	87.15** (26.55)	-0.05 ^{NS} (0.14)	0.06 ^{NS} (0.09)	-12.72 ^{NS} (13.99)	-40.39** (2.30)	0.992**	741.120
2	DDCC-1 Control	57.74** (13.17)	0.36 ^{NS} (0.19)	-0.08** (0.03)	6.52 ^{NS} (7.78)	-30.26** (1.41)	0.988**	497.94
3	Pin Stripe	111.08** (35.64)	-0.15 ^{NS} (0.25)	-0.13 ^{NS} (0.11)	-0.09 ^{NS} (19.74)	-30.00** (2.82)	0.956**	135.961
4	Medium Stripe	143.85** (30.54)	-0.59** (0.26)	-0.09 ^{NS} (0.07)	-8.18 ^{NS} (13.62)	-27.43** (1.87)	0.973**	229.439
5	Small Checks	129.16** (42.87)	-0.45 ^{NS} (0.27)	0.03 ^{NS} (0.13)	-45.80** (18.49)	-29.06** (2.69)	0.962**	158.078
6	Medium Checks	165.22** (42.98)	0.28 ^{NS} (0.31)	-0.36** (0.11)	-19.22 ^{NS} (31.80)	-44.30** (3.21)	0.963**	160.734

Note: *Significant at 5 per cent level, ** Significant at 1 per cent level, NS- Non-significant

Figures in parenthesis indicate standard error

In case of white cotton, the tensile strength was 87.15 per cent before treatment which came down by 40.39 per cent after the treatment. The tensile strength was found to be negatively influenced by cloth weight and cloth thickness and positively influenced by cloth count. However, these parameters failed to exert a significant influence on tensile strength. The variation in independent variables explained 99.2 per cent variation in cloth tensile strength. The R^2 value was found to be significant at 1 per cent level.

The variation in tensile strength was explained to the tune of 99 per cent by the variation in the cloth parameters ($R^2 = 0.988$) in case of DDCC-1. The dummy variable was significant at 1 per cent level. This indicated that the tensile strength has decreased by 30.26 per cent after the treatment. The tensile strength was 57.74 per cent before treatment in DDCC-1. The tensile strength was found to be negatively and significantly associated with cloth count. One unit increase in cloth count would increase the tensile strength by 0.08 per cent. However, cloth thickness and cloth weight are positively associated but fail to exert a significant influence on tensile strength statistically.

In case of pin stripe fabric, the regression model explained 95.6 per cent of variation in the tensile strength due to variation in cloth parameters. The regression model was significant at 1 per cent. Cloth count, cloth weight and cloth thickness were having negative influence. However, these influences were statistically not significant. The tensile strength was found to decrease by 30.00 per cent from 111.08 per cent because of the treatment.

About 97 per cent of variation in tensile strength was found to explain by the variation in independent variables in the case of medium stripe fabrics. The F-value was very high indicating that the regression model was a good fit. The cloth weight was found to negatively and significantly condition the tensile strength. An increase of 1 GSM of cloth weight will decrease 0.59 per cent tensile strength. Cloth thickness and cloth count were found to influence tensile strength negatively. However, these influences were statistically not established. The tensile strength came down by 27.43 per cent due to the treatment.

In small checks, the tensile strength was 129.16 per cent before treatment which came down by 29.06 per cent after the treatment. The tensile strength was found to be negatively influenced by cloth weight and cloth thickness and positively influenced by cloth count. However, cloth weight and cloth count were found to be statistically non-significant in their results. Only cloth thickness was statistically found to be significant at 1 per cent. The increase in cloth thickness by 1 mm would decrease the tensile strength by 45.80 per cent. The variation in independent variables explained 96.2 per cent variation in tensile strength. The R^2 value was found to be significant at 1 per cent level.

In case of medium checks fabric, the regression model explained 96.3 per cent of variation in the tensile strength due to variation in cloth parameters. The regression model was significant at 1 per cent. Only cloth count was found to significantly and negatively condition the tensile strength. One unit increase in cloth count would decrease the tensile strength by 0.36 per cent. Cloth weight was having positive influence while cloth thickness had negative influence. However, these influences were statistically not significant. The tensile strength was found to decrease by 44.30 per cent.

4.3.3.3 Cloth abrasion (cycles) and cloth pilling (ratings) of hand woven *khadi* fabric

Abrasion, an aspect of wear is rubbing away of the component fibres and yarns of the fabric. The abrasive wear of the material depends on the construction of the yarn or fabric. In general fibre breakage has been reported to be the most important mechanism causing abrasion damage in fabrics and abrasion resistance is therefore expected to be related to the structural properties of the fibres. Fabrics get abraded against various material surfaces, pressures and conditions in day today use. Thus, the life of a fabric is dependent on resistance to abrasion. While reading the Table 14, the impact of special finishes on abrasion resistance for the entire designer's fabrics was found to be very good. It is indicated that all the fabric samples before and after treatment are able to withstand more than 10,000 abrasion cycles except for pin stripe which was 9,777 abrasion cycles before treatment. Generally a garment is not discarded because of hole or a tear, but more often because of loss of appearance. Consequently in assessing the durability of the fabric, one has to judge how soon it becomes "shabby" and unacceptable. One of the causes for shabby appearance or texture is pilling.

Pilling is the formation of clusters or balls of entangled fibres that appear on the surface of material as a result of mechanical rubbing. Sometimes foreign materials like dust, dirt and other fibres add to pills making it more prominent than pills of the same fibre, which ultimately affects the appearance of the fabric. Table 14 clearly indicates that there are no pills for the entire fabric samples showing special finishes improved pilling resistance.

4.4 Consumers preference for type of surface embellishment

Present day market is flooded with varieties of attractive and appealing surface embellishments in range of prices, available for all income groups. Consumer obviously has his/her own likings and interests and purchase accordingly. Therefore, the consumer's choice and preference for type of surface embellishment was identified and highlighted in Table 15 and Table 16 respectively.

4.4.1. Choice for surface embellishments by the respondents

Surface embellishments are most suitable on occasional clothing irrespective of age, education, class and gender. It is clear from Table 15 that cent percent of the home scientists have desired embellishments on both the ladies garments whereas 93.33 percent of them preferred on gents wear. Meanwhile, cent percent of the adolescent boys preferred embellishments on gents kurta followed by ladies kurta (96.67 %), ladies top (93.33 %) and gents shirt (79.99 %). While, cent percent of the adolescent girls replied that the embellishments were more suitable for both the ladies wear followed by gents kurta (96.67 %) and gents shirt (73.33 %).

On the whole the collective opinion of Home Scientists, adolescent boys and girls indicated that 98.66 per cent of the total respondents desired surface embellishment on ladies kurta followed by ladies top and gents kurta (each 97.33 %). However, 79.99 per cent of them indicated decoratives can be used on gents shirt.

4.4.2. Preference for type of surface embellishments by the respondents

Embellishments are the driving force for consumers to promote promotion, since the consumers are fashion conscious and always wish to be trendy. Several varieties of decoratives are in vogue that ultimately attracts consumer's attention. But when focused to individual's choice, there will be variation in the likes and dislikes that is ruled according to one's own desire to look decent or fancy. It is evident from Table 16 and Fig. 8 that irrespective of the Home Scientists, adolescent boys and girls, majority of the respondents preferred hand embroidery (88 %, LT & 81.33 %, LK) followed by machine embroidery (81.33 % LT & 80 % LK) and zardosi (Beadwork) (80 %, LT & 80 %, LK) for ladies garments. Least preference was given to ties and bows (30.67 %) on ladies top and belt and buckles (20.00 %) on ladies kurta.

Irrespective of the category, majority of the respondents preferred machine embroidery (62.67 %, GS & 78.67 %, GK) for gents garments followed by hand embroidery (58.67 %, GS & 60 %, GK); and third preference was given to show buttons and glass work (57.33 %) for gents shirt and gents kurta respectively. But, none preferred zardosi and lace work on gents shirt. Very meager per cent of them preferred belts & buckles and ties & bows (05.33 %) for gents kurta.

4.5 Designing and construction of *khadi* outfits with a new concept of detachable garment components

A great variety of garments with wide array of designs are in the market. Consumers always demand for newness, to look special in the designer's outfits. Therefore, today the designer's are spending lots of time and putting efforts to quench the customer's demand by creating trendy outfits in the fashion world.

Hence, an attempt was made to design unique *khadi* outfits for ladies viz., top-cum-kurta and for gents, shirt as well as kurta, constructed by bespoke method with a new concept of detachable garment components. An innovative idea of detachable garment components was introduced as a reviving concept to develop trendy outfits for elite group who always demand change, who can mix and match the detachable garment components with the main garment according to their will and wish.

Table 14. Cloth abrasion (cycles) and cloth pilling (ratings) of hand woven *khadi* fabric

Sl.No.	Designer's Fabrics	Cloth abrasion (cycles)		Cloth pilling (ratings)	
		Control	Enzyme + Softener Wash	Control	Enzyme + Softener Wash
1.	WC Control	Above 10,000	Above 10,000	1	1
2.	DDCC-1 Control	Above 10,000	Above 10,000	1	1
3.	Pin Stripe	9,777	Above 10,000	1	1
4.	Medium Stripe	Above 10,000	Above 10,000	1	1
5.	Small Checks	Above 10,000	Above 10,000	1	1
6.	Medium Checks	Above 10,000	Above 10,000	1	1

Note: WC – White Cotton and DDCC-1 – Dharwad Desi Coloured Cotton-1

Table 15. Choice for surface embellishments by the respondents

	n ₁ =60				n ₂ =120				n ₃ =120				n=300			
	Home Scientists (HS)				Adolescent Boys (AB)				Adolescent Girls (AG)				Total (n ₁ + n ₂ + n ₃)			
	Ladies		Gents		Ladies		Gents		Ladies		Gents		Ladies		Gents	
	LT	LK	GS	GK	LT	LK	GS	GK	LT	LK	GS	GK	LT	LK	GS	GK
Choice for Surface embellishments	60 (100)	60 (100)	56 (93.33)	56 (93.33)	112 (93.33)	116 (96.67)	96 (79.99)	120 (100)	120 (100)	120 (100)	88 (73.33)	116 (96.67)	292 (97.33)	296 (98.66)	240 (79.99)	292 (97.33)

Note: LT- Ladies Top, LK- Ladies Kurta, GS- Gents Shirt, GK- Gents Kurta

Table 16. Preference for type of surface embellishments by the respondents

Sl. No.	Type of surface embellishments	n ₁ =60				n ₂ =120				n ₃ =120				n=300			
		Home Scientists (HS)				Adolescent Boys (AB)				Adolescent Girls (AG)				Total (n ₁ + n ₂ + n ₃)			
		Ladies		Gents		Ladies		Gents		Ladies		Gents		Ladies		Gents	
		LT	LK	GS	GK	LT	LK	GS	GK	LT	LK	GS	GK	LT	LK	GS	GK
1	Applique/ Patch work	44 (73.33)	20 (33.33)	16 (26.67)	16 (26.67)	40 (33.33)	44 (36.67)	32 (26.67)	28 (23.33)	52 (43.33)	68 (56.67)	24 (20.00)	12 (10.00)	136 (45.33)	132 (44.00)	72 (24.00)	56 (18.67)
2	Bead work/ Zardosi	48 (80.00)	36 (60.00)	0 (0.00)	12 (20.00)	88 (73.33)	112 (93.33)	0 (0.00)	20 (16.67)	104 (86.67)	92 (76.67)	0 (0.00)	28 (23.33)	240 (80.00)	240 (80.00)	0 (0.00)	60 (20.00)
3	Belts & Buckles	28 (46.67)	4 (6.67)	16 (26.67)	12 (20.00)	60 (50.00)	20 (16.67)	40 (33.33)	0 (0.00)	56 (46.67)	36 (30.00)	32 (26.67)	4 (03.33)	144 (48.00)	60 (20.00)	88 (29.33)	16 (05.33)
4	Block Printing	40 (66.67)	40 (66.67)	20 (33.33)	24 (40.00)	48 (40.00)	60 (50.00)	8 (06.67)	8 (06.67)	64 (53.33)	48 (40.00)	12 (10.00)	32 (26.67)	152 (50.67)	148 (49.33)	40 (13.33)	64 (21.33)
5	Fringed edges	36 (60.00)	20 (33.33)	04 (6.67)	08 (13.33)	56 (46.67)	48 (40.00)	08 (06.67)	04 (03.33)	52 (43.33)	68 (56.67)	04 (03.33)	16 (13.33)	144 (48.00)	136 (45.33)	16 (05.33)	28 (09.33)
6	Glass work	44 (73.33)	40 (66.67)	0 (0.00)	16 (26.67)	92 (76.67)	100 (83.33)	08 (06.67)	76 (63.33)	84 (70.00)	96 (80.00)	20 (16.67)	80 (66.67)	220 (73.33)	236 (78.67)	28 (09.33)	172 (57.33)
7	Hand embroidery	56 (93.33)	52 (86.67)	36 (60.00)	40 (66.67)	108 (90.00)	104 (86.67)	52 (43.33)	56 (46.67)	100 (83.33)	88 (73.33)	88 (73.33)	84 (70.00)	264 (88.00)	244 (81.33)	176 (58.67)	180 (60.00)
8	Honey comb/ Smocking	32 (53.33)	16 (26.67)	04 (6.67)	08 (13.33)	28 (23.33)	36 (30.00)	04 (03.33)	0 (0.00)	52 (43.33)	48 (40.00)	08 (06.67)	12 (10.00)	112 (37.33)	100 (33.33)	16 (05.33)	20 (06.67)
9	Lace work	36 (60.00)	24 (40.00)	0 (0.00)	08 (13.33)	72 (60.00)	80 (66.67)	0 (0.00)	16 (13.33)	60 (50.00)	88 (73.33)	0 (0.00)	48 (40.00)	168 (56.00)	192 (64.00)	0 (0.00)	72 (24.00)
10	Machine embroidery	52 (86.67)	48 (80.00)	48 (80.00)	48 (80.00)	100 (83.33)	100 (83.33)	60 (50.00)	88 (73.33)	92 (76.67)	92 (76.67)	80 (66.67)	100 (83.33)	244 (81.33)	240 (80.00)	188 (62.67)	236 (78.67)
11	Pin Tucks	40 (66.67)	32 (53.33)	16 (26.67)	08 (13.33)	36 (30.00)	56 (46.67)	08 (06.67)	16 (13.33)	52 (43.33)	60 (50.00)	24 (20.00)	32 (26.67)	128 (42.67)	148 (49.33)	48 (16.00)	56 (18.67)
12	Show buttons	44 (73.33)	44 (73.33)	32 (53.33)	36 (60.00)	76 (63.33)	96 (80.00)	56 (46.67)	80 (66.67)	96 (80.00)	88 (73.33)	84 (70.00)	48 (40.00)	216 (72.00)	228 (76.00)	172 (57.33)	164 (54.67)
13	Tie Dye Techniques	36 (60.00)	40 (66.67)	12 (20.00)	24 (40.00)	56 (46.67)	72 (60.00)	20 (16.67)	04 (03.33)	48 (40.00)	64 (53.33)	08 (06.67)	08 (06.67)	140 (46.67)	176 (58.67)	40 (13.33)	36 (12.00)
14	Ties & Bows	20 (33.33)	08 (13.33)	24 (40.00)	08 (13.33)	32 (26.67)	16 (13.33)	28 (23.33)	12 (10.00)	40 (33.33)	40 (33.33)	36 (30.00)	0 (0.00)	92 (30.67)	64 (21.33)	88 (29.33)	16 (05.33)

Note: LT- Ladies Top, LK- Ladies Kurta, GS- Gents Shirt, GK- Gents Kurta

Multiple responses possible, Figures in parenthesis indicate percentages

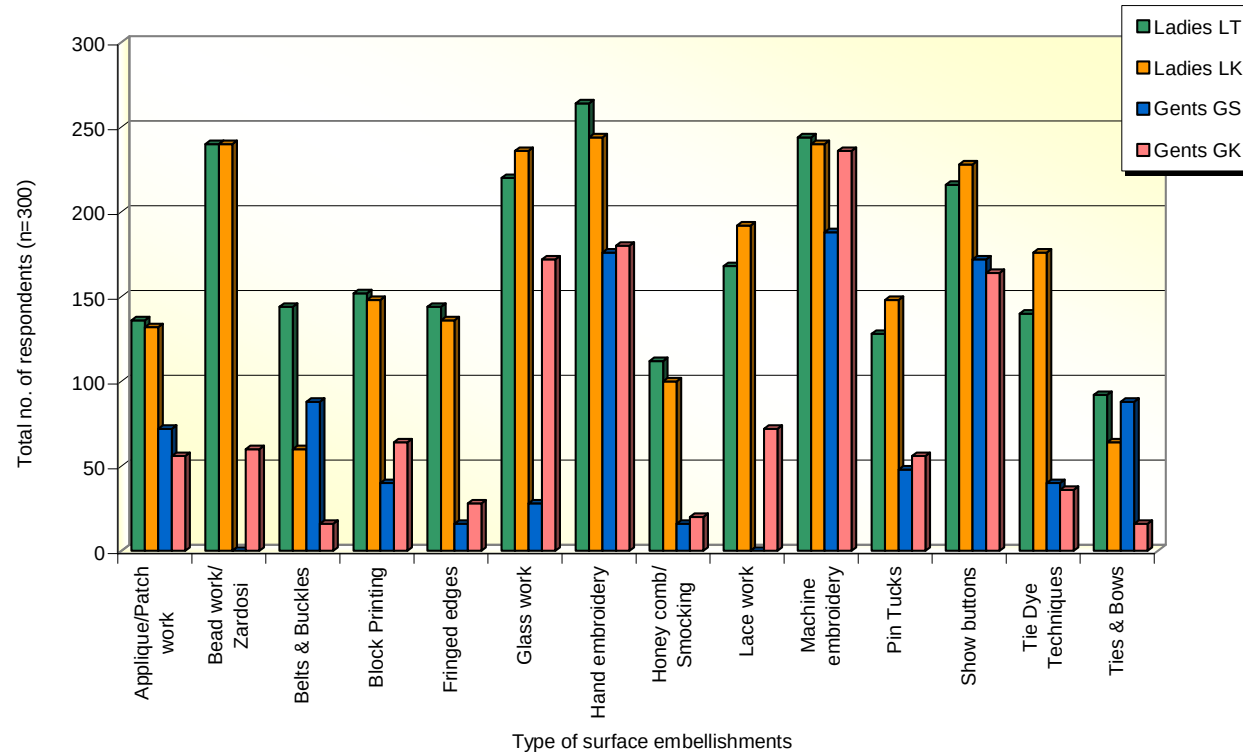


Fig. 8. Preference for type of surface embellishments by the total respondents

Fig. 8. Preference for type of surface embellishments by the total respondents



Before attaching neeklines



After attaching neeklines



Before attaching lower panel



After attaching lower panel

Plate 9. Ladies top with detachable garments components (before and after attachment)

Sl. No.	Particulars	Details
1	Fabric	Plain naturally coloured khadi cotton
2	Fabric colour	Almond brown
3	Sleeve	Plain sleeve
4	Detachable garment components	Necklines Lower panel
5	Fasteners	Necklines – cloth buttons Lower panel – open zipper
6	Thread type and colour	Spade with brown colour
7	Seam type	Open seam with over lock finishing
8	Seam allowance	2.5 cm
9	Stitches per inch (SPI)	12
10	Value addition	1. Hand embroidery (Karnatak karnat – <i>Mandhi</i> stitch) 2. Machine embroidery 3. Zardosi
Note: Value addition is done on only detachable garment components		



Front



Back



Detachable components

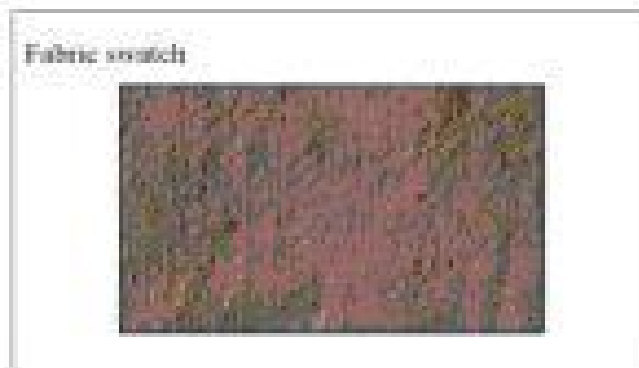


Fig.9. Spec sheet of designer's plain naturally coloured cotton *khadi* ladies top-cum-kurta

Table 17. Cost sheet of Designer's *khadi* ladies top-cum-kurta: NCC control
I. Fabric information

1	Material	Naturally coloured cotton <i>khadi</i> fabric (DDCC-1)
2	Weave	Plain weave
3	Width	28 inches
4	Colour	Almond brown
5	Price	Rs. 100 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A. Fabric for ladies top				
1	Naturally coloured cotton fabric	2.50 mt	100.00	250.00
2	Lining material	0.15 mt	35.00	5.25
	Total (A)			255.25
B1. Fabric for hand embroidered detachables				
1	Naturally coloured cotton fabric	1 mt	100.00	100.00
2	Lining material	0.15 mt	35.00	5.25
	Total (B1)			105.25
B2. Fabric for machine embroidered detachables				
1	Naturally coloured cotton fabric	1 mt	100.00	100.00
2	Lining material	0.15 mt	35.00	5.25
	Total (B2)			105.25
B3. Fabric for zardosi worked detachables				
1	Naturally coloured cotton fabric	1 mt	100.00	100.00
2	Lining material	0.15 mt	35.00	5.25
	Total (B3)			105.25
	Sub total (A+B1+B2+ B3)			571.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for ladies top				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Canvas (mt.)	0.15	70.00	10.50
3	Cloth buttons (Nos.)	15	1.00	15.00
4	Open zippers (Nos.)	2	10.00	20.00
	Total (A)			50.50
B1. Trimming cost for detachables with hand embroidery				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Anchor thread (Nos.)	3	8.00	24.00
	Total (B1)			54.50
B2. Trimming cost for detachables with machine embroidery				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Art silk thread (Nos.)	3	6.00	18.00
	Total (B2)			48.50
B3. Trimming cost for detachables with zardosi worked				
1	Canvas (mt.)	0.15	70.00	10.50

2	Open zipper (Nos.)	2	10.00	20.00
3	Kundan packet (Nos.)	5	20.00	100.00
4	Beads (tola)	2	15.00	30.00
5	Sequins (tola)	2	12.00	24.00
6	Golden zari (Nos.)	1	15.00	15.00
7	Fabric glue (Nos.)	1	10.00	10.00
	Total (B3)			209.50
	Sub total (A+B1+B2+B3)			363.00

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for ladies top	100.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	25.00
B2	Machine embroidered detachables	25.00
B3	Zardosi worked detachables	25.00
	a – Sum of A+B1+B2+B3	175.00
Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	90.00
B2	Machine embroidered detachables	75.00
B3	Zardosi worked detachables	60.00
	b – Sum of B1+B2+B3	225.00
	Sub total (a + b)	400.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for ladies top (II+III+IV)	405.75
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	274.75
B2	Machine embroidered detachables (II+III+IV)	253.75
B3	Zardosi worked detachables (II+III+IV)	399.75
	Sub total	1334.00

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for ladies top	121.73
B	Profit for detachables	
B1	Hand embroidered detachables	82.43
B2	Machine embroidered detachables	76.13
B3	Zardosi worked detachables	119.93
	Sub total	400.2

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of ladies top (V+VI)	527.48
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	350.88
B2	Machine embroidered detachables (V+VI)	329.88
B3	Zardosi worked detachables (V+VI)	519.68
	Grand total	1727.90



a. Hand embroidery



b. Machine embroidery



c. Zardosi

Plate 10. Designer's *khadi* DDCC-1 ladies top-cum-kurtas with surface embellishments

Sl. No.	Particulars	Details
1	Fabric	Pin stripe <i>khadi</i> cotton
2	Fabric colour	Almond brown and white
3	Sleeve	Plain sleeve
4	Detachable garment components	Necklines Lower panel
5	Fasteners	Necklines – cloth buttons Lower panel – open zipper
6	Thread type and colour	Spade with brown colour
7	Seam type	Open seam with over lock finishing
8	Seam allowance	2.5 cm
9	Stitches per inch (SPI)	12
10	Value addition	1. Hand embroidery (Kannada <i>kaneri</i> – <i>Moorli</i> stitch) 2. Machine embroidery 3. Zardosi
Note: Value addition is done on only detachable garment components		



Front



Back



Detachable components

Fabric swatch

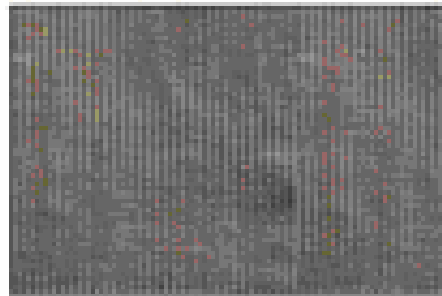


Fig.10. Spec sheet of designer's pin stripe *khadi* ladies top-cum-kurta

Table 18. Cost sheet of Designer's *khadi* ladies top-cum-kurta: Pin stripe**I. Fabric information**

1	Material	Pin stripe fabric
2	Weave	Plain weave with pin stripe
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 110 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A. Fabric for ladies top				
1	Naturally coloured cotton fabric	2.50 mt	110.00	275.00
2	Lining material	0.15 mt	35.00	5.25
	Total (A)			280.25
B1. Fabric for hand embroidered detachables				
1	Naturally coloured cotton fabric	1 mt	110.00	110
2	Lining material	0.15 mt	35.00	5.25
	Total (B1)			115.25
B2. Fabric for machine embroidered detachables				
1	Naturally coloured cotton fabric	1 mt	110.00	110
2	Lining material	0.15 mt	35.00	5.25
	Total (B2)			115.25
B3. Fabric for zardosi worked detachables				
1	Naturally coloured cotton fabric	1 mt	110.00	110
2	Lining material	0.15 mt	35.00	5.25
	Total (B3)			115.25
	Sub total (A+B1+B2+ B3)			626.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for ladies top				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Canvas (mt.)	0.15	70.00	10.50
3	Cloth buttons (Nos.)	15	1.00	15.00
4	Open zippers (Nos.)	2	10.00	20.00
	Total (A)			50.50
B1. Trimming cost for detachables with hand embroidery				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Anchor thread (Nos.)	3	8.00	24.00
	Total (B1)			54.50
B2. Trimming cost for detachables with machine embroidery				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Art silk thread (Nos.)	3	6.00	18.00
	Total (B2)			48.50

B3. Trimming cost for detachables with zardosi worked				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Kundan packet (Nos.)	5	20.00	100.00
4	Beads (tola)	2	15.00	30.00
5	Sequins (tola)	2	12.00	24.00
6	Golden zari (Nos.)	1	15.00	15.00
7	Fabric glue (Nos.)	1	10.00	10.00
	Total (B3)			209.50
	Sub total (A+B1+B2+B3)			363.00

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for ladies top	100.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	25.00
B2	Machine embroidered detachables	25.00
B3	Zardosi worked detachables	25.00
	a – Sum of A+B1+B2+B3	175.00
Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	90.00
B2	Machine embroidered detachables	75.00
B3	Zardosi worked detachables	60.00
	b – Sum of B1+B2+B3	225.00
	Sub total (a + b)	400.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for ladies top (II+III+IV)	430.75
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	284.75
B2	Machine embroidered detachables (II+III+IV)	263.75
B3	Zardosi worked detachables (II+III+IV)	409.75
	Sub total	1389.00

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for ladies top	129.23
B	Profit for detachables	
B1	Hand embroidered detachables	85.43
B2	Machine embroidered detachables	79.13
B3	Zardosi worked detachables	122.93
	Sub total	416.7

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of ladies top (V+VI)	559.98
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	363.88
B2	Machine embroidered detachables (V+VI)	342.88
B3	Zardosi worked detachables (V+VI)	532.68
	Grand total	1799.4



a. Hand embroidery



b. Machine embroidery



c. Zardosi

Plate 11. Designer's *khadi* pin stripe ladies top-cum-kurtas with surface embellishments

Sl. No.	Particulars	Details
1	Fabric	Medium stripe khadi cotton
2	Fabric colour	Almond brown and white
3	Sleeve	Plain sleeve
4	Detachable garment components	Necklines Lower panel
5	Fasteners	Necklines – cloth buttons Lower panel – open zipper
6	Thread type and colour	Spade with brown colour
7	Seam type	Open seam with over lock finishing
8	Seam allowance	2.5 cm
9	Stitches per inch (SPI)	12
10	Value addition	1. Hand embroidery (Karnatak kassati – Alnath stitch) 2. Machine embroidery 3. Zardosi
Note: Value addition is done on only detachable garment components.		



Front



Back



Detachable components

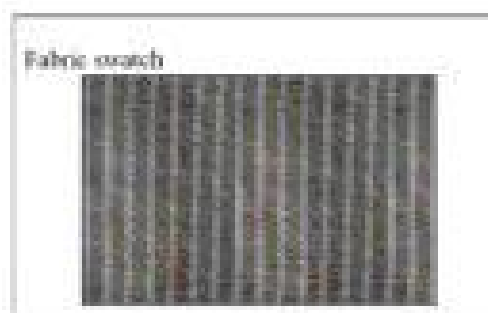


Fig. 11. Spec sheet of designer's medium stripe *khadi* ladies top-cum-kurta

Table 19. Cost sheet of Designer's *khadi* ladies top-cum-kurta: Medium stripe**I. Fabric information**

1	Material	Medium stripe fabric
2	Weave	Plain weave with medium stripe
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 110 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A. Fabric for ladies top				
1	Naturally coloured cotton fabric	2.50 mt	110.00	275.00
2	Lining material	0.15 mt	35.00	5.25
	Total (A)			280.25
B1. Fabric for hand embroidered detachables				
1	Naturally coloured cotton fabric	1 mt	110.00	110
2	Lining material	0.15 mt	35.00	5.25
	Total (B1)			115.25
B2. Fabric for machine embroidered detachables				
1	Naturally coloured cotton fabric	1 mt	110.00	110
2	Lining material	0.15 mt	35.00	5.25
	Total (B2)			115.25
B3. Fabric for zardosi worked detachables				
1	Naturally coloured cotton fabric	1 mt	110.00	110
2	Lining material	0.15 mt	35.00	5.25
	Total (B3)			115.25
	Sub total (A+B1+B2+ B3)			626.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for ladies top				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Canvas (mt.)	0.15	70.00	10.50
3	Cloth buttons (Nos.)	15	1.00	15.00
4	Open zippers (Nos.)	2	10.00	20.00
	Total (A)			50.50
B1. Trimming cost for detachables with hand embroidery				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Anchor thread (Nos.)	3	8.00	24.00
	Total (B1)			54.50
B2. Trimming cost for detachables with machine embroidery				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Art silk thread (Nos.)	3	6.00	18.00
	Total (B2)			48.50

B3. Trimming cost for detachables with zardosi worked				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Kundan packet (Nos.)	5	20.00	100.00
4	Beads (tola)	2	15.00	30.00
5	Sequins (tola)	2	12.00	24.00
6	Golden zari (Nos.)	1	15.00	15.00
7	Fabric glue (Nos.)	1	10.00	10.00
	Total (B3)			209.50
	Sub total (A+B1+B2+B3)			363.00

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for ladies top	100.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	25.00
B2	Machine embroidered detachables	25.00
B3	Zardosi worked detachables	25.00
	a – Sum of A+B1+B2+B3	175.00
Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	90.00
B2	Machine embroidered detachables	75.00
B3	Zardosi worked detachables	60.00
	b – Sum of B1+B2+B3	225.00
	Sub total (a + b)	400.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for ladies top (II+III+IV)	430.75
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	284.75
B2	Machine embroidered detachables (II+III+IV)	263.75
B3	Zardosi worked detachables (II+III+IV)	409.75
	Sub total	1389.00

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for ladies top	129.23
B	Profit for detachables	
B1	Hand embroidered detachables	85.43
B2	Machine embroidered detachables	79.13
B3	Zardosi worked detachables	122.93
	Sub total	416.7

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of ladies top (V+VI)	559.98
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	363.88
B2	Machine embroidered detachables (V+VI)	342.88
B3	Zardosi worked detachables (V+VI)	532.68
	Grand total	1799.4



a. Hand embroidery



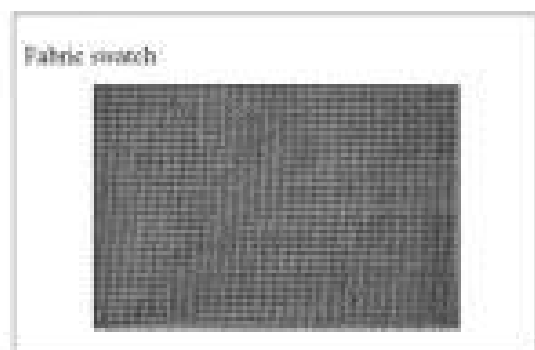
b. Machine embroidery



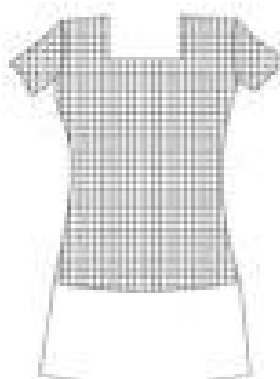
c. Zardosi

Plate 12. Designer's *khadi* medium stripe ladies top-cum-kurtas with surface embellishments

Sl. No.	Particulars	Details
1	Fabric	Small checks <i>khadi</i> cotton
2	Fabric colour	Almond brown and white
3	Sleeve	Plain sleeve
4	Detachable garment components	Necklines Lower panel
5	Fasteners	Necklines – cloth button Lower panel – open zipper
6	Thread type and colour	Spade with brown colour
7	Seam type	Open seam with over lock finishing
8	Seam allowance	2.5 cm
9	Stitches per inch (SPI)	12
10	Value addition	1. Hand embroidery (Kannada <i>kanat</i> – <i>Alrothi</i> stitch) 2. Machine embroidery 3. Zardari
Note: Value addition is done on only detachable garment components		



Front



Back



Detachable components

Fig. 12. Spec sheet of designer's small checks *khadi* ladies top-cum-kurta

Table 20. Cost sheet of Designer's *khadi* ladies top-cum-kurta: Small checks**I. Fabric information**

1	Material	Small checks fabric
2	Weave	Plain weave with small checks
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 120 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A. Fabric for ladies top				
1	Naturally coloured cotton fabric	2.50 mt	120.00	300
2	Lining material	0.15 mt	35.00	5.25
	Total (A)			305.25
B1. Fabric for hand embroidered detachables				
1	Naturally coloured cotton fabric	1 mt	120.00	120
2	Lining material	0.15 mt	35.00	5.25
	Total (B1)			125.25
B2. Fabric for machine embroidered detachables				
1	Naturally coloured cotton fabric	1 mt	120.00	120
2	Lining material	0.15 mt	35.00	5.25
	Total (B2)			125.25
B3. Fabric for zardosi worked detachables				
1	Naturally coloured cotton fabric	1 mt	120.00	120
2	Lining material	0.15 mt	35.00	5.25
	Total (B3)			125.25
	Sub total (A+B1+B2+ B3)			681.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for ladies top				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Canvas (mt.)	0.15	70.00	10.50
3	Cloth buttons (Nos.)	15	1.00	15.00
4	Open zippers (Nos.)	2	10.00	20.00
	Total (A)			50.50
B1. Trimming cost for detachables with hand embroidery				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Anchor thread (Nos.)	3	8.00	24.00
	Total (B1)			54.50
B2. Trimming cost for detachables with machine embroidery				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Art silk thread (Nos.)	3	6.00	18.00
	Total (B2)			48.50

B3. Trimming cost for detachables with zardosi worked				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Kundan packet (Nos.)	5	20.00	100.00
4	Beads (tola)	2	15.00	30.00
5	Sequins (tola)	2	12.00	24.00
6	Golden zari (Nos.)	1	15.00	15.00
7	Fabric glue (Nos.)	1	10.00	10.00
	Total (B3)			209.50
	Sub total (A+B1+B2+B3)			363.00

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for ladies top	100.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	25.00
B2	Machine embroidered detachables	25.00
B3	Zardosi worked detachables	25.00
	a – Sum of A+B1+B2+B3	175.00
Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	90.00
B2	Machine embroidered detachables	75.00
B3	Zardosi worked detachables	60.00
	b – Sum of B1+B2+B3	225.00
	Sub total (a + b)	400.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for ladies top (II+III+IV)	455.75
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	294.75
B2	Machine embroidered detachables (II+III+IV)	273.75
B3	Zardosi worked detachables (II+III+IV)	419.75
	Sub total	1444.00

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for ladies top	136.73
B	Profit for detachables	
B1	Hand embroidered detachables	88.43
B2	Machine embroidered detachables	82.13
B3	Zardosi worked detachables	125.93
	Sub total	433.20

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of ladies top (V+VI)	592.48
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	376.88
B2	Machine embroidered detachables (V+VI)	355.88
B3	Zardosi worked detachables (V+VI)	545.68
	Grand total	1870.90



a. Hand embroidery



b. Machine embroidery



c. Zardosi

Plate 13. Designer's *khadi* small checks ladies top-cum-kurtas with surface embellishments

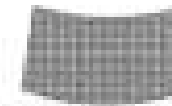
Sl. No.	Particulars	Details
1	Fabric	Medium checks <i>khadi</i> cotton
2	Fabric colour	Almond brown and white
3	Sleeve	Plain sleeve
4	Detachable garment components	Necklines Lower panel
5	Fasteners	Necklines – cloth buttons Lower panel – open zipper
6	Thread type	Spade with brown colour
7	Seam type	Open seam with over lock finishing
8	Seam allowance	2.5 cm
9	Stitches per inch (SPI)	12
10	Value addition	1. Hand embroidery (Kamank, <i>konai</i> – <i>Morchi</i> stitch) 2. Machine embroidery 3. Zardoi
Note: Value addition is done on only detachable garment components		



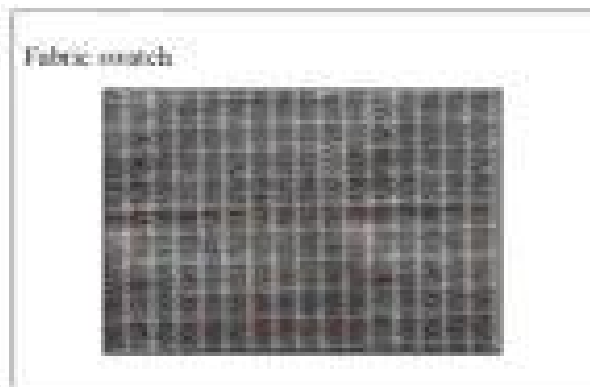
Front



Back



Detachable components



Fabric match

Fig. 13. Spec sheet of designer's medium checks *khadi* ladies top-cum-kurta

Table 21. Cost sheet of Designer's *khadi* ladies top-cum-kurta: Medium checks**I. Fabric information**

1	Material	Medium checks fabric
2	Weave	Plain weave with medium checks
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 120 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A. Fabric for ladies top				
1	Naturally coloured cotton fabric	2.50 mt	120.00	300
2	Lining material	0.15 mt	35.00	5.25
	Total (A)			305.25
B1. Fabric for hand embroidered detachables				
1	Naturally coloured cotton fabric	1 mt	120.00	120
2	Lining material	0.15 mt	35.00	5.25
	Total (B1)			125.25
B2. Fabric for machine embroidered detachables				
1	Naturally coloured cotton fabric	1 mt	120.00	120
2	Lining material	0.15 mt	35.00	5.25
	Total (B2)			125.25
B3. Fabric for zardosi worked detachables				
1	Naturally coloured cotton fabric	1 mt	120.00	120
2	Lining material	0.15 mt	35.00	5.25
	Total (B3)			125.25
	Sub total (A+B1+B2+ B3)			681.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for ladies top				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Canvas (mt.)	0.15	70.00	10.50
3	Cloth buttons (Nos.)	15	1.00	15.00
4	Open zippers (Nos.)	2	10.00	20.00
	Total (A)			50.50
B1. Trimming cost for detachables with hand embroidery				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Anchor thread (Nos.)	3	8.00	24.00
	Total (B1)			54.50
B2. Trimming cost for detachables with machine embroidery				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Art silk thread (Nos.)	3	6.00	18.00
	Total (B2)			48.50

B3. Trimming cost for detachables with zardosi worked				
1	Canvas (mt.)	0.15	70.00	10.50
2	Open zipper (Nos.)	2	10.00	20.00
3	Kundan packet (Nos.)	5	20.00	100.00
4	Beads (tola)	2	15.00	30.00
5	Sequins (tola)	2	12.00	24.00
6	Golden zari (Nos.)	1	15.00	15.00
7	Fabric glue (Nos.)	1	10.00	10.00
	Total (B3)			209.50
	Sub total (A+B1+B2+B3)			363.00

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for ladies top	100.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	25.00
B2	Machine embroidered detachables	25.00
B3	Zardosi worked detachables	25.00
	a – Sum of A+B1+B2+B3	175.00
Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	90.00
B2	Machine embroidered detachables	75.00
B3	Zardosi worked detachables	60.00
	b – Sum of B1+B2+B3	225.00
	Sub total (a + b)	400.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for ladies top (II+III+IV)	455.75
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	294.75
B2	Machine embroidered detachables (II+III+IV)	273.75
B3	Zardosi worked detachables (II+III+IV)	419.75
	Sub total	1444.00

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for ladies top	136.73
B	Profit for detachables	
B1	Hand embroidered detachables	88.43
B2	Machine embroidered detachables	82.13
B3	Zardosi worked detachables	125.93
	Sub total	433.20

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of ladies top (V+VI)	592.48
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	376.88
B2	Machine embroidered detachables (V+VI)	355.88
B3	Zardosi worked detachables (V+VI)	545.68
	Grand total	1870.90



a. Hand embroidery



b. Machine embroidery



c. Zardosi

Plate 14. Designer's *khadi* medium checks ladies top-cum-kurtas with surface embellishments



Before attaching collar



After attaching collar



Before attaching cuff



After attaching cuff



Before attaching buttonstand



After attaching buttonstand

Plate 15. Gents shirt with detachable garments components (before and after attachment)

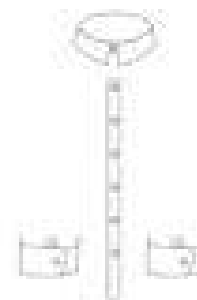
Sl. No.	Particulars	Details
1	Fabric	Plain naturally coloured <i>khadi</i> cotton
2	Fabric colour	Almond brown
3	Collar	Short collar
4	Sleeve	Full sleeves with cuff
5	Detachable garment components	Collar Cuff Button stand
6	Fasteners	Collar - open zipper Cuff - open zipper Button stand - buttons
7	Thread type	Spade
8	Seam type	Open seam with over lock finishing
9	Seam allowance	2.5 cm
10	Stitches per inch (SPI)	12
11	Value addition	1. Hand embroidery (Karnatak <i>loosi</i> - <i>Mugi</i> stitch) 2. Machine embroidery
Note: Value addition is done on only detachable garment components		



Front



Back



Detachable components

Fig 14. Spec sheet of designer's plain naturally coloured cotton *khadi* shirt

Table 22. Cost sheet of Designer's *khadi* gents shirt: NCC control**I. Fabric information**

1	Material	Naturally coloured cotton <i>khadi</i> fabric (DDCC-1)
2	Weave	Plain weave
3	Width	28 inches
4	Colour	Almond brown
5	Price	Rs. 100 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A	Fabric for shirt	3.25 mt	100.00	325.00
B	Fabric for detachables			
B1	Hand embroidered detachables	0.75 mt	100.00	75.00
B2	Machine embroidered detachables	0.75 mt	100.00	75.00
	Sub total (Rs.)			475.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for shirt				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Buttons (Nos.)	8	0.25	2.00
3	Canvas (mt.)	0.50	70.00	35.00
4	Open zipper (Nos.)	3	10.00	30.00
	Total (A)			72.00
B1. Trimming cost for detachables with hand embroidery				
1	Buttons (Nos.)	2	0.25	0.50
2	Canvas (mt.)	0.50	70.00	35.00
3	Open zipper (Nos.)	3	10.00	30.00
4	Anchor thread (Nos.)	2	8.00	16.00
	Total (B1)			81.50
B2. Trimming cost for detachables with machine embroidery				
1	Buttons (Nos.)	2	0.25	0.50
2	Canvas (mt.)	0.50	70.00	35.00
3	Open zipper (Nos.)	3	10.00	30.00
4	Art silk thread (Nos.)	2	6.00	12.00
	Total (B2)			77.50
	Sub total (A+B1+B2)			231.00

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for shirt	150.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	50.00
B2	Machine embroidered detachables	50.00
	a – Sum of A+B1+B2	250.00

Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	50.00
B2	Machine embroidered detachables	40.00
	b – Sum of B1+B2	90.00
	Sub total (a + b)	340.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for shirt (II+III+IV)	547.00
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	256.50
B2	Machine embroidered detachables (II+III+IV)	242.50
	Sub total	1046.00

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for shirt	164.10
B	Profit for detachables	
B1	Hand embroidered detachables	76.95
B2	Machine embroidered detachables	72.75
	Sub total	313.80

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of shirt (V+VI)	711.10
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	333.45
B2	Machine embroidered detachables (V+VI)	315.25
	Grand total	1359.80



a. Hand embroidery



b. Machine embroidery

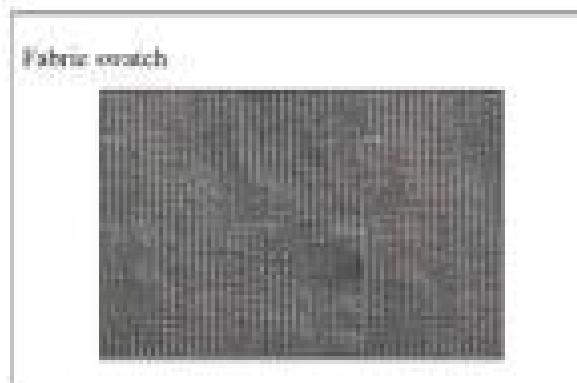
Sl. No.	Particulars	Details
1	Fabric	Pin stripe <i>khadi</i> cotton
2	Fabric colour	Almond brown and white
3	Collar	Shirt collar
4	Sleeve	Full sleeve with cuff
5	Detachable garment components	Collar Cuff Button stand
6	Fasteners	Collar - open zipper Cuff - open zipper Button stand - buttons
7	Thread type	Spade
8	Thread colour	Brown
9	Seam type	Open seam with over lock finishing
10	Seam allowance	2.5 cm
11	Stitches per inch (SPI)	12
12	Value addition	Hand embroidery (Kannada <i>kusti</i> - <i>Murg</i> stitch) Machine embroidery
Note: Value addition is done on only detachable garment components		



Front



Back



Detachable components

Fig. 15. Spec sheet of designer's pin stripe *khadi* shirt

Table 23. Cost sheet of Designer's *khadi* gents shirt: Pin stripe**I. Fabric information**

1	Material	Pin stripe fabric
2	Weave	Plain weave with pin stripes
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 110 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A	Fabric for shirt	3.25	110	357.50
B	Fabric for detachables			
B1	Hand embroidered detachables	0.75	110	82.50
B2	Machine embroidered detachables	0.75	110	82.50
	Sub total (Rs.)			522.50

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for shirt				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Buttons (Nos.)	8	0.25	2.00
3	Canvas (mt.)	0.50	70.00	35.00
4	Open zipper (Nos.)	3	10.00	30.00
	Total (A)			72.00
B1. Trimming cost for detachables with hand embroidery				
1	Buttons (Nos.)	2	0.25	0.50
2	Canvas (mt.)	0.50	70.00	35.00
3	Open zipper (Nos.)	3	10.00	30.00
4	Anchor thread (Nos.)	2	8.00	16.00
	Total (B1)			81.50
B2. Trimming cost for detachables with machine embroidery				
1	Buttons (Nos.)	2	0.25	0.50
2	Canvas (mt.)	0.50	70.00	35.00
3	Open zipper (Nos.)	3	10.00	30.00
4	Art silk thread (Nos.)	2	6.00	12.00
	Total (B2)			77.50
	Sub total (A+B1+B2)			231.00

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for shirt	150.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	50.00
B2	Machine embroidered detachables	50.00
	a – Sum of A+B1+B2	250.00

Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	50.00
B2	Machine embroidered detachables	40.00
	b – Sum of B1+B2	90.00
	Sub total (a + b)	340.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for shirt (II+III+IV)	579.50
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	264.00
B2	Machine embroidered detachables (II+III+IV)	250.00
	Sub total	1093.50

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for shirt	173.85
B	Profit for detachables	
B1	Hand embroidered detachables	79.20
B2	Machine embroidered detachables	75.00
	Sub total	328.05

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of shirt (V+VI)	753.35
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	343.20
B2	Machine embroidered detachables (V+VI)	325.00
	Grand total	1421.55



a. Hand embroidery



b. Machine embroidery

Plate 17. Designer's small stripe *khadi* shirts with surface embellishments

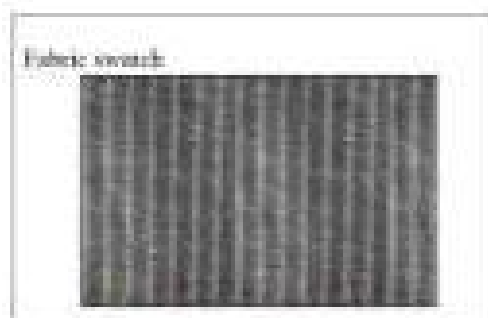
Sl. No.	Particulars	Details
1	Fabric	Medium stripe khadi cotton
2	Fabric colour	Almond brown and white
3	Collar	Short collar
4	Sleeve	Full sleeve with cuff
5	Detachable garment components	Collar Cuff Button stand
6	Fasteners	Collar – open zipper Cuff – open zipper Button stand – buttons
7	Thread type and colour	Spade with brown colour
8	Seam type	Open seam with over lock finishing
9	Seam allowance	2.5 cm
10	Stitches per inch (SPI)	12
11	Value addition	1. Hand embroidery (Karnatak knot – Mergi stitch) 2. Machine embroidery
Note: Value addition is done on only detachable garment components		



Front



Back



Detachable components

Fig. 16. Spec sheet of designer's medium stripe *khadi* shirt

Table 24. Cost sheet of Designer's *khadi* gents shirt: Medium stripe**I. Fabric information**

1	Material	Medium stripe fabric
2	Weave	Plain weave with medium stripes
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 110 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A	Fabric for shirt	3.25	110	357.50
B	Fabric for detachables			
B1	Hand embroidered detachables	0.75	110	82.50
B2	Machine embroidered detachables	0.75	110	82.50
	Sub total (Rs.)			522.50

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for shirt				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Buttons (Nos.)	8	0.25	2.00
3	Canvas (mt.)	0.50	70.00	35.00
4	Open zipper (Nos.)	3	10.00	30.00
	Total (A)			72.00
B1. Trimming cost for detachables with hand embroidery				
1	Buttons (Nos.)	2	0.25	0.50
2	Canvas (mt.)	0.50	70.00	35.00
3	Open zipper (Nos.)	3	10.00	30.00
4	Anchor thread (Nos.)	2	8.00	16.00
	Total (B1)			81.50
B2. Trimming cost for detachables with machine embroidery				
1	Buttons (Nos.)	2	0.25	0.50
2	Canvas (mt.)	0.50	70.00	35.00
3	Open zipper (Nos.)	3	10.00	30.00
4	Art silk thread (Nos.)	2	6.00	12.00
	Total (B2)			77.50
	Sub total (A+B1+B2)			231.00

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for shirt	150.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	50.00
B2	Machine embroidered detachables	50.00

	a – Sum of A+B1+B2	250.00
Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	50.00
B2	Machine embroidered detachables	40.00
	b – Sum of B1+B2	90.00
	Sub total (a + b)	340.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for shirt (II+III+IV)	579.50
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	264.00
B2	Machine embroidered detachables (II+III+IV)	250.00
	Sub total	1093.50

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for shirt	173.85
B	Profit for detachables	
B1	Hand embroidered detachables	79.20
B2	Machine embroidered detachables	75.00
	Sub total	328.05

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of shirt (V+VI)	753.35
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	343.20
B2	Machine embroidered detachables (V+VI)	325.00
	Grand total	1421.55



a. Hand embroidery



b. Machine embroidery

Plate 18. Designer's medium stripe *khadi* shirts with surface embellishments

Sl. No.	Particulars	Details
1	Fabric	Small checks <i>khadi</i> cotton
2	Fabric colour	Almond brown and white
3	Collar	Short collar
4	Sleeve	Full sleeve with cuff
5	Detachable garment components	Collar Cuff Button stand
6	Fasteners	Collar – open zipper Cuff – open zipper Button stand – buttons
7	Thread type	Spade
8	Thread colour	Brown
9	Seam type	Open seam with over lock finishing
10	Seam allowance	2.5 cm
11	Stitches per inch (SPI)	12
12	Value addition	Hand embroidery (Kornatik <i>lassu</i> – <i>Margi</i> stitch) Machine embroidery
Note: Value addition is done on only detachable garment components		

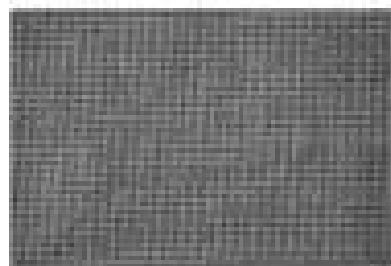


Front



Back

Fabric swatch



Detachable components

Fig. 17. Spec sheet of designer's small checks *khadi* shirt

Table 25. Cost sheet of Designer's *khadi* gents shirt: Small checks**I. Fabric information**

1	Material	Small checks fabric
2	Weave	Plain weave with small checks
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 120 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A	Fabric for shirt	3.25	120	390.00
B	Fabric for detachables			
B1	Hand embroidered detachables	0.75	120	90.00
B2	Machine embroidered detachables	0.75	120	90.00
	Sub total (Rs.)			570.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for shirt				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Buttons (Nos.)	8	0.25	2.00
3	Canvas (mt.)	0.50	70.00	35.00
4	Open zipper (Nos.)	3	10.00	30.00
	Total (A)			72.00
B1. Trimming cost for detachables with hand embroidery				
1	Buttons (Nos.)	2	0.25	0.50
2	Canvas (mt.)	0.50	70.00	35.00
3	Open zipper (Nos.)	3	10.00	30.00
4	Anchor thread (Nos.)	2	8.00	16.00
	Total (B1)			81.50
B2. Trimming cost for detachables with machine embroidery				
1	Buttons (Nos.)	2	0.25	0.50
2	Canvas (mt.)	0.50	70.00	35.00
3	Open zipper (Nos.)	3	10.00	30.00
4	Art silk thread (Nos.)	2	6.00	12.00
	Total (B2)			77.50
	Sub total (A+B1+B2)			231.00

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for shirt	150.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	50.00
B2	Machine embroidered detachables	50.00

	a – Sum of A+B1+B2	250.00
Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	50.00
B2	Machine embroidered detachables	40.00
	b – Sum of B1+B2	90.00
	Sub total (a + b)	340.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for shirt (II+III+IV)	612.00
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	271.50
B2	Machine embroidered detachables (II+III+IV)	257.50
	Sub total	1141.00

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for shirt	183.60
B	Profit for detachables	
B1	Hand embroidered detachables	81.45
B2	Machine embroidered detachables	77.25
	Sub total	342.30

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of shirt (V+VI)	795.60
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	352.95
B2	Machine embroidered detachables (V+VI)	334.75
	Grand total	1483.30



a. Hand embroidery



b. Machine embroidery

Plate 19. Designer's small checks *khadi* shirts with surface embellishments

Sl. No.	Particulars	Details
1	Fabric	Medium checks khadi cotton
2	Fabric colour	Almond brown and white
3	Collar	Shirt collar
4	Sleeve	Full sleeve with cuff
5	Detachable garment components	Collar Cuff Button stand
6	Fasteners	Collar – open zipper Cuff – open zipper Button stand – buttons
7	Thread type	Spade
8	Thread colour	Brown
9	Seam type	Open seam with over lock finishing
10	Seam allowance	2.5 cm
11	Stitches per inch (SPI)	12
12	Value addition	Hand embroidery (Karamuk karai – large stitch) Machine embroidery
Note: Value addition is done on only detachable garment components		

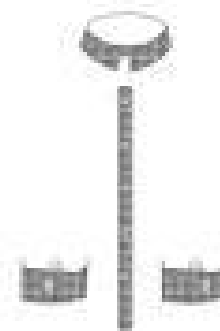
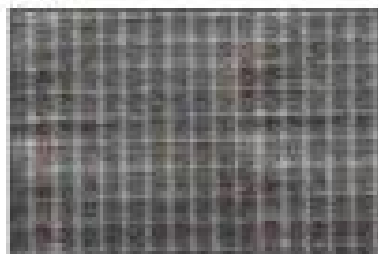


Front



Back

Fabric swatch



Detachable components

Fig. 18. Spec sheet of designer's median cheeks khadi shirt

Table 26. Cost sheet of Designer's *khadi* gents shirt: Medium checks**I. Fabric information**

1	Material	Medium checks fabric
2	Weave	Plain weave with medium checks
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 120 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A	Fabric for shirt	3.25	120	390.00
B	Fabric for detachables			
B1	Hand embroidered detachables	0.75	120	90.00
B2	Machine embroidered detachables	0.75	120	90.00
	Sub total (Rs.)			570.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for shirt				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Buttons (Nos.)	8	0.25	2.00
3	Canvas (mt.)	0.50	70.00	35.00
4	Open zipper (Nos.)	3	10.00	30.00
	Total (A)			72.00
B1. Trimming cost for detachables with hand embroidery				
1	Buttons (Nos.)	2	0.25	0.50
2	Canvas (mt.)	0.50	70.00	35.00
3	Open zipper (Nos.)	3	10.00	30.00
4	Anchor thread (Nos.)	2	8.00	16.00
	Total (B1)			81.50
B2. Trimming cost for detachables with machine embroidery				
1	Buttons (Nos.)	2	0.25	0.50
2	Canvas (mt.)	0.50	70.00	35.00
3	Open zipper (Nos.)	3	10.00	30.00
4	Art silk thread (Nos.)	2	6.00	12.00
	Total (B2)			77.50
	Sub total (A+B1+B2)			231.00

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for shirt	150.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	50.00
B2	Machine embroidered detachables	50.00
	a – Sum of A+B1+B2	250.00

Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	50.00
B2	Machine embroidered detachables	40.00
	b – Sum of B1+B2	90.00
	Sub total (a + b)	340.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for shirt (II+III+IV)	612.00
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	271.50
B2	Machine embroidered detachables (II+III+IV)	257.50
	Sub total	1141.00

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for shirt	183.60
B	Profit for detachables	
B1	Hand embroidered detachables	81.45
B2	Machine embroidered detachables	77.25
	Sub total	342.30

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of shirt (V+VI)	795.60
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	352.95
B2	Machine embroidered detachables (V+VI)	334.75
	Grand total	1483.30



a. Hand embroidery



b. Machine embroidery

Plate 20. Designer's medium checks *khadi* shirts with surface embellishments



Before attaching collar



After attaching collar



Before attaching buttonstand



After attaching buttonstand

Plate 21. Gents kurta with detachable garments components (before and after attachment)

Sl. No.	Particulars	Details
1	Fabric	Plain naturally coloured <i>khadi</i> cotton
2	Fabric colour	Almond brown
3	Collar	Stand collar
4	Sleeve	Three fourth sleeve
5	Detachable garment components	Collar Button stand
6	Fasteners	Collar – open zipper Button stand – buttons
7	Thread type and colour	Spade with brown colour
8	Seam type	Open seam with over lock finishing
9	Seam allowance	2.5 cm
10	Stitches per inch (SPI)	12
11	Value addition	1. Hand embroidery (Kammatik kassai – <i>Almahi</i> stitch) 2. Machine embroidery
Note: Value addition is done on only detachable garment components		



Front



Back



Detachable components

Fig. 19. Spec sheet of designer's plain naturally coloured cotton *khadi* gents kurta

Table 27. Cost sheet of Designer's *khadi* gents kurta: NCC control**I. Fabric information**

1	Material	Naturally coloured cotton <i>khadi</i> fabric (DDCC-1)
2	Weave	Plain weave
3	Width	28 inches
4	Colour	Almond brown
5	Price	Rs. 100 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A	Fabric for kurta	3.50 mt	100.00	350.00
B	Fabric for detachables			
B1	Hand embroidered detachables	0.25 mt	100.00	25.00
B2	Machine embroidered detachables	0.25 mt	100.00	25.00
	Sub total (Rs.)			400.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for kurta				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Buttons (Nos.)	4	0.25	1.00
3	Canvas (mt.)	0.25	70.00	17.50
4	Open zipper (Nos.)	1	10.00	10.00
	Total (A)			33.5
B1. Trimming cost for detachables with hand embroidery				
1	Canvas (mt.)	0.25	70.00	17.50
2	Open zipper (Nos.)	1	10.00	10.00
3	Anchor thread (Nos.)	1	8.00	8.00
	Total (B1)			35.50
B2. Trimming cost for detachables with machine embroidery				
1	Canvas (mt.)	0.25	70.00	17.50
2	Open zipper (Nos.)	1	10.00	10.00
3	Art silk thread (Nos.)	1	6.00	6.00
	Total (B2)			33.50
	Sub total (A+B1+B2)			102.50

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for kurta	125.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	25.00
B2	Machine embroidered detachables	25.00
	a – Sum of A+B1+B2	200.00
Value addition cost		

B	Value addition cost for detachables	
B1	Hand embroidered detachables	40.00
B2	Machine embroidered detachables	30.00
	b – Sum of B1+B2	70.00
	Sub total (a + b)	270.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for kurta (II+III+IV)	508.50
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	125.50
B2	Machine embroidered detachables (II+III+IV)	113.50
	Sub total	747.50

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for kurta	152.55
B	Profit for detachables	
B1	Hand embroidered detachables	37.65
B2	Machine embroidered detachables	34.05
	Sub total	224.25

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of kurta (V+VI)	661.05
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	163.15
B2	Machine embroidered detachables (V+VI)	147.55
	Grand total	971.75



a. Hand embroidery



b. Machine embroidery

Plate 22. Designer's DDCC-1 *khadi* kurta with surface embellishments

Sl. No.	Particulars	Details
1	Fabric	Pin stripe <i>khadi</i> cotton
2	Fabric colour	Almond brown and white
3	Collar	Stand collar
4	Sleeve	Three fourth sleeve
5	Detachable garment components	Collar Button stand
6	Fasteners	Collar – open zipper Button stand – buttons
7	Thread type and colour	Spade with brown colour
8	Seam type	Open seam with over lock finishing
9	Seam allowance	2.5 cm
10	Stitches per inch (SPI)	12
11	Value addition	1. Hand embroidery (Karnatak <i>kasari</i> – <i>Mishki</i> stitch) 2. Machine embroidery
Note: Value addition is done on only detachable garment components.		



Front



Back



Detachable components

Fabric swatch



Fig. 20. Spec sheet of designer's pin stripe *khadi* gents kurta

Table 28. Cost sheet of Designer's *khadi* gents kurta: Pin stripe**I. Fabric information**

1	Material	Pin stripe fabric
2	Weave	Plain weave with pin stripes
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 110 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A	Fabric for kurta	3.50 mt	110.00	385.00
B	Fabric for detachables			
B1	Hand embroidered detachables	0.25 mt	110.00	27.50
B2	Machine embroidered detachables	0.25 mt	110.00	27.50
	Sub total (Rs.)			440.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for kurta				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Buttons (Nos.)	4	0.25	1.00
3	Canvas (mt.)	0.25	70.00	17.50
4	Open zipper (Nos.)	1	10.00	10.00
	Total (A)			33.50
B1. Trimming cost for detachables with hand embroidery				
1	Canvas (mt.)	0.25	70.00	17.50
2	Open zipper (Nos.)	1	10.00	10.00
3	Anchor thread (Nos.)	1	8.00	8.00
	Total (B1)			35.50
B2. Trimming cost for detachables with machine embroidery				
1	Canvas (mt.)	0.25	70.00	17.50
2	Open zipper (Nos.)	1	10.00	10.00
3	Art silk thread (Nos.)	1	6.00	6.00
	Total (B2)			33.50
	Sub total (A+B1+B2)			102.50

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for kurta	125.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	25.00
B2	Machine embroidered detachables	25.00
	a – Sum of A+B1+B2	200.00
Value addition cost		

B	Value addition cost for detachables	
B1	Hand embroidered detachables	40.00
B2	Machine embroidered detachables	30.00
	b – Sum of B1+B2	70.00
	Sub total (a + b)	270.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for kurta (II+III+IV)	543.50
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	128.00
B2	Machine embroidered detachables (II+III+IV)	116.00
	Sub total	787.50

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for kurta	163.05
B	Profit for detachables	
B1	Hand embroidered detachables	38.40
B2	Machine embroidered detachables	34.80
	Sub total	236.25

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of kurta (V+VI)	706.55
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	166.40
B2	Machine embroidered detachables (V+VI)	150.80
	Grand total	1023.75



a. Hand embroidery



b. Machine embroidery

Plate 23. Designer's small stripe *khadi* kurta with surface embellishments

Sl. No.	Particulars	Details
1	Fabric	Medium stripe khadi cotton
2	Fabric colour	Almond brown and white
3	Collar	Stand collar
4	Sleeve	Three fourth sleeve
5	Detachable garment components	Collar Button stand
6	Fasteners	Collar - open zipper Button stand - buttons
7	Thread type and colour	Spade with brown colour
8	Seam type	Open seam with over lock finishing
9	Seam allowance	2.5 cm
10	Stitches per inch (SPI)	12
11	Value addition	1. Hand embroidery (Karnatak kassal - Alavali stitch) 2. Machine embroidery
Note: Value addition is done on only detachable garment components		



Front



Back



Detachable components

Fabric swatch

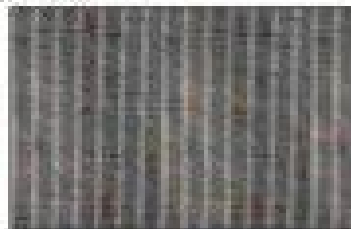


Fig 21. Spec sheet of designer's medium stripe *khadi* gents kurta

Table 29. Cost sheet of Designer's *khadi* gents kurta: Medium stripe**I. Fabric information**

1	Material	Medium stripe fabric
2	Weave	Plain weave with medium stripes
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 110 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A	Fabric for kurta	3.50 mt	110.00	385.00
B	Fabric for detachables			
B1	Hand embroidered detachables	0.25 mt	110.00	27.50
B2	Machine embroidered detachables	0.25 mt	110.00	27.50
	Sub total (Rs.)			440.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for kurta				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Buttons (Nos.)	4	0.25	1.00
3	Canvas (mt.)	0.25	70.00	17.50
4	Open zipper (Nos.)	1	10.00	10.00
	Total (A)			33.50
B1. Trimming cost for detachables with hand embroidery				
1	Canvas (mt.)	0.25	70.00	17.50
2	Open zipper (Nos.)	1	10.00	10.00
3	Anchor thread (Nos.)	1	8.00	8.00
	Total (B1)			35.50
B2. Trimming cost for detachables with machine embroidery				
1	Canvas (mt.)	0.25	70.00	17.50
2	Open zipper (Nos.)	1	10.00	10.00
3	Art silk thread (Nos.)	1	6.00	6.00
	Total (B2)			33.50
	Sub total (A+B1+B2)			102.50

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for kurta	125.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	25.00
B2	Machine embroidered detachables	25.00
	a – Sum of A+B1+B2	200.00
Value addition cost		
B	Value addition cost for detachables	

B1	Hand embroidered detachables	40.00
B2	Machine embroidered detachables	30.00
	b – Sum of B1+B2	70.00
	Sub total (a + b)	270.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for kurta (II+III+IV)	543.50
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	128.00
B2	Machine embroidered detachables (II+III+IV)	116.00
	Sub total	787.50

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for kurta	163.05
B	Profit for detachables	
B1	Hand embroidered detachables	38.40
B2	Machine embroidered detachables	34.80
	Sub total	236.25

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of kurta (V+VI)	706.55
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	166.40
B2	Machine embroidered detachables (V+VI)	150.80
	Grand total	1023.75



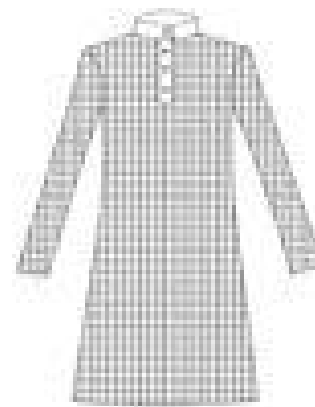
a. Hand embroidery



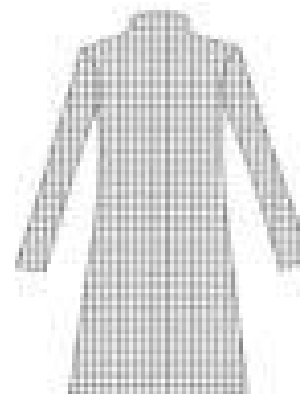
b. Machine embroidery

Plate 24. Designer's medium stripe *khadi* kurta with surface embellishments

Sl. No.	Particulars	Details
1	Fabric	Small checks <i>khadi</i> cotton
2	Fabric colour	Almond brown and white
3	Collar	Stand collar
4	Sleeve	Three fourth sleeve
5	Detachable garment components	Collar Button stand
6	Fasteners	Collar - open zipper Button stand - buttons
7	Thread type and colour	Spade with brown colour
8	Seam type	Open seam with over lock finishing
9	Seam allowance	2.5 cm
10	Stitches per inch (SPI)	12
11	Value addition	1. Hand embroidery (Karnatak <i>kassat</i> - <i>Alenby</i> stitch) 2. Machine embroidery
Note: Value addition is done on only detachable garment components		



Front



Back



Detachable components

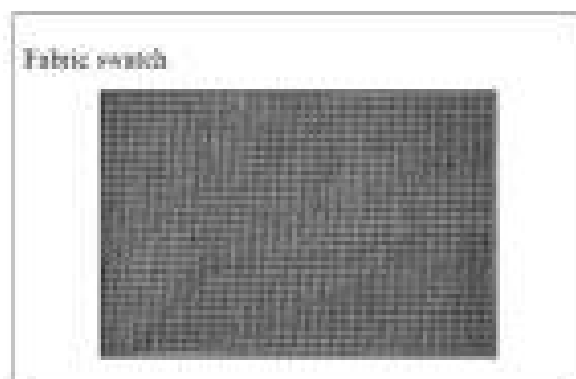


Fig. 22. Spec sheet of designer's small checks *khadi* gents kurta

Table 30. Cost sheet of Designer's *khadi* gents kurta: Small checks**I. Fabric information**

1	Material	Small checks fabric
2	Weave	Plain weave with small checks
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 120 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A	Fabric for kurta	3.50 mt	120.00	420.00
B	Fabric for detachables			
B1	Hand embroidered detachables	0.25 mt	120.00	30.00
B2	Machine embroidered detachables	0.25 mt	120.00	30.00
	Sub total (Rs.)			480.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for kurta				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Buttons (Nos.)	4	0.25	1.00
3	Canvas (mt.)	0.25	70.00	17.50
4	Open zipper (Nos.)	1	10.00	10.00
	Total (A)			33.50
B1. Trimming cost for detachables with hand embroidery				
1	Canvas (mt.)	0.25	70.00	17.50
2	Open zipper (Nos.)	1	10.00	10.00
3	Anchor thread (Nos.)	1	8.00	8.00
	Total (B1)			35.50
B2. Trimming cost for detachables with machine embroidery				
1	Canvas (mt.)	0.25	70.00	17.50
2	Open zipper (Nos.)	1	10.00	10.00
3	Art silk thread (Nos.)	1	6.00	6.00
	Total (B2)			33.50
	Sub total (A+B1+B2)			102.50

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for kurta	125.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	25.00
B2	Machine embroidered detachables	25.00
	a – Sum of A+B1+B2	200.00

Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	40.00
B2	Machine embroidered detachables	30.00
	b – Sum of B1+B2	70.00
	Sub total (a + b)	270.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for kurta (II+III+IV)	578.50
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	130.50
B2	Machine embroidered detachables (II+III+IV)	118.50
	Sub total	827.50

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for kurta	173.55
B	Profit for detachables	
B1	Hand embroidered detachables	39.15
B2	Machine embroidered detachables	35.55
	Sub total	248.25

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of kurta (V+VI)	752.05
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	169.65
B2	Machine embroidered detachables (V+VI)	154.05
	Grand total	1075.75



a. Hand embroidery



b. Machine embroidery

Plate 25. Designer's small checks *khadi* kurta with surface embellishments

Sl. No.	Particulars	Details
1	Fabric	Medium checks <i>khadi</i> cotton
2	Fabric colour	Almond brown and white
3	Collar	Stand collar
4	Sleeve	Three fourth sleeve
5	Detachable garment components	Collar Button stand
6	Fasteners	Collar - open zipper Button stand - buttons
7	Thread type	Spade
8	Seam type	Open seam with over lock finishing
9	Seam allowance	2.5 cm
10	Stitches per inch (SPI)	12
11	Value addition	1. Hand embroidery (Karnatak <i>khusti</i> - <i>Mendi</i> stitch) 2. Machine embroidery
Note: Value addition is done on only detachable garment components		



Front



Back



Detachable components

Fabric swatch

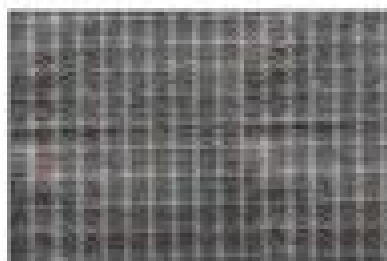


Fig. 23. Spec sheet of designer's medium checks *khadi* gents kurta

Table 31. Cost sheet of Designer's *khadi* gents kurta: Medium checks**I. Fabric information**

1	Material	Medium checks fabric
2	Weave	Plain weave with medium checks
3	Width	28 inches
4	Colour	Almond brown and white
5	Price	Rs. 120 / meter including charges of softener + enzyme finish

II. Material cost

Sl. No.	Particulars	Quantity (metre)	Price (Rs.)	Total amount (Rs.)
A	Fabric for kurta	3.50 mt	120.00	420.00
B	Fabric for detachables			
B1	Hand embroidered detachables	0.25 mt	120.00	30.00
B2	Machine embroidered detachables	0.25 mt	120.00	30.00
	Sub total (Rs.)			480.00

III. Trimming cost

Sl. No.	Particulars	Quantity	Price (Rs.)	Total amount (Rs.)
A. Trimming cost for kurta				
1	Sewing thread (Nos.)	1	5.00	5.00
2	Buttons (Nos.)	4	0.25	1.00
3	Canvas (mt.)	0.25	70.00	17.50
4	Open zipper (Nos.)	1	10.00	10.00
	Total (A)			33.50
B1. Trimming cost for detachables with hand embroidery				
1	Canvas (mt.)	0.25	70.00	17.50
2	Open zipper (Nos.)	1	10.00	10.00
3	Anchor thread (Nos.)	1	8.00	8.00
	Total (B1)			35.50
B2. Trimming cost for detachables with machine embroidery				
1	Canvas (mt.)	0.25	70.00	17.50
2	Open zipper (Nos.)	1	10.00	10.00
3	Art silk thread (Nos.)	1	6.00	6.00
	Total (B2)			33.50
	Sub total (A+B1+B2)			102.50

IV. Labour cost

Sl. No.	Particulars	Total amount (Rs.)
Constructional cost		
A	Constructional cost for kurta	125.00
B	Constructional cost for detachables	
B1	Hand embroidered detachables	25.00
B2	Machine embroidered detachables	25.00

	a – Sum of A+B1+B2	200.00
Value addition cost		
B	Value addition cost for detachables	
B1	Hand embroidered detachables	40.00
B2	Machine embroidered detachables	30.00
	b – Sum of B1+B2	70.00
	Sub total (a + b)	270.00

V. Production charges

Sl. No.	Particulars	Production charges (Rs.)
A	Production cost for kurta (II+III+IV)	578.50
B	Production cost for detachables	
B1	Hand embroidered detachables (II+III+IV)	130.50
B2	Machine embroidered detachables (II+III+IV)	118.50
	Sub total	827.50

VI. Expected profit (30%)

Sl. No.	Particulars	Expected profit (Rs.)
A	Profit for kurta	173.55
B	Profit for detachables	
B1	Hand embroidered detachables	39.15
B2	Machine embroidered detachables	35.55
	Sub total	248.25

VII. Selling price

Sl. No.	Particulars	Selling price (Rs.)
A	Selling Price of kurta (V+VI)	752.05
B	Selling Price of detachables	
B1	Hand embroidered detachables (V+VI)	169.65
B2	Machine embroidered detachables (V+VI)	154.05
	Grand total	1075.75



a. Hand embroidery



b. Machine embroidery

Plate 26. Designer's medium checks *khadi* kurta with surface embellishments

These detachable garment components are structural units, embellished with different decoratives which, can be used to create a sense of contrast or harmony in the outfit. Elements of art such as line, shape, colour, texture, space, form, size and principles of design such as harmony, unity, emphasis, balance and rhythm were applied while designing the embellishments on the outfits to attract the consumers.

The ladies top is the base garment on which two detachable garment components are designed; one being the lower panel to add length to the top and second being the necklines, each been embellished with three varieties of decorations viz., hand, machine and zardosi embroideries which can attached according to individual's likes, interest, fashion and occasion. The fastener used for attaching lower panel is open zipper and for necklines is cloth buttons. Plate 9 depicts the picture of ladies top with and without detachable garment components i.e before and after their attachment. The regular ladies top can be worn on jeans pant or skirts before attaching detachable garment components. On attaching the detachable components, it gives an essence of trendy outfit which will be occasional wear with the title top-cum-kurta and can be worn on jeans pant, salwars or any other leg wears. Fig. 9 – 13 illustrates the spec sheet; Table 17 – 21 shows the cost sheet and Plate 10 - 14 presents the ladies top-cum-kurta with hand embroidery, machine embroidery and zardosi on plain naturally coloured cotton, pin stripe, medium stripe, small checks and medium checks fabrics.

The researcher has put her efforts in designing two gents outfits viz., gents shirt and kurta with a reviving concept of detachable garment components. The normal gents shirt is a regular formal wear which is usually worn on pants. Further three detachable garment components are designed such as collar, cuffs and button stand; where the collar and the cuffs are fastened with open zippers and the button stand with matching buttons. Plate 15 depicts the picture of gents shirt with and without detachable garment components i.e before and after their attachment. Then embellishment was done on each component with hand and machine embroidery, which were attached to the regular wear shirt to make it occasional attire. Fig. 14– 18 illustrates the spec sheet; Table 22-26 shows the cost sheet and Plate 16 - 20 presents the gents shirt with hand embroidery and machine embroidery on plain naturally coloured cotton, pin stripe, medium stripe, small checks and medium checks fabrics.

Gents kurta is simple attire, worn on jeans, pyjamas, dhotis or other similar outfits. Two detachable garment components viz., stand collar and button stand are designed and attached by using open zipper and buttons respectively. Plate 21 depicts the picture of gents kurta with and without detachable garment components i.e before and after their attachment. These components are embellished with hand and machine embroidery to form occasional wear. Fig. 19– 23 illustrates the spec sheet; Table 27-31 shows the cost sheet and Plate 22 - 26 presents the gents shirt with hand embroidery and machine embroidery on plain naturally coloured cotton, pin stripe, medium stripe, small checks and medium checks fabrics.

4.6 Designing and embellishing the detachable garment components

Surface embellishments in one or the other form are obviously used on almost all the attires to add charm, to attract customers and to increase the profit margin. Decoratives on the designer's wear may be light, milder, moderate, heavy and gorgeous. Consumers show their penchant very distinctly due to unique choice and interest of their own. Hand embroidery, machine embroidery, smocking, block printing, lace work, tie dye so on aptly can be used on the regular wear or casual wear garments. Further heavy work using beads, kundan, zardosi, and glasses become a focal point of attraction on the occasional or party wears.

Keeping these points in view, the designs were developed for embellishing the attire keeping in view the concept of traditionality with a contemporary touch. The traditional motifs selected comprised of peacock (mayuri), creepers, flowers which are in vogue and trendy. The placement of the motifs and patterns was planned according to principles of design as well as the dimensions of the detachable. The different embellishment designs applied on the detachable garment components of ladies top are shown in Fig 24; and designs on detachable components of gents shirt and gents kurta in Fig. 25.

Further, the researcher made a visionary inclination towards introducing surface embellishments on all five types of NCC *khadi* fabrics viz., DDCC-1, pin stripe, medium stripe, small checks and medium checks which are constructed into attractive ladies top-cum-kurta, gents shirt and kurta with detachable garment components.

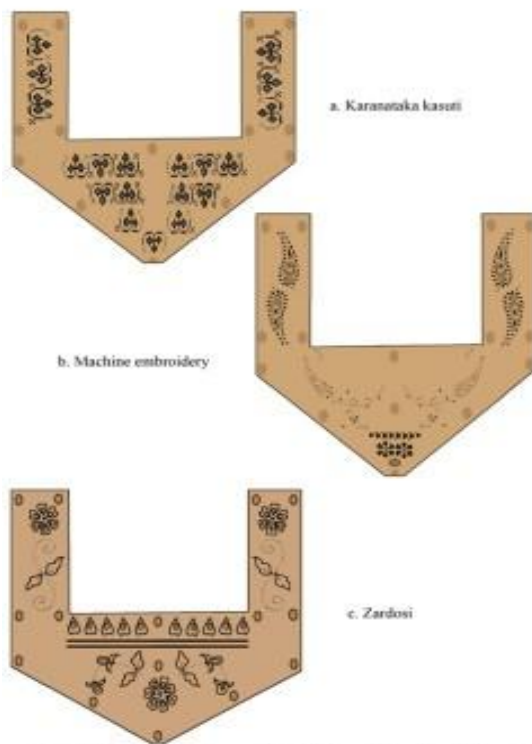


Fig. 24. Embellishments on detachable necklines for ladies top

Fig. 24. Embellishments on detachable necklines for ladies top



Fig. 24. (Contd.....) Embellishments on detachable necklines for ladies top

Fig. 24. (Contd...) Embellishments on detachable necklines for ladies top

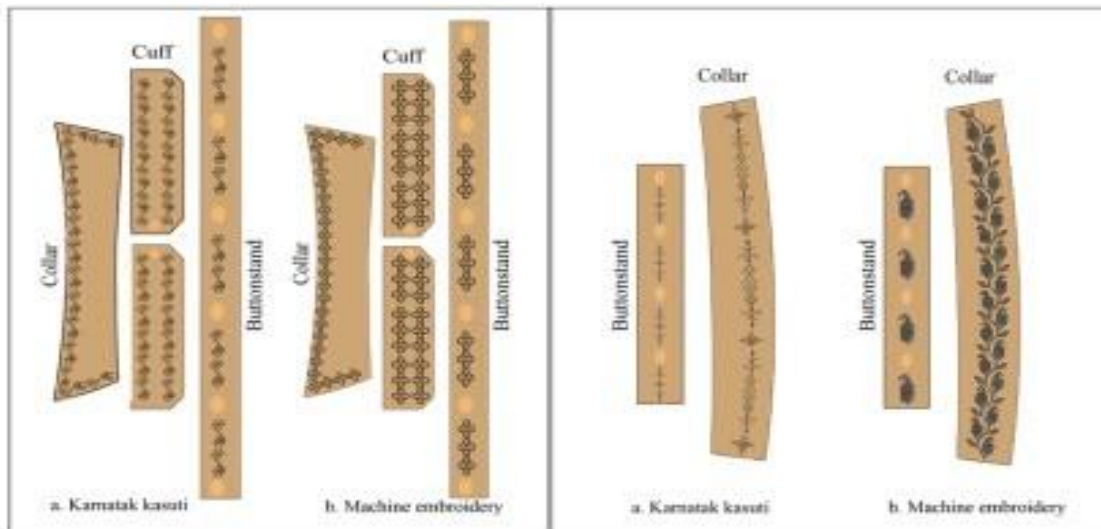


Fig. 25. Embellishments on detachable components for gents shirt and kurta

Fig.25. Embellishments on detachable necklines for gents shirt and kurta

The opinion of the Home Scientists, adolescent girls and boys about preference for type of surface embellishments was determined by conducting survey and the results revealed that hand embroidery, machine embroidery and zardosi were most suitable for ladies top-cum-kurta whereas hand and machine embroidery on the gents shirt and kurta.

Plate 27 – 30 depicts detachable garment components of ladies top-cum-kurta, gents shirt and gents kurta with different surface embellishments on 5 types of designer's *khadi* fabrics.

This mix-n-match concept is designed not with embellishments but also with the fabrics. Five designers NCC *khadi* fabrics are used to construct the ladies and gents apparel. So, mix-n-match can be done among the fabrics viz., apparel made with NCC control can be taken as base garment on which pin stripe embellished detachable components can be attached or vice versa. Similarly pin/medium stripe apparel as base on which small/medium checks embellished detachable components, small/medium checked apparel with NCC control embellished detachable components etc. can be used. These are only the possibilities which are enumerated by the researcher but it totally depends upon the customer's creativity in doing it and their mood, occasion and interest. Mix-n-match concept with fabrics is clearly depicting in the illustrations in Plate 31.

4.7 Consumers' acceptance for designer's *khadi* apparel

Today's eco-friendly consumers have several choices while picking cotton clothing. But, these cottons are grown with harmful chemicals that pollute the environment. Due to pollution, consumer awareness and about eco-friendly concept revitalization of old techniques, they are opening their minds towards organically grown cotton, naturally coloured cotton and recycled cotton products. These may cost a little extra, but by supporting eco-friendly cotton industry, as consumers were protect the future planet too. This eco-friendly concept has also flooded in the field of fashion industry inducing every fashion designer or research scholar to focus on eco-fashion. Traditional *khadi* has also found its place in eco-fashion. *Khadi* is a symbol of self-reliance and non-violence. *Khadi* enables one to carry the message of swadeshi and swaraj to the people and to establish connection between the rural and urban. Hence, the researcher has made efforts to blend these two concepts by producing variegated NCC *khadi* fabrics and beautifully designed and constructed designer's ladies and gents wear with detachable garment components and embellished them with decoratives.

4.7.1 Consumers' choice for naturally colour cotton

Furthermore, consumers' awareness, fibre and fabric characteristics, inherent features, aesthetic appearance were assessed and depicted under the following subheadings:

4.7.1.1 Respondents' awareness about naturally colour cotton

The use of cotton dates back to the Egyptians some 4,500 year ago. For thousands of years, cotton, grown using natural methods, formed the primary source of textiles. Today, cotton production is far from natural. Most of the cotton garments sold today are made from cotton grown with chemical pesticides, bleached and then coloured with chemical dyes containing toxic heavy metals. About a third of a pound of chemicals are used to make one adult T-shirt; two-thirds of a pound of chemicals can go into a pair of jeans. Hence an eco-friendly solution to this is the use of naturally coloured cotton garments. Further, there is no bleaching or harmful dyestuff involved in manufacturing and no waste water is produced. Coloured cotton is naturally pest and disease tolerant, making it easier to grow organically. Coloured cotton is suitable for chemically sensitive people. Hence it was found necessary to know the consumer's awareness.

It is clear from the Table 32 that about 93.33 per cent of Home Scientists so also 90.00 per cent and 73.33 cent of adolescent boys and adolescent girls respectively are aware of naturally coloured cotton. Irrespective of the categories of respondents nearly 84 per cent of them are aware about the existence and application of naturally coloured cotton.

4.7.1.2 Respondents' outlook about traits of naturally colour cotton

In 1982, an entomologist Sally Fox reintroduced naturally colored cotton which eliminated the need for dyeing. Cottons of different colors have always existed in nature. Like our eyes or hair, cotton is genetically encoded with colors ranging from brown to tan. Native peoples have used these wild cottons for weaving and hand spinning for centuries. Most of the consumers know that naturally coloured cotton due to dyeing which is not so. Obviously it was essential to find out how actually the consumers perceive naturally coloured cotton.

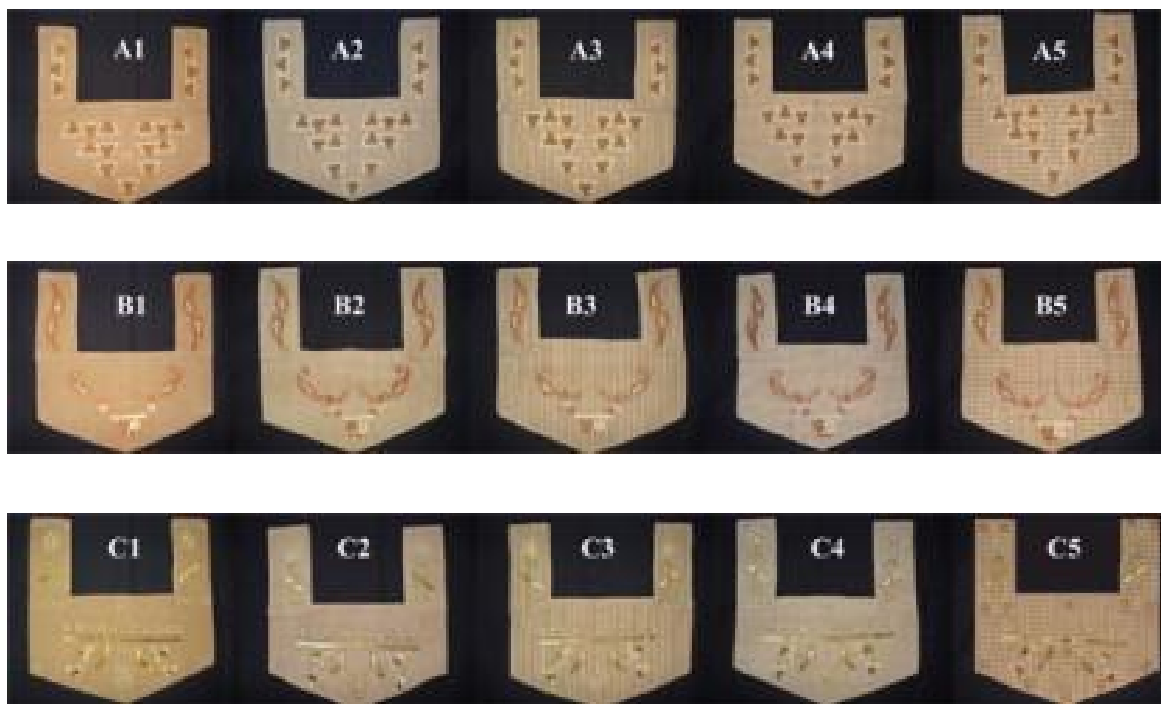


Plate 27. Detachable necklines with hand embroidery (A1-A5), machine embroidery (B1-B5) and zardosi (C1-C5) on 5 types of Designer's *khadi* fabrics



Plate 28. Detachable lower panels with hand embroidery (A1-A5), machine embroidery (B1-B5) and zardosi (C1-C5) on 5 types of Designer's *khadi* fabrics

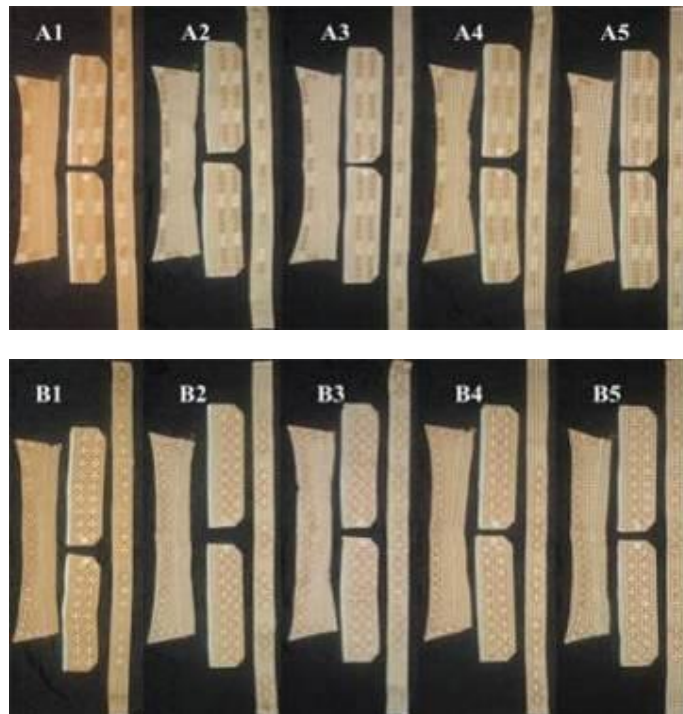


Plate 29. Detachable collar, cuff and button stand of gents shirt with hand embroidery (A1-A5) and machine embroidery (B1-B5) on 5 types of Designer's *khadi* fabrics

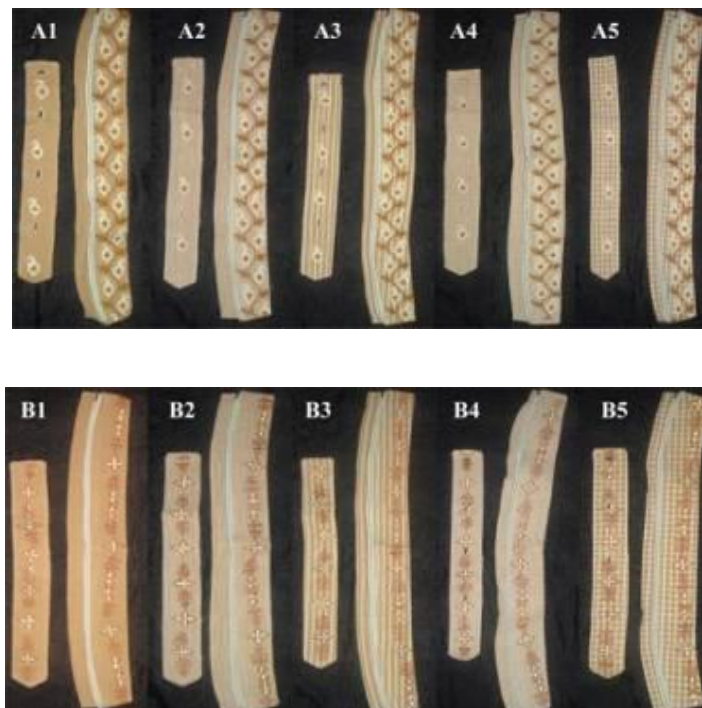


Plate 30. Detachable button stand and cuff of gents kurta with hand embroidery (A1-A5) and machine embroidery (B1-B5) on 5 types of Designer's *khadi* fabrics



Base garment : DDCC-1
Detachable components : Pin stripe



Base garment : DDCC-1
Detachable components : Medium checks



Base garment : Medium checks
Detachable components : DDCC-1



Base garment : DDCC-1
Detachable components : Small checks

Plate 31. Mix and match concept with different base garments and detachable components

Table 32. Respondents' awareness about naturally colour cotton

	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
	Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
	Yes	No	Yes	No	Yes	No	Yes	No
Awareness	56 (93.33)	04 (06.67)	88 (73.33)	32 (26.67)	108 (90.00)	12 (10.00)	252 (84.00)	48 (16.00)

Figure in parenthesis indicate percentages

Table 32a. Respondents' outlook about traits of naturally colour cotton

		n ₁ =56		n ₂ =88		n ₃ =108		n=252	
Sl. No.	Traits of Naturally Coloured Cotton	Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
		Yes	No	Yes	No	Yes	No	Yes	No
a.	<i>Source</i> - Anciently known to mankind	44 (78.57)	12 (21.43)	32 (36.36)	56 (63.64)	44 (40.74)	64 (59.26)	180 (71.43)	72 (28.57)
b.	<i>Colours</i> - Brown, Black, Mahogany red, Red, Khaki, Pink, Blue, Green, Dirty white and White shades are found in history	48 (85.71)	8 (14.29)	32 (36.36)	56 (63.64)	68 (62.96)	40 (37.04)	148 (58.73)	104 (41.27)
c.	<i>Fibre length</i> - Short staple	44 (78.57)	12 (21.43)	56 (63.64)	32 (36.36)	72 (66.67)	36 (33.33)	172 (68.25)	80 (31.75)
d.	<i>Applicability</i> - Eco and Skin friendly	56 (100.00)	00 (00.00)	88 (100.00)	00 (00.00)	100 (92.59)	08 (07.41)	244 (96.83)	08 (03.17)
e.	<i>Wet processing</i> - Dyeing process can be excluded	48 (85.71)	08 (14.29)	40 (45.45)	48 (54.55)	64 (59.26)	44 (40.74)	152 (60.32)	100 (39.68)

Figure in parenthesis indicate percentages

As revealed in the above Table 32, out of 300 respondents irrespective of their category, 252 of them are aware about naturally coloured cotton. Out of which, Table 32a very clearly indicates that cent per cent of the Home Scientists and adolescent girls and 92.59 per cent of boys are aware of the applicability of naturally coloured cotton *i.e* eco and skin friendly.

Further 85.71 per cent of the Home Scientists know that there are multi colours which exclude dyeing process and 78.57 per cent of them opined that it is short staple and known to mankind anciently.

But about 64 per cent of adolescent girls know that coloured cotton is short staple followed by 45.45 per cent of them opined that dyeing process can be excluded. Then, only 36.36 per cent knew that it is multi-coloured and known to mankind anciently. However, only 72 adolescent boys were aware about the short fibre length (about 67 %) and available in different shades (62.96 %). Then 59.26 per cent opined that dyeing process can be excluded and only 40.74 per cent knew that it was known to mankind anciently.

It is evident from the Table 32a that 96.83 per cent of the respondents, irrespective of their category, are aware that naturally coloured cotton is eco and skin friendly, followed by 71.43 per cent of them know that it was anciently known to the mankind, 68.25 per cent say that it is short staple and about 60.32 per cent have the opinion that dyeing process can be excluded to get different shades and naturally coloured cotton available in multi-colours naturally is known only to 58.73 per cent of respondents.

4.7.1.3 Respondents' view about designer's NCC *khadi* fabrics

Consumers usually look forward for diversified textiles and ensembles, created by fashion designers and research scholars. Textiles continue to connect art, people, and life as evidenced through the myriad of wearable art shows, exhibitions and publications, today. Fiber and textiles are very sensual and symbolic which express through pattern and texture. Meanwhile the admixture of naturally coloured cotton and white cotton yarns produced variegated designer's fabrics in stripe and checks patterns.

Hence, it is found necessary to obtain the opinion of the respondents about the designer's naturally coloured cotton fabrics. It is very clear from Table 33 that 93.33 per cent of adolescent boys, 80 per cent of the Home Scientists and 70 per cent of adolescent girls opined that these stripe and check fabrics were excellent, whereas rest rated them as good. In totality, the stripe and check fabrics were rated excellent by 73.33 per cent of the total respondents and whereas good by 26.67 per cent.

4.7.1.4 Respondents' choice for designer's fabrics

The non stop march towards creating variegated textiles and clothing has lead some mandates or rules or policies. An exhibition was organized to find out the choice for the stripe and checked fabric and the results are presented Table 34 and Fig. 26. This depicts that Home Scientists gave highest preference for control fabric woven with naturally coloured cotton (3.73) followed by pin stripe and small checks (each 3.67) and relatively less preferred were medium stripes (3.27) and medium checks (3.07).

Meanwhile, adolescent girls ranked NCC control (4.27) as first, followed by medium checks (3.13), medium stripes (3.10) and WC control (3.00), whereas pin stripes (2.87) and small checks (2.63) were preferred the least.

On the contrary, small checks (4.33) was preferred by most of the adolescent boys followed by pin stripes (4.07), NCC control (3.53) and medium stripes (3.23). Among the *khadi* fabrics woven, least preference was given to medium checks (3.00) and WC control (2.83).

Irrespective of the category of respondents, the descending order of preference is small checks fabric (9.90) NCC control (9.67) and pin stripe (8.77), WC control (8.53), medium stripe (7.97) and medium checks (7.67).

4.7.1.5 Respondents' view about utility of NCC *khadi* fabrics

Naturally coloured cotton being eco and cuticle friendly has innumerable end uses like intimate garments, outer wear, bed linen, towels, curtains and draperies, home furnishings, decorative items and rugs and carpets. Hence, it was felt necessary to know the respondents view about the utility of naturally coloured cotton *khadi* fabrics by way of preference.

Table 33. Respondents' view about designer's NCC *khadi* fabrics

	n ₁ =60			n ₂ =120			n ₃ =120			n=300		
	Home Scientists (HS)			Adolescent Girls (AG)			Adolescent Boys (AB)			Total (n ₁ + n ₂ + n ₃)		
	F	G	E	F	G	E	F	G	E	F	G	E
Respondents' view	0 (0.00)	12 (20.00)	48 (80.00)	0 (0.00)	36 (30.00)	84 (70.00)	0 (0.00)	32 (23.67)	88 (93.33)	0 (0.00)	80 (26.67)	220 (73.33)

Figure in parenthesis indicate percentages

Note: F – Fair, G – Good, E – Excellent

Table 34. Respondents' choice for designer's fabrics

Sl. No.	Designer's Fabrics	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
		Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
		WAR	Rank	WAR	Rank	WAR	Rank	WAR	Rank
a.	White Cotton Control	3.60	3	3.00	4	2.83	6	8.53	4
b.	Naturally Coloured Cotton Control	3.73	1	4.27	1	3.53	3	9.67	2
c.	Narrow Stripe	3.67	2	2.87	5	4.07	2	8.77	3
d.	Medium Stripe	3.27	4	3.10	3	3.23	4	7.97	5
e.	Small Checks	3.67	2	2.63	6	4.33	1	9.90	1
f.	Medium Checks	3.07	5	3.13	2	3.00	5	7.67	6

Note: WAR – Weighted Average Ranking

Where, higher the value, higher will be the rank

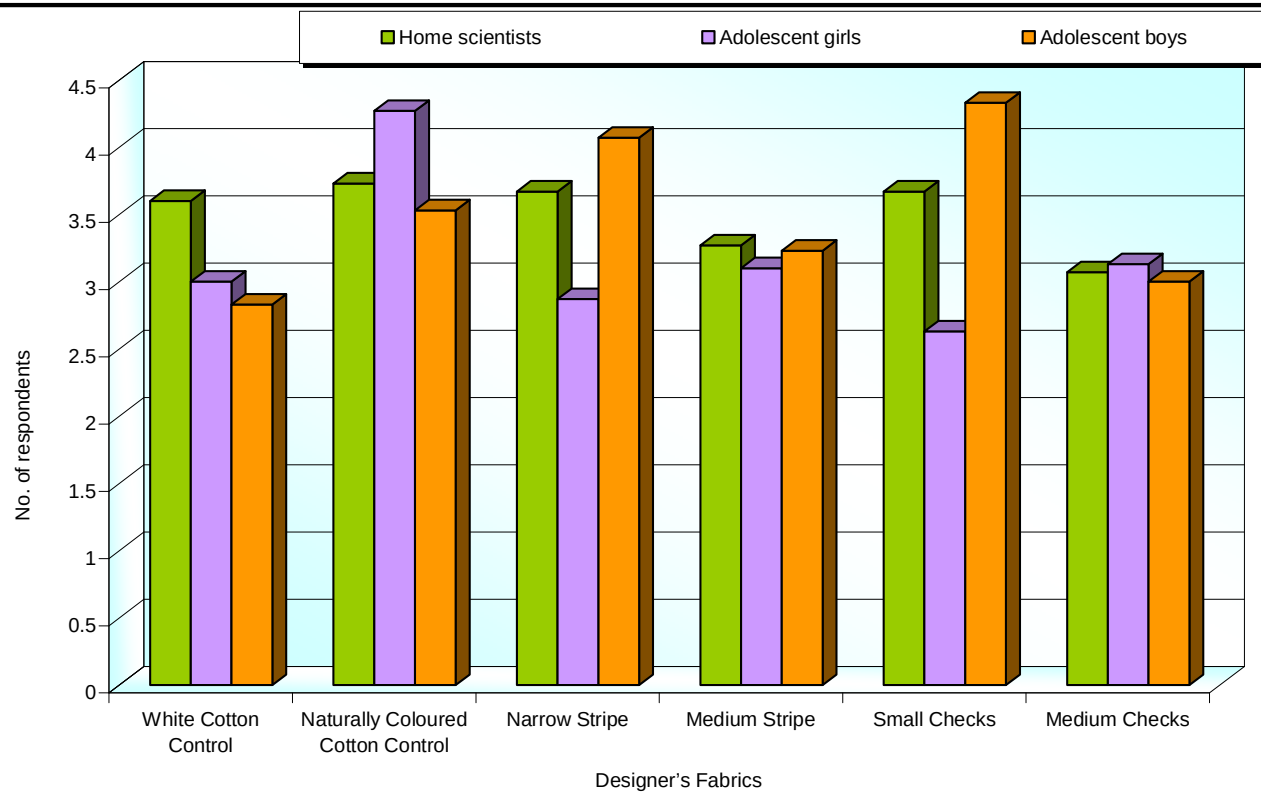


Fig. 26. Respondents' choice for designer's fabrics

Fig. 26. Respondents' choice for designer's fabrics

Table 35. Respondents' view about utility of NCC *khadi* fabrics

Sl. No.	Utility of NCC <i>khadi</i> fabrics	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
		Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
		Yes	No	Yes	No	Yes	No	Yes	No
a.	Intimate Garments	28 (46.67)	32 (53.30)	32 (26.70)	88 (73.30)	48 (40.00)	72 (60.00)	108 (36.00)	192 (64.00)
b.	Outer Wear	56 (93.33)	04 (06.67)	120 (100.00)	0 (0.00)	108 (90.00)	12 (10.00)	284 (94.70)	16 (05.33)
c.	Bed Linen	48 (80.00)	12 (20.00)	104 (86.70)	16 (13.30)	92 (76.70)	28 (23.30)	244 (81.30)	56 (18.70)
d.	Towels	40 (66.67)	20 (33.30)	100 (83.30)	20 (16.70)	92 (76.70)	28 (23.30)	232 (77.30)	68 (22.70)
e.	Curtains and Draperies	32 (53.33)	28 (46.70)	88 (73.30)	32 (26.70)	80 (66.70)	40 (33.30)	200 (66.70)	100 (33.30)
f.	Home Furnishings	52 (86.67)	08 (13.30)	108 (90.00)	12 (10.00)	96 (80.00)	24 (20.00)	256 (85.30)	44 (14.70)
g.	Decorative Items	60 (100.00)	0 (0.00)	104 (86.70)	16 (13.30)	108 (90.00)	12 (10.00)	272 (90.70)	28 (9.33)
h.	Rugs and Carpets	16 (26.67)	44 (73.30)	48 (40.00)	72 (60.00)	64 (53.30)	56 (46.70)	128 (42.70)	172 (57.30)

Figure in parenthesis indicate percentages

Table 35 distinctly shows that cent per cent of Home Scientists viewed naturally coloured cotton fabrics more suitable for decorative items followed by outer wear (93.33%), home furnishings (86.67%) bed linen (80.00%) and towels (66.67%) Whereas, outerwear was viewed as most suitable by cent per cent of the adolescent girls followed by home furnishings (90.00%), bed linen and decoratives (each 86.67%) and towel (83.30%).

On the other hand, adolescent boys gave highest preference for outer wear and decorative items (each 90.00%) followed by home furnishings (80.00%), bed linen and towels (76.70%) and curtains and draperies (66.70%).

In a nutshell, 94.70 percent of the total respondents opined that naturally coloured cotton is more suitable for outer wear followed by decoratives (90.70%) and home furnishings (85.30%). Least preference was given to rugs and carpets (42.70%) and intimate garments (36.00%).

4.7.1.6 Aesthetic characteristics of designer's NCC *khadi* fabrics

Basically the *khadi* fabrics are dull in appearance, crisp, coarse, stiff to handle with relatively high GSM compared to mill made cloth. Nevertheless, NCC *khadi* is no exception to these properties. However, appearance, texture and handle of the NCC *khadi* is improved after subjecting them to enzyme and softener finish. The impact of special finish and the change in the aesthetic appearance of the *khadi* fabrics as assessed by the respondents is presented in Table 36. It is evident from this Table that cent per cent of the Home Scientists, adolescent girls and boys opined that at control (untreated), the *khadi* fabric was coarse, dull, crisp, stiff, open and heavy fabric. On the other hand, after treating with special finishes, the change in aesthetic characteristics was recognized by the respondents and judged them as fine, lustrous with soft flexible handle, light weight and closed structured.

4.7.2 Consumers' acceptance for *khadi* fabrics

Gandhiji addressed to workers of Sadaquat Ashram, Patna in 1947 and said ". . . *Khadi* is meant for everyone. Even a depraved man, a sinner, a drunkard, a gambler, anybody, can wear it. But the sacred quality of *khadi* is that it is a symbol of freedom. Those who wish to live in free India ought to wear *khadi*". The word '*khadi*' always remind us of our great leader M.K.Gandhi who fought for our nation 'India'. Thereafter *khadi* had vanished or lost its value in the society due to lack of innovations in the field of textile. But now *khadi* has become a passion for youngsters depicting the fashion statement. Hence it was very essential to know the consumer's mind set about *khadi* fabrics which are represented under the following sub-headings.

4.7.2.1 Respondents' flare for *khadi* materials

Khadi is always affiliated with the words cotton, coarse material, Mahatma Gandhi, charaka and so on. With all these words, it reminds us of the controversial statement that people like *khadi* but would not like to possess it in their wardrobe due to several varied reasons. Hence it was felt evident that the respondents should be questioned of their flare for *khadi* materials.

Table 37 clearly indicated that about 96.70 percent adolescent girls followed by 93.33 percent of home scientists and 86.70 percent of adolescent boys showed liking towards *khadi*. It can be summarized that 92 percent of the total respondents desired *khadi* stating the reasons that it is eco-friendly (94.20%) followed by its comfort (91.30%) and the characteristic that it is cool in summer & warm in winter (84.10%). But not because they are fashionable and trendy (52.20%) and for its compulsion (24.60%). (Table 38a)

Later it was distinctly shown in the Table 38b that the disliking for *khadi* among remaining 8% of the respondents was because of old fashioned; dull in appearance, extra care and maintenance and limited designs by 66.70% of respondents. Only 33.20% of respondents disliked *khadi* due to its expensiveness, no novelty and monotonous nature.

4.7.2.2 Characteristics of *khadi* fabrics

The views of M. Gandhiji were published in Navajivan magazine in 1925 as "Hand-woven cloth made of hand-spun yarn is of course *khadi*, however fine it may be. This is made of cotton, silk or even of wool. One should wear whichever of these one happens to find convenient. The *khadi* from Andhra is very fine. In Assam, one can get some *khadi* made of silk. Woolen *khadi* is made in Kathiawar. In other words, the only criterion of *khadi* is its being hand-spun and hand-woven.

Table 36. Aesthetic characteristics of designer's NCC *khadi* fabrics

Sl. No.	Visual characteristics	n ₁ =60				n ₂ =120				n ₃ =120				n=300			
		Home Scientists (HS)				Adolescent Girls (AG)				Adolescent Boys (AB)				Total (n ₁ + n ₂ + n ₃)			
		C		S		C		S		C		S		C		S	
		2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
1	<i>Fabric Appearance</i>																
a.	Fine (2) or Coarse (1)	0 (0.00)	60 (100.00)	60 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	300 (100.00)	300 (100.00)	0 (0.00)
b.	Lustrous (2) or Dull (1)	0 (0.00)	60 (100.00)	60 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	300 (100.00)	300 (100.00)	0 (0.00)
2	<i>Fabric Handle</i>																
a.	Soft (2) or Crisp (1)	0 (0.00)	60 (100.00)	60 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	300 (100.00)	300 (100.00)	0 (0.00)
b.	Flexible (2) or Stiff (1)	0 (0.00)	60 (100.00)	60 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	300 (100.00)	300 (100.00)	0 (0.00)
3	<i>Fabric Texture</i>																
a.	Close (2) or Open (1)	0 (0.00)	60 (100.00)	60 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	300 (100.00)	300 (100.00)	0 (0.00)
b.	Light (2) or heavy (1)	0 (0.00)	60 (100.00)	60 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	120 (100.00)	120 (100.00)	0 (0.00)	0 (0.00)	300 (100.00)	300 (100.00)	0 (0.00)

Note: C – Control fabrics, S – Special finished fabrics (softener + enzyme finish)

Table 37. Respondents' flare for *khadi* materials

	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
	Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
	Like	Dislike	Like	Dislike	Like	Dislike	Like	Dislike
Flare for <i>khadi</i> materials	56 (93.33)	04 (06.67)	116 (96.70)	04 (03.33)	104 (86.70)	16 (13.30)	276 (92.00)	24 (08.00)

Figure in parenthesis indicate percentages

Table 38a. Reasons for liking of *khadi* materials

Sl. No.	Reasons for Liking	n ₁ =56		n ₂ =116		n ₃ =104		n=276	
		Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
		Yes	No	Yes	No	Yes	No	Yes	No
a.	<i>Khadi</i> is nation's pride	40 (71.40)	16 (28.60)	104 (89.70)	12 (10.30)	80 (76.90)	24 (23.10)	224 (81.20)	52 (18.80)
b.	Unique	44 (78.60)	12 (21.40)	112 (96.60)	04 (03.45)	56 (53.80)	48 (46.20)	212 (76.80)	64 (23.20)
c.	Cool in summer and warm in winter	48 (85.70)	08 (14.30)	100 (86.20)	16 (13.80)	84 (80.80)	20 (19.20)	232 (84.10)	44 (15.90)
d.	Fashionable and trendy	28 (50.00)	28 (50.00)	80 (69.00)	36 (31.00)	36 (34.60)	68 (65.40)	144 (52.20)	132 (47.80)
e.	Comfort	44 (78.60)	12 (21.40)	116 (100.00)	0 (0.00)	92 (88.50)	12 (11.50)	252 (91.30)	24 (08.70)
f.	<i>Swadeshi</i>	36 (64.30)	20 (35.70)	100 (86.20)	16 (13.80)	88 (84.60)	16 (15.40)	224 (81.20)	52 (18.80)
g.	Compulsion	04 (07.14)	52 (92.90)	36 (31.00)	80 (69.00)	28 (26.90)	76 (73.10)	68 (24.60)	208 (75.40)
h.	National costume	28 (50.00)	28 (50.00)	92 (79.30)	24 (20.70)	76 (73.10)	28 (26.90)	196 (71.00)	80 (29.00)
i.	Ecofriendly	48 (85.70)	08 (14.30)	116 (100.00)	0 (0.00)	96 (92.30)	08 (07.69)	260 (94.20)	16 (05.80)

Figure in parenthesis indicate percentages

Table 38b. Reasons for disliking of *khadi* materials

Sl. No.	Reasons for Disliking	n ₁ =04		n ₂ =04		n ₃ =16		n=24	
		Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
		Yes	No	Yes	No	Yes	No	Yes	No
a.	Old fashioned	0 (0.00)	04 (100.00)	04 (100.00)	0 (0.00)	12 (75.00)	04 (25.00)	16 (66.70)	08 (33.30)
b.	Dull in appearance	04 (100.00)	0 (0.00)	04 (100.00)	0 (0.00)	08 (50.00)	08 (50.00)	16 (66.70)	08 (33.30)
c.	Coarse fabric	04 (100.00)	0 (0.00)	0 (0.00)	04 (100.00)	08 (50.00)	08 (50.00)	12 (50.00)	12 (50.00)
d.	Elaborate care and maintenance	0 (0.00)	04 (100.00)	0 (0.00)	04 (100.00)	16 (100.00)	0 (0.00)	16 (66.70)	08 (33.30)
e.	Limited designs	0 (0.00)	04 (100.00)	04 (100.00)	0 (0.00)	12 (75.00)	04 (25.00)	16 (66.70)	08 (33.30)
f.	Expensive	0 (0.00)	04 (100.00)	0 (0.00)	04 (100.00)	08 (50.00)	08 (50.00)	08 (33.30)	16 (66.70)
g.	Simple	0 (0.00)	04 (100.00)	04 (100.00)	0 (0.00)	08 (50.00)	08 (50.00)	12 (50.00)	12 (50.00)
h.	No novelty	0 (0.00)	04 (100.00)	04 (100.00)	0 (0.00)	04 (25.00)	12 (75.00)	08 (33.30)	16 (66.70)
i.	Monotonous	04 (100.00)	0 (0.00)	0 (0.00)	04 (100.00)	04 (25.00)	12 (75.00)	08 (33.30)	16 (66.70)

Figure in parenthesis indicate percentages

Ordinarily, hand-spun *khadi* is found to be coarse and thick; hence, some people erroneously believe that *khadi* can only be of this type, though in fact fine *khadi* of sixty to eighty count yarns is also made.

Nevertheless, those who have used thick *khadi* know that the touch of coarse rough *khadi* is soft to the body and, being rough, it affords better protection to the skin."

It was found necessary to find the consumers awareness about the characteristics of *khadi* fabrics and came to know from Table 39 that cent percent of Home Scientists were aware of *khadi* being hand spun and hand woven and so also Mahatma Gandhi was the first designer of *khadi*.

About 93.00 percent of them were aware about *khadi* is swadeshi concept and symbol of non violence and freedom.

Further among adolescent girls, 86.70 percent of them know that Mahatma Gandhiji was first designer of *khadi* followed by 80 percent say that it is hand spun and hand woven, 76.70 percent are aware of *khadi* is swadeshi concept and a symbol of non violence and freedom. Later majority of adolescent boys (96.70%) know about Mahatma Gandhiji was the first designer of *khadi* followed by hand spun and hand woven (93.30%) and *khadi* is swadeshi concept (90.00%). The characteristic that *khadi* is the link between rural and urban masses was known only to 80 percent of Home Scientists, 70 percent of adolescent girls and 63.30 percent boys.

Table 39 clearly indicates that irrespective of the category of the respondents, majority are aware about Mahatma Gandhiji being the first designer of *khadi* (93.30) followed by the characteristic hand spun and hand woven (89.30%), *khadi* spirit is swadeshi concept (85.30%), symbol of non-violence & freedom (78.70%) and lastly *khadi* is link between rural & urban masses (69.30%).

4.7.2.3 Respondents' inclination towards purchase of *khadi* garments

"*Khadi* is the sun of the village solar system. The planets are the various industries which can support *khadi* in return for the heat and the sustenance they derive from it. Without it, the other industries cannot grow. But during my last tour I discovered that, without the revival of the other industries, *khadi* could not make further progress.

For villagers to be able to occupy their spare time profitably, the village life must be touched at all points. . ." was opined by Gandhiji in the magazine Harijan in 1934. Consequently to promote *khadi* it is necessary to be possessed and used with pride. In spite of liking *khadi* fabrics, most of the consumers usually purchase countable *khadi* garments and the details are given below.

However, it was felt necessary to assess the inclination towards purchase of *khadi* garments by the respondents. It is shown in Table 40 that about 76.00 percent of the adolescent boys showed inclination towards purchase of *khadi* followed by the Home Scientists (73.30%) and adolescent girls (60%). Thus, it can be summarized that irrespective of the type of respondents about 69.00 percent of them showed inclination towards *khadi* garments.

4.7.2.4 Type of *khadi* garment purchased by the respondents

Khadi fabrics are available in a number of varieties from hand kerchief to saree and baby's garments to gorgeous ladies and gent's designer's wear. But consumers knowingly or unknowingly purchase clothes other than *khadi* base.

Meanwhile, it was essential to know the possession of type of *khadi* garment with the respondents. Table 41a represents that majority of the Home Scientists (53.30%) purchased chudi/ kameez followed by kurta (40.00%). But 43.30 per cent of the adolescent girls purchased ladies top followed by kurta (40.00%).

Adolescent boys purchased very few *khadi* garments. 56.70 percent of the boys have *khadi* shirts in their wardrobe followed by lungi (23.30%) and kurta (20.00%) as shown in Table 41b.

4.7.3 Consumers' view on the concept of detachable garment components

People irrespective of the age and gender are gripped with the new trend of fashion designing influenced by popular trends of the west. With the popularity of fashion clothing, various fashion designers and their designs have made a mark among people. To bring a suitable change to fit in the today's fashion, a new concept of detachable garment components was introduced in the designer's *khadi* apparel produced with naturally coloured cotton and white cotton and were decorated with hand, machine and zardosi embroideries.

Table 39. Characteristics of *khadi* fabrics

Sl. No.	Features of <i>khadi</i> fabrics	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
		Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
		Yes	No	Yes	No	Yes	No	Yes	No
a.	Hand spun and Hand woven	60 (100.00)	0 (0.00)	96 (80.00)	24 (20.00)	112 (93.30)	08 (06.67)	268 (89.30)	32 (10.70)
b.	Mahatma Gandhiji, the First Designer of <i>khadi</i>	60 (100.00)	0 (0.00)	104 (86.70)	16 (13.30)	116 (96.70)	04 (03.33)	280 (93.30)	20 (06.67)
c.	Symbol of Non-violence and Freedom	56 (93.33)	04 (06.67)	92 (76.70)	28 (23.30)	88 (73.30)	32 (26.70)	236 (78.70)	64 (21.30)
d.	<i>Khadi</i> is Swadeshi Concept	56 (93.33)	04 (06.67)	92 (76.70)	28 (23.30)	108 (90.00)	12 (10.00)	256 (85.30)	44 (14.70)
e.	Link between Rural and Urban masses	48 (80.00)	12 (20.00)	84 (70.00)	36 (30.00)	76 (63.30)	44 (36.70)	208 (69.30)	92 (30.70)

Figure in parenthesis indicate percentages

Table 40. Respondents' inclination towards purchase of *khadi* garments

	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
	Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
	Yes	No	Yes	No	Yes	No	Yes	No
Inclination towards purchase of <i>khadi</i> garments	44 (73.33)	16 (26.67)	72 (60.00)	48 (40.00)	92 (76.70)	28 (23.30)	208 (69.30)	92 (30.70)

Figure in parenthesis indicate percentages

Table 41a. Type of *khadi* garments purchased by the women respondents

Sl. No.	Women's <i>khadi</i> garments	n ₁ =60		n ₂ =120		n=180	
		Home Scientists (HS)		Adolescent Girls (AG)		Total (n ₁ + n ₂)	
		Yes	No	Yes	No	Yes	No
a.	Bed linen	20 (33.30)	40 (66.67)	44 (36.70)	76 (63.30)	64 (35.50)	116 (64.40)
b.	Kameez	32 (53.30)	28 (46.70)	24 (20.00)	96 (80.00)	56 (31.10)	124 (68.90)
c.	Kurta	24 (40.00)	36 (60.00)	48 (40.00)	72 (60.00)	72 (40.00)	108 (60.00)
d.	Ladies top	20 (33.30)	40 (66.67)	52 (43.30)	68 (56.70)	72 (40.00)	108 (60.00)
e.	Sarees	20 (33.30)	40 (66.67)	24 (20.00)	96 (80.00)	44 (24.40)	136 (75.60)
f.	Skirt	08 (13.30)	52 (86.70)	16 (13.30)	104 (86.70)	24 (13.30)	156 (86.70)

Figure in parenthesis indicate percentages

Table 41b. Type of *khadi* garments purchased by the men respondents

Sl. No.	Men's <i>khadi</i> garments	n ₃ = 120	
		Adolescent Boys (AB)	
		Yes	No
a.	Coat	0 (0.00)	120 (100.00)
b.	Jacket	20 (16.70)	100 (83.30)
c.	Kurta	24 (20.00)	96 (80.00)
d.	Lungi	28 (23.30)	92 (76.70)
e.	Pants	16 (13.30)	104 (86.70)
f.	Shirts	68 (56.70)	52 (43.30)

Figure in parenthesis indicate percentages

Hence, it was felt necessary to find out consumers perseverance towards new concept of detachable garment components and is presented in the following sub headings:

4.7.3.1 Suitability of designer's NCC *khadi* fabrics for ladies and gents apparel

Consumers consider fit, style, fabric type, colour and price as the driving forces that assist in apparel purchases. It is felt necessary to know the suitability of these variegated *khadi* fabrics to construct ladies and gents designer's apparel. Cent percent of the respondents i.e. Home Scientists, adolescent girls and boys predicted that designer's NCC *khadi* fabrics are suitable for ladies and gents apparel (Table 42).

4.7.3.2 Appropriateness of NCC *khadi* fabric for designer's apparel

The investigator planned and wove five types of *khadi* fabrics employing NCC and WC yarns; that formed the ground fabric for constructing designer's ladies and gents apparel. Meanwhile, it urged to know the appropriateness of these NCC *khadi* fabrics for designer's apparel.

It is evidently shown in the Table 43 that the descending order of appropriateness of NCC *khadi* fabrics by Home Scientists is small checks (3.67) for ladies top cum kurta, medium stripe and plain woven NCC fabric for gents shirt and kurta (each 3.60) followed by pin stripe (3.33) for ladies top. NCC and pin stripe for gents shirt were selected followed by medium stripe and small checks fabric for gents kurta. But medium checks fabric was given the last preference for the entire designer's apparel.

On the other hand, adolescent girls have first chosen naturally coloured cotton control fabric for all the three apparels followed by pin stripe for ladies top cum kurta, and medium stripe for both the gents apparel. Similar to home scientists, the last preference was given to medium checks for ladies top cum kurta and gents shirt and small checks for gents kurta by the adolescent girls.

From the Table it is evident that a change in opinion of adolescent boys who indicated that medium stripe (3.27) was given highest preference for ladies top cum kurta, NCC control fabric and medium stripe (each 3.20) for gents shirt and small checks (3.57) for gents kurta. Further next preference was given to NCC control fabric (3.23) for ladies top cum kurta, small checks (2.97) for gents shirt and medium checks (2.90) for gents kurta. Least preference was given to medium checks (2.43) for ladies top cum kurta, pin stripe (2.70) for gents shirt and NCC control fabric along with pin stripe (each 2.83) for gents kurta.

In a nutshell it may be summarized that the most appropriate fabric for ladies top, gents shirt and kurta is plain woven NCC fabric (8.70 LT, 8.03 GS and 8.27 GK) followed by small checks (7.80 LT, 7.33 GS and 7.77 GK) and finally medium checks (6.10 LT, 6.97 GS and 6.70 GK).

4.7.3.3 Suitability of surface embellishments on designer's apparel

Any surface embellishment on purchased or constructed garment viz., embroidery, lace, ribbon, appliqué, braid, buttons and so on makes it a complete and wearable outfit. These embellishments not only enhance the beauty of the garment but earn better profit. Thus it becomes mandatory to know the opinion of the respondents towards the suitability of surface embellishments on designer's apparel.

From Table 44 and Fig. 27, it is very clear that the Home Scientists and adolescent girls have ranked hand embroidery first followed by machine embroidery for all the three garments whereas zardosi occupied the last place as embellishment for ladies top cum kurta. Meanwhile, adolescent girls have given equal weightage to hand and machine embroideries for gents shirt. But reverse trend of boys was observed who indicated zardosi to be the most suitable embellishment for ladies top cum kurta and machine embroidery for both the gents wear.

By summarizing the table, irrespective of the category of respondents it was found that hand embroidery is more suitable for both ladies and gents outfits followed by machine embroidery.

4.7.3.4 Compatibility of design and colours in surface embellishment

The garment beautification most of the times depends on the appropriate selection of motif / pattern / design and their colour combinations. On reviewing the compatibility of design in relation to colour combination in surface embellishment, it was revealed that Home Scientists and adolescent girls that hand embroidery is more compatible with respect to design and colour for all the three outfits followed by machine embroidery.

Table 42. Suitability of designer's NCC *khadi* fabrics for ladies and gents apparel

	n ₁ =60		n ₂ =120		n ₃ =120		n=300		Total (n ₁ + n ₂ + n ₃)
	Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)				
	Yes	No	Yes	No	Yes	No	Yes	No	
Suitability of designer's NCC <i>khadi</i> fabrics	60 (100.00)	-	120 (100.00)	-	120 (100.00)	-	300 (100.00)	-	

Figure in parenthesis indicate percentages

Table 43. Appropriateness of NCC *khadi* fabric for designer's apparel

Sl. No.	Designer's Fabrics	n ₁ =60			n ₂ =120			n ₃ =120			n=300		
		Home Scientists (HS)			Adolescent Girls (AG)			Adolescent Boys (AB)			Total (n ₁ + n ₂ + n ₃)		
		LT	GS	GK	LT	GS	GK	LT	GS	GK	LT	GS	GK
a.	Naturally coloured cotton	3.20 ³	2.93 ²	3.60 ¹	3.83 ¹	3.37 ¹	3.63 ¹	3.23 ²	3.20 ¹	2.83 ⁴	8.70 ¹	8.03 ¹	8.27 ¹
b.	Pin Stripe	3.33 ²	2.93 ²	2.80 ³	2.97 ²	2.97 ³	2.83 ³	2.97 ⁴	2.70 ⁴	2.83 ⁴	7.60 ³	7.13 ³	7.07 ⁴
c.	Medium Stripe	2.53 ⁴	3.60 ¹	3.20 ²	2.80 ⁴	3.03 ²	3.23 ²	3.27 ¹	3.20 ¹	2.87 ³	7.30 ⁴	8.03 ¹	7.70 ³
d.	Small Checks	3.67 ¹	2.80 ³	3.20 ²	2.87 ³	2.97 ³	2.60 ⁵	3.20 ³	2.97 ²	3.57 ¹	7.80 ²	7.33 ²	7.77 ²
e.	Medium Checks	2.27 ⁵	2.73 ⁴	2.20 ⁴	2.50 ⁵	2.67 ⁴	2.70 ⁴	2.43 ⁵	2.93 ³	2.90 ²	6.10 ⁵	6.97 ⁴	6.70 ⁵

Note: LT - Ladies Top-cum-kurta, GS - Gents Shirt, GK – Gents Kurta

WAR – Weighted Average Ranking,

Higher the WAR, higher will be the ranking

Table 44. Suitability of surface embellishments on designer's apparel

Sl. No.	Type of apparel	Type of surface embellishments	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
			Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
			WAR	Rank	WAR	Rank	WAR	Rank	WAR	Rank
1.	Ladies top-cum- kurta	Hand Embroidery	2.47	1	2.13	1	1.90	3	5.27	1
		Machine Embroidery	2.13	2	2.07	2	2.00	2	5.13	2
		Zardosi	1.40	3	1.80	3	2.10	1	4.60	3
2.	Gents shirt	Hand Embroidery	1.87	1	1.50	1	1.47	2	3.90	1
		Machine Embroidery	1.13	2	1.50	1	1.53	1	3.60	2
3.	Gents kurta	Hand Embroidery	1.67	1	1.70	1	1.37	2	3.90	1
		Machine Embroidery	1.33	2	1.30	2	1.63	1	3.60	2

Note: WAR – Weighted Average Ranking
Higher the value, higher will be the rank

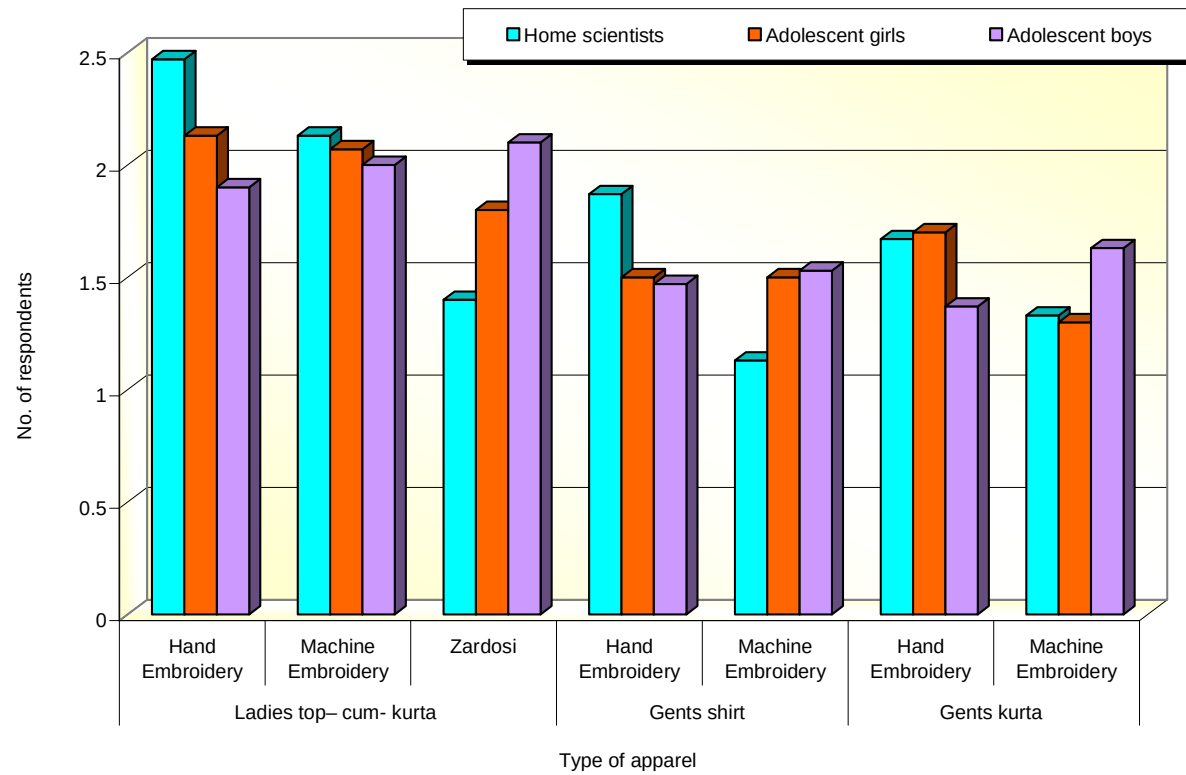


Fig. 27. Suitability of surface embellishments on designer's apparel

Fig. 27. Suitability of surface embellishments on designer's apparel

Whereas, the adolescent boys have opined in the reverse order that machine embroidery is most suitable on ladies top cum kurta and hand embroidery on gents kurta in both design and colour combination.

But, the boys have rated hand embroidery first with respect to design and machine embroidery for colour combination which would be suitable for gents shirt. Wherein, hand embroidery is given the last preference for both design and colour combination on ladies top cum kurta.

On the whole, hand embroidery was said to be the most becoming for all the three outfits with respect to both design and colour combination. Whereas in case of design, machine embroidery on ladies top cum kurta was also given first priority.

Further second preference was given to machine embroidery on all the designer's wear for both the aspects except zardosi on ladies top cum kurta with respect to design. Further with colour combination aspect, zardosi occupied the last place (Table 45).

4.7.3.5 Respondents' outlook for new concept of detachable garment components

Detachable garment components were attached to ladies top, gents' shirt and gent's kurta with the new concept of using it according to the individual's interest, fashion and occasion. Obviously it was felt necessary to know the respondents outlook for aptness towards the new concept of detachable garment components

Cent per cent of the Home Scientists showed aptness for detachable collar and cuffs on gents shirt followed by detachable necklines on ladies top-cum-kurta (93.30) and for detachable button stand on gents shirt and kurta.

Among adolescent girls, cent per cent of them showed their liking for detachable necklines on ladies top followed by detachable button stand and gents kurta and for detachable collar on gents shirt.

However, each 93.30 per cent of adolescent boys showed their penchant towards detachable cuffs and collar on gents shirt and kurta respectively followed by detachable collar (96.70 %) and button stand (80.00%) on gents shirt. Mean while the detachable lower panel was liked by ladies tops each 80 per cent of Home Scientists and adolescent girls and 70 per cent of boys.

Table 46 and Fig. 28 show that 89.30 percent of the total respondents did like the concept of detachable necklines and about 76 percent of them desired detachable lower panel for designer's ladies top. In gent's shirt, 92 percent of them showed their liking towards detachable cuffs and collars followed by 86.70 percent expressed their views of accepting detachable button stand.

About 90 percent of the total respondents have liked detachable collar for gents kurta followed by 88 percent showed their liking for detachable button stand.

4.7.3.6 Mode of attachment of detachable garment components and their suitability

The detachable garment components were attached to the apparel with open zipper or the buttons. The respondents assessed their suitability which is clearly depicted in the Table 47 that 89.30 percent of the respondents irrespective of their category presume the suitability of cloth buttons to the necklines followed by suitability of open zipper to the lower panel (77.30%) of ladies top-cum-kurta.

In gent's shirt, 90.70 percent of the respondents irrespective of their category said that open zipper is more suitable for collar followed by buttons to the button stand (86.70%) and open zipper to the cuffs (81.30%).

About 85.30% of the respondents irrespective of their category replied that buttons are more suitable to the detachable button stand followed by open zipper to the detachable collar (78.70%) in the gent's kurta.

4.7.3.7 Lure towards the new concept of detachable garment components

Researcher as a designer tried to design ladies top, gent's shirt & kurta with a new concept of detachable garment components to suit the modern market. Table 48 shows that finally cent percent of the Home Scientists, adolescent boys & 96.70% of adolescent girls liked the new concept of detachable garment components. Hence altogether 98.70% of respondents showed lure towards the new concept of detachable garment components.

Table 45. Compatibility of design and colours in surface embellishment

			n ₁ =60	n ₂ =120	n ₃ =120		n=300			
Sl. No.	Type of Apparel	Type of Surface Embellishments	Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
			WAR for Design	WAR for Colour	WAR for Design	WAR for Colour	WAR for Design	WAR for Colour	WAR for Design	WAR for Colour
1.	Ladies top-cum-kurta	Hand embroidery	2.27 ¹	2.40 ¹	2.17 ¹	2.23 ¹	1.87 ³	1.87 ³	5.17 ¹	5.30 ¹
		Machine embroidery	2.00 ²	2.20 ²	2.00 ²	2.10 ²	2.17 ¹	2.00 ²	5.17 ¹	5.20 ²
		Zardosi	1.73 ³	1.40 ³	1.83 ³	1.63 ³	1.97 ²	2.13 ¹	4.67 ²	4.47 ³
2.	Gents shirt	Hand embroidery	1.67 ¹	1.60 ¹	1.70 ¹	1.70 ¹	1.53 ¹	1.47 ²	4.07 ¹	3.97 ¹
		Machine embroidery	1.33 ²	1.40 ²	1.30 ²	1.30 ²	1.47 ²	1.53 ¹	3.43 ²	3.53 ²
3.	Gents kurta	Hand embroidery	1.80 ¹	1.60 ¹	1.77 ¹	1.73 ¹	1.47 ²	1.47 ²	4.13 ¹	4.00 ¹
		Machine embroidery	1.20 ²	1.40 ²	1.23 ²	1.27 ²	1.53 ¹	1.53 ¹	3.37 ²	3.50 ²

Note: WAR – Weighted Average Ranking
Higher the value, higher will be the rank

Table 46. Respondents' outlook for new concept of detachable garment components

Sl. No.	Type of apparel	Detachable components	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
			Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
			Yes	No	Yes	No	Yes	No	Yes	No
1	Ladies top-cum-kurta	Lower panel	48 (80.00)	12 (20.00)	96 (80.00)	24 (20.00)	84 (70.00)	36 (30.00)	228 (76.00)	72 (24.00)
		Necklines	56 (93.30)	04 (06.67)	120 (100.00)	0 (0.00)	92 (76.70)	28 (23.30)	268 (89.30)	32 (10.70)
2	Gents shirt	Collar	60 (100.00)	0 (0.00)	112 (93.30)	0 (06.67)	104 (86.70)	16 (13.30)	276 (92.00)	24 (08.00)
		Cuffs	60 (100.00)	0 (0.00)	104 (86.70)	16 (13.30)	112 (93.30)	08 (06.67)	276 (92.00)	24 (08.00)
		Button stand	56 (93.30)	04 (06.67)	108 (90.00)	12 (10.00)	96 (80.00)	24 (20.00)	260 (86.70)	40 (13.30)
3	Gents kurta	Collar	52 (86.70)	08 (13.30)	108 (90.00)	12 (10.00)	112 (93.30)	08 (06.67)	272 (90.70)	28 (09.33)
		Button stand	56 (93.30)	04 (06.67)	116 (96.70)	04 (03.33)	92 (76.70)	28 (23.30)	264 (88.00)	36 (12.00)

Figure in parenthesis indicate percentages

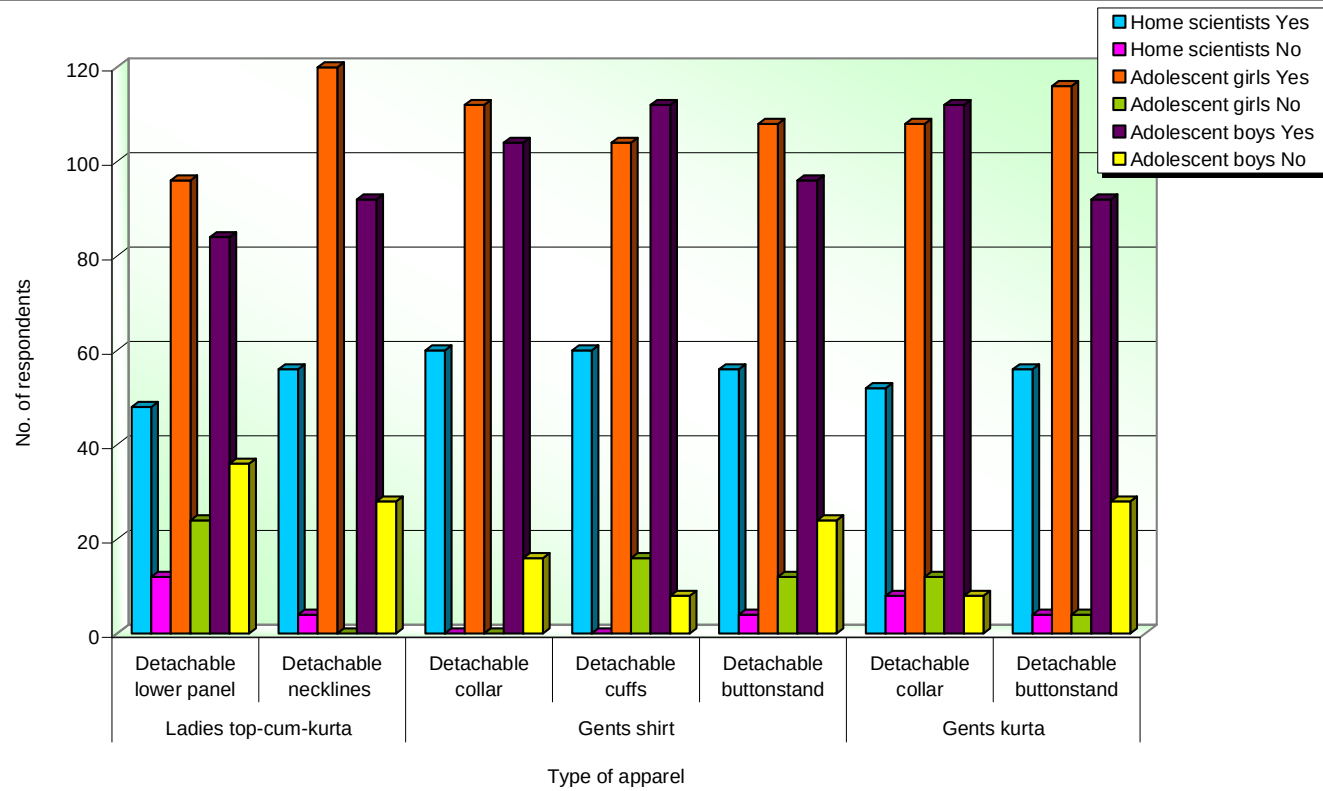


Fig. 28. Respondents' outlook for new concept of detachable garment components

Fig. 28. Respondents' outlook for new concept of detachable garment components

Table 47. Mode of attachment of detachable garment components and their suitability

Sl. No.	Type of Apparel	Detachable components	Mode of Attachment	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
				Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
				Suitable	Non-suitable	Suitable	Non-suitable	Suitable	Non-suitable	Suitable	Non-suitable
1	Ladies top-cum-kurta	Lower panel	Open zipper	48 (80.00)	12 (20.00)	100 (83.30)	20 (16.70)	84 (70.00)	36 (30.00)	232 (77.30)	68 (22.70)
		Necklines	Cloth buttons	60 (100.00)	0 (0.00)	112 (93.30)	08 (06.67)	96 (80.00)	24 (20.00)	268 (89.30)	32 (10.70)
2	Gents shirt	Collar	Open zipper	56 (93.30)	04 (06.67)	112 (93.30)	08 (06.67)	104 (86.70)	16 (13.30)	272 (90.70)	28 (09.33)
		Cuffs	Open zipper	56 (93.30)	04 (06.67)	100 (83.30)	20 (16.70)	88 (73.30)	32 (26.70)	244 (81.30)	56 (18.70)
		Button stand	Buttons - buttonholes	52 (86.70)	08 (13.30)	116 (96.70)	04 (03.33)	92 (76.70)	28 (23.30)	260 (86.70)	40 (13.30)
3	Gents kurta	Collar	Open zipper	48 (80.00)	12 (20.00)	92 (76.70)	28 (23.30)	96 (80.00)	24 (20.00)	236 (78.70)	64 (21.30)
		Button stand	Buttons - buttonholes	56 (93.30)	04 (06.67)	116 (96.70)	04 (03.33)	84 (70.00)	36 (30.00)	256 (85.30)	44 (14.70)

Figure in parenthesis indicate percentages

4.7.3.8 Relevance of designer's apparel with detachable garment components for different age groups

The most important step in dress designing is to decide age group for whom the apparel is intended for, in other words it indicates the target customer whose needs and interests need to be studied before designing any garment. The needs differ according to age groups. Designing apparel for a two year old kid is totally different from designing for an adolescent boy or girl.

Hence, keeping these factors in view, the researcher has designed outfits with a concept of detachable garment components for adolescent boys and girls, the important age group who accepts change and adopts trendy clothes. Consequently, it was found necessary to find out the respondent's opinion towards the relevance of designer's apparel with detachable garment components for different age groups, categorized as late childhood (6-12 years), adolescents (12-18 years) and early adulthood (18-40 years).

It is evident from Table 49 that all the three categories of respondents expressed that ladies top-cum-kurta is most suitable for adolescents (80.00%, HS, 90.00%, AG and 73.33%, AB). Further, 73.33 per cent of the Home Scientists reported that this designer's wear is relevant for women in the age group of 18 to 40 years too. Whereas these are not suitable for children belonging to 6-12 years (60.00%, HS and 56.67%, AG) and adolescent girls did not prefer it even for early adults (60.00%) age group. On the other hand, adolescent boys mentioned that these garments are even suitable for children of 6-12 yrs (63.33%) and not for early adults (76.67%). On the whole, irrespective of the category of respondents, ladies top-cum-kurta is best suited for adolescents (81.33%) followed by children of 6-12 yrs (50.67%) and not for early adults (60.00%).

Majority of the Home Scientists clearly indicated that shirt with detachable garment components is suitable for both adolescents and early adults (each 80.00%) and not for children belonging to 6-12 yrs (73.33%). Most of the adolescent girls (90.00%) and boys (73.33%) indicated that such shirts are becoming for adolescents as well as early adults (60.00%, AG and 70.00%, AB) and definitely not for boys of late childhood (80.00%, AG and 66.67%, AB). Thus, it may be inferred that, in totality, gents shirt is more relevant to adolescents (81.33%) followed by early adults (68.00%) and not for children of 6-12 yrs (73.33%) age group.

On the contrary, designer's gents kurta with detachable garment components found to be suitable for early adults (86.67%, HS and 80.00%, AB) followed by adolescents (73.33%, HS and 63.33%, AB) and not very relevant to late childhood (86.67%, HS and 70.00%, AB) age group. Whereas, each 73.33 per cent of the adolescent girls expressed that gents kurta are suitable for both adolescents and early adults but not suitable for late childhood (76.67%) age group. Hence, it may be summarized that gents kurtas are more suitable for early adults (78.67%) followed by adolescents (69.33%) and not found to be relevant to children belonging to 6-12 yrs (76.00%) (Fig. 29).

4.7.3.9 Relevance of designer's apparel with various surface embellishments for different occasions

While designing, it is equally important to forecast the occasion for which the garments are constructed as that of deciding the target customers. Since, clothes are chosen occasion wise *i.e.* casual, formal, traditional or party wear. Therefore, while selecting the clothes, focus should be given to the occasion, when to be worn. Hence, it was necessary to find out the relevance of designer's apparel with various surface embellishments with respect to different occasions.

Table 50 shows that the entire sample reported hand embroidery on ladies top-cum-kurta is more relevant on traditional wear (86.67% HS, 66.67% AG and 70.00% AB), machine embroidery on formal wear (73.33% HS) and on casual wear (50.00% AG and 56.67% AB) and zardosi on only party wear (93.33% HS, 86.67% AG and 73.33% AB). Further 60 per cent of the Home Scientists envisaged that hand embroidery and machine embroidery looks good even on casual wears. Adolescent girls did support the vision of Home Scientists in visualizing hand embroidery on casual wears (63.33%). On the contrary, very meager per cent of Home Scientists notified that zardosi does not go well on casual wear (06.67%) followed by formal wear (13.33%); and hand embroidery on party wear (13.33%). Similarly, 13.33 per cent of adolescent girls reciprocated that zardosi is not an appropriate on casual and formal wears. Similarly, adolescent boys enlightened that hand embroidery do not match on party wear (06.67%), zardosi on casual wear (10.00%) and traditional wear (13.33%).

With respect to gents shirt, 93.33 per cent of the Home Scientists and 63.33 per cent of the adolescent girls opted hand embroidery on traditional wear whereas 66.67 per cent of the adolescent boys selected it for casual wears.

Table 48. Lure towards the new concept of detachable garment components

	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
	Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
	Yes	No	Yes	No	Yes	No	Yes	No
Lure towards the new concept of detachable garment components	60 (100.00)	0 (0.00)	116 (96.70)	04 (03.33)	120 (100.00)	0 (0.00)	296 (98.70)	04 (01.33)

Figure in parenthesis indicate percentages

Table 49. Relevance of designer's apparel with detachable garment components for different age groups

Sl. No.	Designer's apparel	Age group	n ₁ =60		n ₂ =120		n ₃ =120		n=300	
			Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
			Suitable	Non-suitable	Suitable	Non-suitable	Suitable	Non-suitable	Suitable	Non-suitable
A.	Ladies top –cum-kurta									
		Late Childhood (6-12 yrs)	24 (40.00)	36 (60.00)	52 (43.00)	68 (56.67)	76 (63.33)	44 (36.67)	152 (50.67)	148 (49.33)
		Adolescents (12-18 yrs)	48 (80.00)	12 (20.00)	108 (90.00)	12 (10.00)	88 (73.33)	32 (26.67)	244 (81.33)	56 (18.67)
		Early Adulthood (18-40 yrs)	44 (73.33)	16 (26.67)	48 (40.00)	72 (60.00)	28 (23.33)	92 (76.67)	120 (40.00)	180 (60.00)
B.	Gents shirt									
		Late Childhood (6-12 yrs)	16 (26.67)	44 (73.33)	24 (20.00)	96 (80.00)	40 (33.33)	80 (66.67)	80 (26.67)	220 (73.33)
		Adolescents (12-18 yrs)	48 (80.00)	12 (20.00)	108 (90.00)	12 (10.00)	88 (73.33)	32 (26.67)	244 (81.33)	56 (18.67)
		Early Adulthood (18-40 yrs)	48 (80.00)	12 (20.00)	72 (60.00)	48 (40.00)	84 (70.00)	36 (30.00)	204 (68.00)	96 (32.00)
C.	Gents kurta									
		Late Childhood (6-12 yrs)	8 (13.33)	52 (86.67)	28 (23.33)	92 (76.67)	36 (30.00)	84 (70.00)	72 (24.00)	228 (76.00)
		Adolescents (12-18 yrs)	44 (73.33)	16 (26.67)	88 (73.33)	32 (26.67)	76 (63.33)	44 (36.67)	208 (69.33)	92 (30.67)
		Early Adulthood (18-40 yrs)	52 (86.67)	08 (13.33)	88 (73.33)	32 (26.67)	96 (80.00)	24 (20.00)	236 (78.67)	64 (21.33)

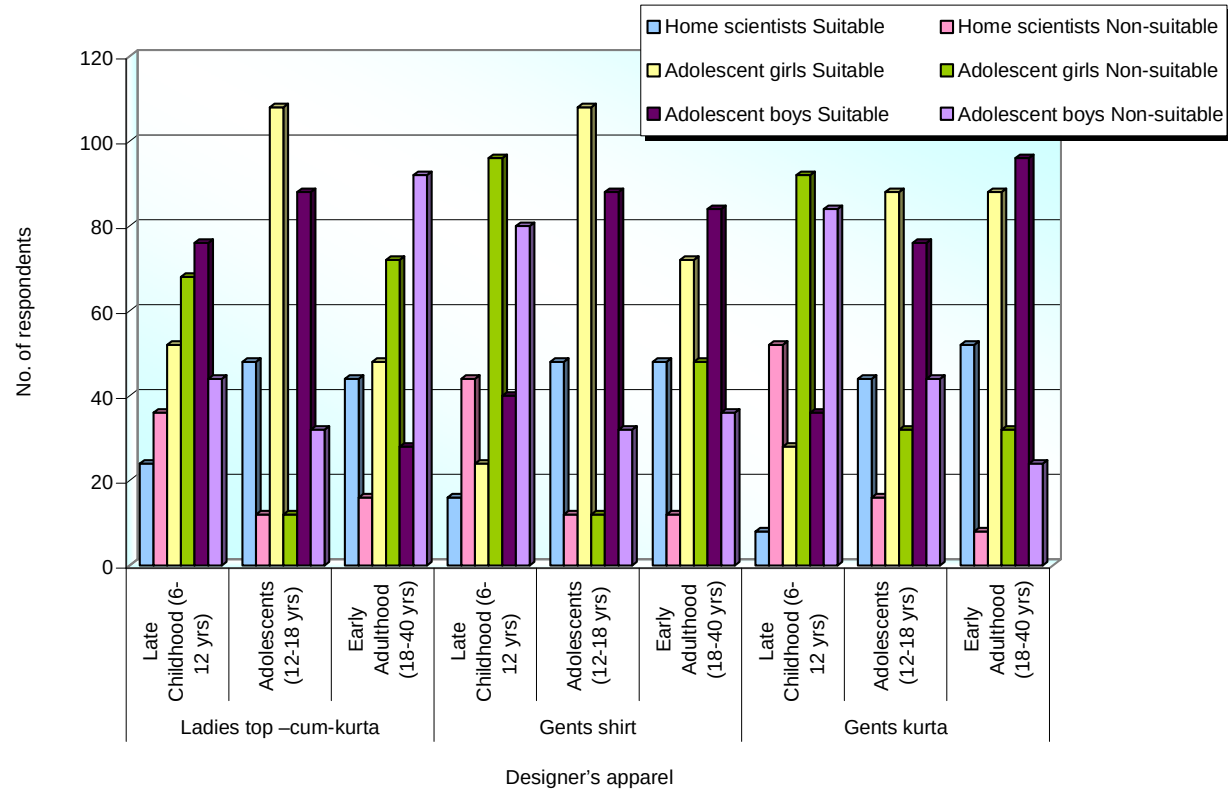


Fig. 29. Relevance of designer's apparel with detachable garment components for different age groups

Fig. 29. Relevance of designer's apparel with detachable garment components for different age groups

Table 50. Relevance of designer's apparel with detachable garment components for different occasions

			n ₁ =60	n ₂ =120	n ₃ =120	n=300				
Sl. No.	Designer's apparel	Occasion	Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
			Suitable	Non-suitable	Suitable	Non-suitable	Suitable	Non-suitable	Suitable	Non-suitable
A.	Ladies top –cum-kurta									
1.	Hand embroidery	Casual Wear	36 (60.00)	24 (40.00)	76 (63.33)	44 (36.67)	44 (36.67)	76 (63.33)	156 (52.00)	144 (48.00)
		Formal Wear	32 (53.33)	28 (46.67)	56 (46.67)	64 (53.33)	48 (40.00)	72 (60.00)	136 (45.33)	164 (54.67)
		Traditional Wear	52 (86.67)	8 (13.33)	80 (66.67)	40 (33.33)	84 (70.00)	36 (30.00)	216 (72.00)	84 (28.00)
		Party Wear	8 (13.33)	52 (86.67)	32 (26.67)	88 (73.33)	08 (06.67)	112 (93.33)	48 (16.00)	252 (84.00)
2.	Machine embroidery	Casual Wear	36 (60.00)	24 (40.00)	60 (50.00)	60 (50.00)	68 (56.67)	52 (43.33)	164 (54.67)	136 (45.33)
		Formal Wear	44 (73.33)	16 (26.67)	52 (43.33)	68 (56.67)	24 (20.00)	96 (80.00)	120 (40.00)	180 (60.00)
		Traditional Wear	8 (13.33)	52 (86.67)	44 (36.67)	76 (63.33)	44 (36.67)	76 (63.33)	96 (32.00)	204 (68.00)
		Party Wear	28 (46.67)	32 (53.33)	28 (23.33)	92 (76.67)	52 (43.33)	68 (56.67)	108 (36.00)	192 (64.00)
3.	Zardosi	Casual Wear	4 (06.67)	56 (93.33)	16 (13.33)	104 (86.67)	12 (10.00)	108 (90.00)	32 (10.67)	268 (89.33)
		Formal Wear	8 (13.33)	52 (86.67)	16 (13.33)	104 (86.67)	32 (26.67)	88 (73.33)	56 (18.67)	244 (81.33)
		Traditional Wear	12 (20.00)	48 (80.00)	52 (43.33)	68 (56.67)	16 (13.33)	104 (86.67)	80 (26.67)	220 (73.33)
		Party Wear	56 (93.33)	4 (06.67)	104 (86.67)	16 (13.33)	88 (73.33)	32 (26.67)	248 (82.67)	52 (17.33)

Table 50. Contd.....

Sl. No.	Designer's apparel	Occasion	Home Scientists (HS)		Adolescent Girls (AG)		Adolescent Boys (AB)		Total (n ₁ + n ₂ + n ₃)	
			Suitable	Non-suitable	Suitable	Non-suitable	Suitable	Non-suitable	Suitable	Non-suitable
B.	Gents shirt									
1.	Hand embroidery	Casual Wear	40 (66.67)	20 (33.33)	72 (60.00)	48 (40.00)	80 (66.67)	40 (33.33)	192 (64.00)	108 (36.00)
		Formal Wear	40 (66.67)	20 (33.33)	44 (36.67)	76 (63.33)	52 (43.33)	68 (56.67)	136 (45.33)	164 (54.67)
		Traditional Wear	56 (93.33)	4 (06.67)	76 (63.33)	44 (36.67)	72 (60.00)	48 (40.00)	204 (68.00)	96 (32.00)
		Party Wear	24 (40.00)	36 (60.00)	36 (30.00)	84 (70.00)	08 (06.67)	112 (93.33)	68 (22.67)	232 (77.33)
2.	Machine embroidery	Casual Wear	28 (46.67)	32 (53.33)	56 (46.67)	64 (53.33)	64 (53.33)	56 (46.67)	148 (49.33)	152 (50.67)
		Formal Wear	28 (46.67)	32 (53.33)	60 (50.00)	60 (50.00)	44 (36.67)	76 (63.33)	132 (44.00)	168 (56.00)
		Traditional Wear	20 (33.33)	40 (66.67)	72 (60.00)	48 (40.00)	52 (43.33)	68 (56.67)	144 (48.00)	156 (52.00)
		Party Wear	48 (80.00)	12 (20.00)	84 (70.00)	36 (30.00)	92 (76.67)	28 (23.33)	224 (74.67)	76 (25.33)
C.	Gents kurta									
1.	Hand embroidery	Casual Wear	36 (60.00)	24 (40.00)	72 (60.00)	48 (40.00)	76 (63.33)	44 (36.67)	184 (61.33)	116 (38.67)
		Formal Wear	40 (66.67)	20 (33.33)	60 (50.00)	60 (50.00)	52 (43.33)	68 (56.67)	152 (50.67)	148 (49.33)
		Traditional Wear	56 (93.33)	4 (06.67)	92 (76.67)	28 (23.33)	64 (53.33)	56 (46.67)	212 (70.67)	88 (29.33)
		Party Wear	24 (40.00)	36 (60.00)	44 (36.67)	76 (63.33)	32 (26.67)	88 (73.33)	100 (33.33)	200 (66.67)
2.	Machine embroidery	Casual Wear	20 (33.33)	40 (66.67)	64 (53.33)	56 (46.67)	72 (60.00)	48 (40.00)	156 (52.00)	144 (48.00)
		Formal Wear	24 (40.00)	36 (60.00)	52 (43.33)	68 (56.67)	44 (36.67)	76 (63.33)	120 (40.00)	180 (60.00)
		Traditional Wear	16 (26.67)	44 (73.33)	56 (46.67)	64 (53.33)	64 (53.33)	56 (46.67)	136 (45.33)	164 (54.67)
		Party Wear	56 (93.33)	4 (06.67)	68 (56.67)	52 (43.33)	84 (70.00)	36 (30.00)	208 (69.33)	92 (30.67)

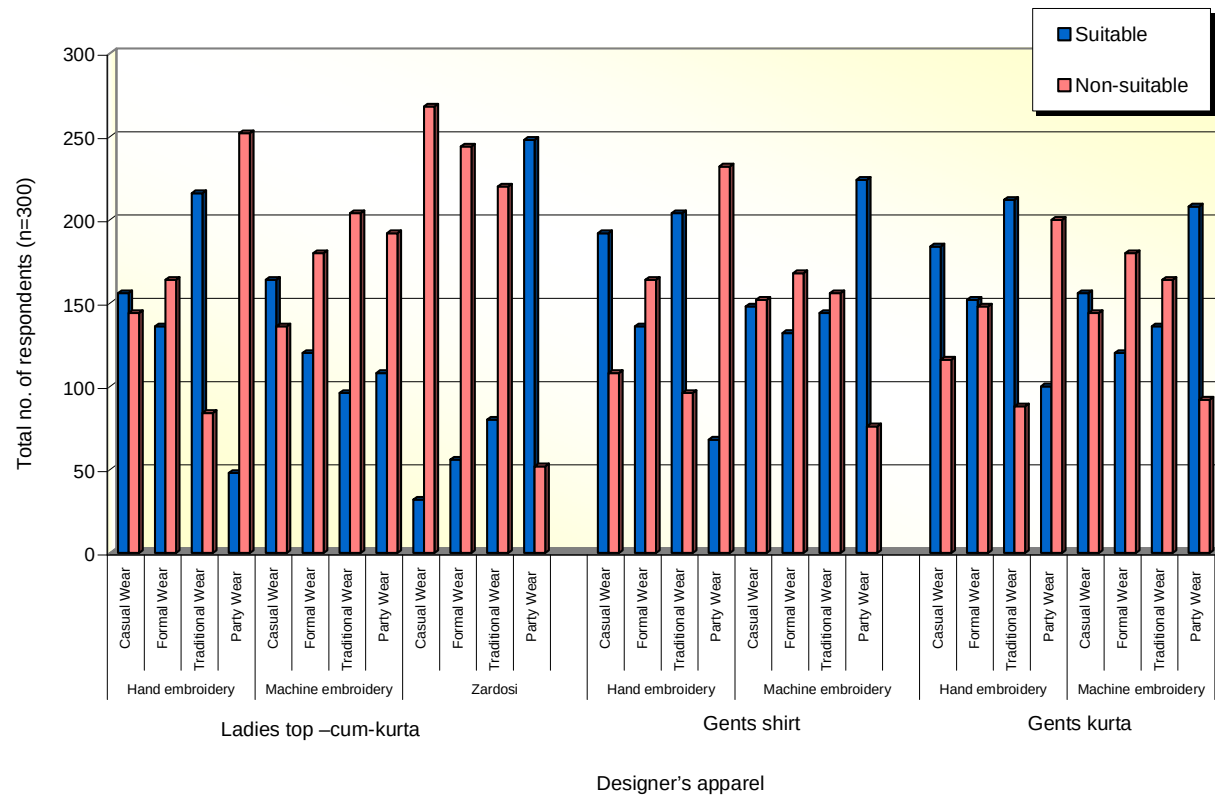


Fig. 30. Relevance of designer's apparel with detachable garment components for different occasions

Fig. 30. Relevance of designer's apparel with detachable garment components for different occasions

And all the three categories of respondents updated that machine embroidery is relevant on party wear (80.00% HS, 70.00% AG and 76.67% AB). It is also enumerated by 66.67 per cent of the Home Scientists that hand embroidery looks good even on casual wear and formal wear while 60 per cent each of adolescent girls and boys imagined it on casual wear and traditional wear respectively. So also, machine embroidery was found to be relevant on traditional attire by 60 per cent of the adolescent girls. On the other hand, negligible no. of adolescent boys reported that hand embroidery is not relevant on party wear (06.67%).

Regarding gents kurta, most of the Home Scientists and adolescent girls disclosed that hand embroidery suits better on traditional attire (93.33% HS and 63.33% AG) but 63.33 per cent of adolescent boys showed their penchant towards casual wear. On the other hand, machine embroidery was found to be relevant on party wears (93.33% HS, 56.67% AG and 70.00% AB) by all the three categories of respondents.

On the contrary, 66.67 per cent of Home Scientists, 60 per cent of adolescent girls and 53.33 per cent of adolescent boys specified that hand embroidery is better suitable on formal wear, casual wear and traditional wears respectively. Whereas, machine embroidery was found to be relevant on casual wear (53.33 % AG and 60.00% AB).

In a nutshell, irrespective of the category of respondents, it may be summarized that for ladies top-cum-kurta, hand embroidery is more relevant on traditional wear (72.00 %) followed by casual wear (52.00%), machine embroidery for casual wear (54.67%) and zardosi for party wears (82.67%). Only 10.67 per cent of the total respondents rejected the relevance of zardosi on casual wears.

While, it is understood from the Table 45 that with respect to gents shirt, hand embroidery looks better on traditional wear (68.00%) followed by casual wears (64.00%) and machine embroidery for party wears (74.67%). In case of gents kurta, 70.67 per cent of the respondents disclosed that hand embroidery is best suited for traditional wears followed casual wear (61.33%) and formal wear (50.67%) and machine embroidery is relevant on party wears (69.33%) followed by casual wears (52.00%) (Fig. 30).

4.7.3.10 General opinion about the new concept of detachable garment components

In the present era of globalization and media highlight, the cultural facets of individual nations are almost lost. Thereby, the profession of the fashion designers or researchers in textile field has called for a lot of creativity, innovation, the ability to think out of the box and a high sense of trims and cuts. Hence an effort made by the researcher was explored by analyzing the respondent's response towards place of trendy designer's apparel in the ever changing fashion world. It was very encouraging to note that invariably cent percent of the Home Scientists, adolescent boys and 96.70 percent of adolescent girls reacted positively and gave their opinion that the trendy designer's apparel will have a glorious place in the ever changing fashion world.

These designer's NCC *khadi* fabrics complement to revival of every Indian fabric and successfully aid in bridging the gap between traditionalism and modernity. Hence it was felt important to verify the suitability of designer's NCC *khadi* fabric as contemporary material for designer's apparel. Cent percent of the total respondents including Home Scientists, adolescent boys and girls opined that designer's NCC *khadi* fabric give a contemporary look when used for designer's apparel.

These fascinating attires with the new concept of detachable garment components are the part of the vast and vivid collection exclusively created with the distinct touch of traditional designs. Lastly but not lately, it was vital to collect the overall opinion of respondents about the new concept of detachable garment components. Totally it was presented in Table 51 that majority of the respondents expressed (78.67%) that the new concept of detachable garment components was excellent and remaining 21.33 percent mentioned as good.

4.8 Cost of production of designer's *khadi* apparel

Money is the deciding factor in the purchasing of clothes. While purchasing, priority will be on the requirement and the income. There are several factors which influence the cost of clothes such as type of fabric, the finishes given, type of weave, exclusive designing, handwork or machine work, etc. Therefore, it was felt necessary to study the cost of production of ladies top-cum-kurta, gents shirt and kurta designed with reviving concept of detachable garment components and compare between them. The fabric cost has been estimated as Rs. 100, Rs. 110 and Rs. 120 per metre for NCC control, stripe and checks respectively which included special finish cost.

Table 51. General opinion about the new concept of detachable garment components

	n₁=60			n₂=120			n₃=120			n=300		
	Home Scientists (HS)			Adolescent Girls (AG)			Adolescent Boys (AB)			Total (n₁ + n₂ + n₃)		
	F	G	E	F	G	E	F	G	E	F	G	E
General opinion about the new concept of detachable garment components	0 (0.00)	16 (26.67)	44 (73.33)	0 (0.00)	16 (13.33)	104 (86.67)	0 (0.00)	32 (26.67)	88 (73.33)	0 (0.00)	64 (21.33)	236 (78.67)

Note: F – Fair, G – Good, E – Excellent

Figure in parenthesis indicate percentages

4.8.1 Cost of production of ladies top-cum-kurta

The cost of production of NCC plain, two stripes and two checks ladies top-cum-kurta are clearly presented in cost sheets in the Table 17 – 21 respectively. The production cost varies according to type of fabric, materials and trimmings required and type of embellishment used. The fabric required for a ladies top-cum-kurta without any embellishment is 2.5 mts. whereas with detachable garment components having hand, machine and zardosi embroidery is assessed as 5.5 mts.

Table 17 enumerates that the cost of production of NCC plain ladies top-cum-kurta range from about Rs. 406 to Rs. 1334 which can be sold with the profit margin of 30 per cent which varies from Rs. 528 to Rs. 1728. The cost of detachable components with zardosi is higher (Rs. 520) followed by hand embroidered (Rs. 351) and machine embroidered (Rs. 330).

It is clearly indicated in the Table 18 and 19 that the cost of production of both the stripe ladies top-cum-kurta viz., pin stripe and medium stripe respectively is found to be same and varies from Rs. 431 to Rs. 1389. After adding profit margin the price ranges from Rs. 560 to Rs. 1799. Similar trend is followed here also as that of NCC control that more cost is estimated for detachable components with zardosi (Rs. 533) followed by hand embroidered (Rs. 364) and machine embroidered (Rs. 343).

Both the checks ladies top-cum-kurta, have been anticipated to be of the same cost varying from Rs. 456 to Rs. 1444. About 30 per cent of profit margin can be added to it ranging from Rs. 593 to Rs. 1871. The increasing order of production cost for detachable components are machine embroidered (Rs. 356), hand embroidered (Rs. 377) and zardosi worked (Rs. 546) (Table 20 – 21).

Thus, it can be concluded that the cost of production for all the ladies checks top-cum-kurta is higher followed by stripe and plain. So also the cost is more for detachable components embellished with zardosi followed by hand embroidery and machine embroidery. The production cost of designer ladies top-cum-kurta with embellished detachable garment components is found to be about three times more than the ladies top without any embellishment.

4.8.2 Cost of production of gents shirt

The cost of production of NCC plain, two stripes and two checks gents shirt are clearly presented in cost sheets in the Table 22 – 26 respectively. The production cost varies according to type of fabric, materials and trimmings required and type of embellishment used. The fabric required for a gents shirt without any embellishment is 3.25 mts. whereas with detachable garment components having hand and machine embroidery is assessed as 4.75 mts.

Table 22 enumerates that the cost of production of NCC plain ladies top-cum-kurta range from about Rs. 547 to Rs. 1046 which can be sold with the profit margin of 30 per cent which varies from Rs. 711 to Rs. 1360. The cost of detachable components with hand embroidery is higher (Rs. 334) followed by machine embroidery (Rs. 315).

It is clearly indicated in the Table 23 and 24 that the cost of production of both the stripe gents shirt viz., pin stripe and medium stripe respectively is found to be same and varies from Rs. 580 to Rs. 1094. After adding profit margin the price ranges from Rs. 753 to Rs. 1422. Similar trend is followed here also as that of NCC plain that more cost is estimated for detachable components with hand embroidery (Rs. 343) followed by machine embroidery (Rs. 325).

Both the checks gents shirt, have been anticipated to be of the same cost varying from Rs. 612 to Rs. 1141. About 30 per cent of profit margin can be added to it ranging from Rs. 796 to Rs. 1483. The increasing order of production cost for detachable components are machine embroidery (Rs. 335) and hand embroidery (Rs. 353) (Table 25 – 26).

Thus, it can be concluded that the cost of production for all the gents checks shirt is higher followed by stripe and plain. So also the cost is more for detachable components embellished with zardosi followed by hand embroidery and machine embroidery. The production cost of designer gents shirt with embellished detachable garment components is found to be about two times more than the shirt without any embellishment.

4.8.3 Cost of production of gents kurta

The cost of production of NCC plain, two stripes and two checks gents kurta are clearly presented in cost sheets in the Table 27 – 31 respectively.

The production cost varies according to type of fabric, materials and trimmings required and type of embellishment used. The fabric required for a gents kurta without any embellishment is 3.50 mts. whereas with detachable garment components having hand and machine embroidery is assessed as 4.00 mts.

Table 27 enumerates that the cost of production of NCC plain gents kurta range from about Rs. 509 to Rs. 748 which can be sold with the profit margin of 30 per cent which varies from Rs. 661 to Rs. 972. The cost of detachable components with hand embroidery is higher (Rs. 163) followed by machine embroidery (Rs. 148).

It is clearly indicated in the Table 28 and 29 that the cost of production of both the stripe gents kurta viz., pin stripe and medium stripe respectively is found to be same and varies from Rs. 544 to Rs. 788. After adding profit margin the price ranges from Rs. 707 to Rs. 1024. Similar trend is followed here also as that of NCC plain that more cost is estimated for detachable components with hand embroidery (Rs. 166) followed by machine embroidery (Rs. 151).

Both the checks gents kurta, have been anticipated to be of the same cost varying from Rs. 579 to Rs. 828. About 30 per cent of profit margin can be added to it ranging from Rs. 752 to Rs. 1076. The increasing order of production cost for detachable components are machine embroidery (Rs. 154) and hand embroidery (Rs. 170) (Table 30 – 31).

Thus, it can be concluded that the cost of production for all the gents checks kurta is higher followed by stripe and plain. So also the cost is more for detachable components embellished with zardosi followed by hand embroidery and machine embroidery. The production cost of designer gents kurta with embellished detachable garment components is found to be about one and half times more than the kurta without any embellishment.

DISCUSSION

The discussion of the study entitled “Naturally Coloured Cotton Designer’s Apparel: An Emerging Trend in *Khadi* World” is presented under the following headings:

- 5.1 Spinning, doubling and quality assessment of white and naturally coloured cotton yarns
- 5.2 Weaving designer’s *khadi* fabric
- 5.3 Impact of special finishes on fabric quality parameters
 - 5.3.1 Structural properties
 - 5.3.2 Performance properties
 - 5.3.3 Durable properties
- 5.4 Consumer’s preference for surface embellishment
- 5.5 Designing and construction of *khadi* outfits with a new concept of detachable garment components
- 5.6 Designing and embellishing the detachable garment components
- 5.7 Consumer’s acceptance for designer’s *khadi* apparel
 - 5.7.1 Consumers’ choice for naturally colour cotton
 - 5.7.2 Consumers’ acceptance for *khadi* fabrics
 - 5.7.3 Consumers’ view on the concept of detachable garment components
- 5.8 Cost of production of designer’s *khadi* apparel

5.1 Spinning, doubling and quality assessment of white and naturally coloured cotton yarns

The WC and DDCC-1 were separately spun and twisted into doubled yarn. Table 4 clearly showed that the Count Strength Product of WC is found to be higher than DDCC-1 yarn which may be because white cotton is much fine spun with higher twist per inch that inturn contributed to higher lea strength than DDCC-1.

5.2 Weaving designer’s *khadi* fabric

In the present study, a total of six fabrics were produced by manipulating white and naturally brown coloured cotton yarns of which two control fabrics viz., white and naturally coloured cottons; two stripes viz., pin and medium stripes and two checks fabrics viz., small and medium checks as indicated under 4.2.

5.3 Impact of special finishes on fabric quality parameters

5.3.1 Structural properties

5.3.1.1 Yarn count (Ne) of hand woven *khadi* fabric

It is learnt from Table 6 that there is slight increase in the yarn fineness irrespective of yarn direction at control as well treated with enzyme and softener finish. The naturally coloured cotton yarns were sized before warping and some percent of it was desized during finishing. Further, deposition of trace of enzyme and/or softening agents on the surface of the fabric probably did not alter the yarn count drastically. Thus, there was not remarkable increase in the yarn count after treatment. This slight increase in the yarn count of the treated samples compared to control may be because of warp yarns being relatively coarser have larger surface area with little protruding fibres which were removed during the enzyme wash and probably made the yarns finer and smoother.

Moreover, the increase in yarn fineness may be because of physical modification of the fibre, wherein the softener acted on the fibre surface initially and then lowered the intermolecular attraction by penetrating into the fibre system and finally softened the fabric. Thus the warp and weft yarns might have become finer. Meanwhile, there was slight variation in warp and weft counts which may be attributed to unevenness and coarseness of hand spun yarns.

5.3.1.2. Cloth count (numerical expression) and cloth thickness (mm) of hand woven *khadi* fabric

It is apparent from Table 7 that among all the six test samples ends per unit area was greater than the corresponding picks which indicates a compact alignment of warp yarns compared to weft. Greater number of ends per unit area attributes to many important functional properties like strength, durability, serviceability, drapability and cloth balance. On application of special finishes, there was consolidation of yarns in both directions on application of special finishes *i.e.* enzyme and softener wash; in turn resulting into increase in the yarn density and compactness of weave.

Further no much difference was observed in warp density among the fabric samples which may be because of weave calculation that remained same for all the six fabrics; however slight difference in weft density was observed which may be attributed to a process *viz.*, beating up in hand weaving that varied among individual weaver.

The results are supported by Suman and Khambra (2003), who stated that cellulose enzymatic treatment lead to increase in cloth count of both cent per cent cotton denim (light weight and heavy weight denim) and blended cotton denim (synthetic denim). The results are also supported by the finding of Sujata and Naik (2006), where the softeners treated samples showed higher thread density when treated with cationic and silicone softeners on naturally coloured cotton with treatment time 30 min.

A perusal of the same Table also showed a trend of decrease in cloth thickness on wet treatment. The test samples have become thinner on subsequent wet processing; however, there is a variation in the percentage thickness. The change in the thickness is mainly because of the physical changes evolved during enzyme and softener finishes. In enzymatic treatment, the cellulose is hydrolysed especially in the amorphous region, which in turn assisted in removal of short protruding fibres from the fabric surface, thus resulting into smooth surface. Further desizing and dehairing as a simultaneous activity in softener treatment made the yarn smoother.

Nevertheless, the cloth thickness of pin stripe and small checks was comparatively lesser than medium stripe and medium checks fabrics respectively and may be due to fabric composition where DDCC-1 is more than 50 percent among pin stripe and small checks and more than 75 percent in medium stripe and medium checks fabric. DDCC-1 yarn is relatively coarser than WC.

These results are on par with the study conducted by Raje *et al.* (2001) where that the cloth thickness reduced on treating cotton fabric with commercial endogluconase cellulose enzyme finish and silicone softener finish.

5.3.1.3. Cloth weight (GSM) of hand woven *khadi* fabric

From Table 8 it is clear that the GSM of all the test samples were relatively greater at control than the enzyme and softener washed samples. This may be because of removal of greater percent of surface fibres or fuzz present on the fabric, along with sizing material during mechanical agitation involved while giving special finish. It is also evident that the fabrics were woven with greater number of ends/unit area; eventually the warp percentage was remarkably higher than the corresponding weft percentage.

Further Table 6 and Table 7 ensure that of the six fabric samples, the GSM of DDCC-1 was greater than white cotton at control, which may be because white cotton being much finer than DDCC-1. The GSM of pin stripe and small checks was relatively lower compared to medium stripe and medium checks, this may be attributed to fabric composition where percentage of DDCC-1 is more than 50 percent among pin stripe and small checks and is more than 75 percent in medium stripe and medium checks fabric. Greater the percentage of DDCC-1 higher is the GSM because of DDCC-1 yarn being relatively coarser than WC, invariably added to the GSM.

5.3.2. Performance properties

5.3.2.1. Cloth crease recovery (degrees) and cloth stiffness (cm) of hand woven *khadi* fabric

A trend of gradual decrease in warpway and weftway crease recovery angle is observed from Table 9, when the newly designed fabrics were subjected to special finishes. This may be because of the effect of finishes (enzyme and softener) that imparted softness by hydrolyzing and removing the surface fibres thus reducing the stiffness due to deposition of a thin film on the surface which is exceptionally soft. These results are supported by the values of reduction in bending length on finishing.

However, it may be inferred from these results that lower the bending length, softer, pliable and docile the fabric is. Soft and pliable fabric have lower crease recovery angle, because of better flexibility.

The crease recovery angle of pin stripe and small checks was relatively lower compared to medium stripe and medium checks, this may be due to fabric composition where percentage of DDCC-1 is more than 50 percent among pin stripe and small checks and is more than 75 percent in medium stripe and medium checks fabric. Greater the percentage of DDCC-1 higher is the crease recovery angle because of DDCC-1 yarn being relatively coarser than WC, invariably added to the crease recovery.

The results are in line with study conducted by Kurlageri (2009) where in both ribbed and basket woven organic cotton samples, the cloth crease recovery gradually reduced from control to enzyme and then to softener.

An appraisal of Table 9 also showed that the warpway bending length of all the samples before treatment was greater than its corresponding weftway bending length except in white cotton (WC). Sizing warp sheet during pre loom process did stiffen the ends, which in turn helped to maintain the warp tension, parallel alignment to the ground as well to withstand the abrasion during primary motion. Meanwhile size did contribute to the cloth stiffness. But because of partial desizing and relaxation of warp yarns during wet treatments *i.e.* enzyme and softener finish, a remarkable decrease in the stiffness was observed, eventually indicated an increase in fabric pliability. In other words the special finish has imparted softness and smoothness to the designer's fabrics by dehairing, thus making the fabric more pliable than the untreated.

These results are in line with the study conducted by Suman and Khambra (2003), who observed that the bending length of denim fabrics decreased after enzyme treatment.

5.3.2.3. Cloth drapability (%) of hand woven *khadi* fabric

From Table 10, it may be concluded that enzyme and softener finish imparted the better drapability for all the samples. These special finishes imparted the softness and pliability for the *khadi* samples when compared to control, where the latter was stiffer with longer bending path because of presence of sizing material in turn showed relatively poor drapability. The excellent softness of the treated fabrics may be because of the softener finish which is evident from reduction in the bending path and decreased crease recovery angle indirectly indicated an improvement in the drapability.

Medium stripe and medium check samples showed poor drape which may be because of presence of greater number of DDCC-1 yarns in the warp and weft directions when compared to pin stripe and small checks even after treating the samples with special finishes.

The results are on par with study conducted by Kurlageri (2009) where enzymatic finish improved the drapability of organic handloom cotton fabric sample to some extent, which is further improved by softener treatment.

5.3.3. Durable properties

5.3.3.1. Cloth tensile strength (kgf) and elongation (%) of hand woven *khadi* fabric

Tensile strength of all the designer's *khadi* fabrics presented in Table 12 indicated to be higher at control than treated samples. This may be because the tensile forces readily displaced the cellulose molecules in the amorphous region of untreated sample where the fibres readily stretched to absorb a considerable amount of force applied.

As mentioned earlier, the structural properties that influence the tensile strength of the cloth are yarn and its characteristics (Table 6), cloth count and cloth thickness (Table 7) and cloth weight (Table 8). The values presented in the above Tables clearly indicated that the yarn count, cloth count, weight and thickness have become finer on application of special finishes that has direct impact on the cloth tensile strength. Finer yarns resulted into finer cloth count and the latter has negatively influenced the cloth weight as well as cloth thickness; finally showed a negative trend in tensile properties of special finished designer's *khadi* fabrics.

These results are not in line with the study conducted by Sujata and Naik (2006) where the softener treated samples showed increase in tensile strength but is supported by the study performed by Kurlageri (2009).

From Table 12 it was concluded that, there was gradual and steady reduction in the elongation of the samples treated with special finishes. The fall in the elongation percentage value may be because of increase in yarn fineness, decrease in cloth thickness due to dehairing, softness, pliability of the fabric.

The percentage decrease in the elongation was almost two to three times in warpway than weftway samples after softener and enzyme finish. This decrease in percent elongation may be attributed to weakening of yarns due to removal of protruding fibres. Thus, the hypothesis stated structural and performance properties do not influence the durable properties of designer's *khadi* fabric is disproved.

5.3.3.3. Cloth abrasion (cycles) and cloth pilling (ratings) of hand woven *khadi* fabric

Table 14 disclosed the abrasion resistance of the designer's *khadi* fabrics. Abrasion resistance is one of the factors that influence the life of a fabric. Failure of abrasion resistance is mainly due to weakening of the structure caused by mechanical breakdown of the individual fibres and this mechanism of breakdown is substantially the same for all fibres. Only those fibres held firmly by tension and pressure suffer gentle abrasion. The general weakening of the fabric structure and majority of the tears and splits that occur in many worn garments are a direct consequence of fibre breakdown. The structural properties influencing the cloth abrasion resistance to a greater extent are fibre content, yarn count and thickness and to some extent, the fabric sett and the starch held mechanically on the cloth surface.

It is observed from the Table 14 that there is no difference in the abrasion resistance between the control and treated fabrics except in pin stripe where there is negligible increase in abrasion resistance.

Table 14 also revealed that there is no difference between the pilling of control and treated samples. All the samples have shown excellent resistance to pilling. It may also be noted here that there is not much difference in abrasion resistance between control and treated samples; so also the pilling values.

5.4 Consumers preference for type of surface embellishment

5.4.1 Choice for surface embellishments by the respondents

It is obvious that ladies wears demand more surface decoration and beautification compared to gent's garments. A similar opinion is expressed in Table 15 where most of the respondents desired embellishments on ladies kurta followed by ladies top, gent's kurta and lastly gent's shirt. Ladies kurtas could be worn on salwar as well as pants or any leg wears with little embellishment as casual or formal wears and highly embellished for occasional or party wears. Therefore, the respondents expressed, decoration is more suitable on versatile garments *i.e.* kurta than single end use one *i.e.* top. Among gent's wears, kurta being versatile is worn on pyjamas as well as pants could be used either as occasional or party wear whereas gent's shirt is invariably considered as formal wear, worn on pants. Surface embellishment enhances the aesthetic appearance and attracts the customers. Further more, embellishments are suitable on ladies wear than gents, as well ladies are conscious of beauty and have a sense of appearance, colour and design.

5.4.2 Preference for type of surface embellishments by the respondents

A perusal of Table 16 clearly shows that irrespective of gents or ladies wears, most of the respondents preferred hand embroidery and machine embroidery may be because these surface embellishments are presently in vogue. Moreover the respondents were educated and belonged to decent and dignified strata who had a sense of decoration or the respondents probably have failed to imagine and visualize the appearance of other embellishment such as appliqué, fringed edges, honeycomb, pin tucks etc.

Customarily most of them accepted that gents shirt to be a formal wear that can tolerate minimal embellishment. So also gents kurta which is usually simple in *khadi* for regular wear or decently embellished with hand or machine embroidery with little glass work used as occasional or party wear. Belts & buckles and ties & bows are rarely preferred on all garments probably these need special care and maintenance failing which tend to wear off very early.

Moreover the hand and machine embroideries are flat embroideries always in the fashion world as evergreen since ages and represent the Indian tradition, appealing to all age groups and have longer life than any other embellishments.

5.5 Designing and construction of *khadi* outfits with a new concept of detachable garment components

The five varieties of *khadi* fabrics were used design and construct designer's outfits by the researcher with a new concept of detachable garment components as explained in 4.5.

5.6 Designing and embellishing the detachable garment components

Surface embellishments viz., hand, machine embroideries and zardosi were used on ladies top cum kurta whereas hand and machine embroideries were used on gents shirt and kurta as elaborated in 4.6.

5.7 Consumers' acceptance for designer's *khadi* apparel

5.7.1 Consumers' choice for naturally colour cotton

5.7.1.1 Respondents' awareness about Naturally Colour Cotton (NCC)

It is imperative to note from Table 32 that on the whole about 84 percent of the respondents were aware about the naturally coloured cotton, may be through printed or mass media. Furthermore, the respondents belonged to Hubli - Dharwad twin cities, who usually visit the krishi melas organized every year in UAS, Dharwad in which information on naturally coloured cotton is displayed. The other reason would be that in the present electronic world of computers, information very easily spreads all over the Globe within seconds and is available on the web. The students probably have known about colour cotton through internet browsing.

5.7.1.2 Respondents' outlook about traits of naturally colour cotton

It is evident from Table 32a that about 96.83 per cent of the total respondents knew that NCC is eco and skin friendly which may be because of the word "Naturally", itself that is prefixed for coloured cotton. In general, cotton is short staple and known to mankind since ages. So, white cotton may be perplexed with the naturally coloured cotton by 71.43 per cent of the respondents.

Further 58-60 per cent of them opined that there are multi colours in cotton which, do not need dyeing. These features of naturally coloured cotton were known to 97 per cent of the total respondents which may be totally attributed to the wide usage of internet and other latest technologies that tend to spread the information speedily.

5.7.1.3. Respondents' view about designer's NCC *khadi* fabrics

Table 33 showed that 73 per cent of the total respondents viewed designer's fabrics as excellent may be because of trendy fabrics with soft texture perfectly suitable for both ladies and gents apparel. Fabric being eco and cuticle friendly is compatible with both consumers and environment. About 1/4th of the respondents (26.63 %) judged the fabric as good may be because of its dull colour and texture.

5.7.1.4. Respondents' choice for designer's fabrics

Of the six fabric samples, two control viz., plain white and plain NCC; two stripes i.e. pin and medium and two checks i.e. small and medium, the respondents preferred small checks (9.90 WAR) followed by naturally coloured cotton (9.67 WAR) and pin stripes (8.77 WAR). This inclination may be due to the illusion effect of small checks and pin stripe which appears almost like plain coloured cotton fabric when viewed from a distance. In fact smaller patterns or designs are suitable for all types of garments. Furthermore, most of the respondents probably do not have flare for bolder designs, thus have given least preference for medium checks (7.67 WAR) and medium stripes (7.97 WAR) (Table 34).

5.7.1.5. Respondents' view about utility of NCC *khadi* fabrics

Most important vision when any new design or pattern or fabric produced is, defining its end uses. Similarly respondents view about the end uses of NCC *khadi* fabrics revealed about 85-94 percent of them wished to use these fabric for outer wear followed by decoratives and home furnishings. This may be attributed to the fact that most of them would like to express their creatively to the outer world by designing artistically with NCC *khadi* fabrics and creating them as dresses, decorative items or diwan spreads etc with all sorts of embellishments, decoratives, trims and accessories (Table 35).

On the other hand, least percent of the respondents indicated intimate garments (36%) and rugs & carpets (42.70%) as end uses for NCC fabrics, probably they do not wish to use these designer's fabrics in concealed form or where the rugs & carpets will be stamped by everyone losing its ethical value.

5.7.1.6. Aesthetic characteristics of designer's NCC *khadi* fabrics

Habitually all the *khadi* fabrics will be coarser with dull appearance, crisp and stiff to handle with open structure and relatively little heavy weight when taken directly from the loom as grey fabric because of presence of starch in the yarn as well as being hand spun and hand woven.

But consequently when the same fabric is subjected for special finish, a drastic change in the overall aesthetic characteristics like appearance and texture is noticed. This fact is proved by the opinion of the respondents who mentioned that the softener finished fabrics are finer and lustrous, soft and pliable, light weight with closed structure than the untreated (control) fabrics (Table 36).

5.7.2 Consumers' acceptance for *khadi* fabrics

5.7.2.1. Respondents' flare for *khadi* materials

Khadi is the name for decent and dignified looks. Most of the people belonging to elite group apparently opt for silk *khadi* and middle income group for cotton *khadi*. *Khadi* is known as common man's cloth, thus found in every household in one or the other forms.

This is proven from Table 37, Table 38a & Table 38b that 92 percent of the total respondents showed flare for *khadi* materials which may be because of eco friendliness, comfort, cool in summer and pleasant in winter on the contrary only 8 percent of them expressed that *khadi* is old fashioned, dull in appearance, needs extra care and maintenance, available in limited colours, patterns and styles that are available locally. This difference in perception of *khadi* materials and quoting reasons for its favoritism are attributed to individual choice, selection, vision and views.

5.7.2.2. Characteristics of *khadi* fabrics

Khadi, the ancient invention popularized and invariably used by every Indians since Gandhian era but a trend of decline observed a couple of decades back. However, *khadi* cotton is revolting its demand in recent years especially by young adults, who are very fond of *khadi*, opening a new vista in modern clothing.

Therefore, it may be inferred that when the respondents have knowledge about *khadi* and its characteristics, thus it was possible for 69 to 93 percent of the respondents to like the characteristics of *khadi* whereas very few of them i.e. 6 to 30 per cent did not have complete knowledge about characteristics of *khadi* which indicated their negligence, lack of interest and exposure (Table 39).

5.7.2.3 Respondents inclination towards purchase of *khadi* garment

Consumer behaviour of purchasing *khadi* material and garments is different from simply like it. Table 37 indicated that 92 per cent of the respondents showed flare for *khadi* products but inclination towards purchase of these garments were only 69.30 per cent (Table 40). Elaborate care and maintenance, limited varieties and designs, trendy patterns and dull appearance of *khadi* products, probably is the cause of difference in the attitude of the respondents (Table 38b).

5.7.2.4 Type of *khadi* garments purchased by the respondents

Table 41a clearly indicated that the trend in the fashion has shifted from sarees (24.40%) and kameez (31.10%) to kurtas (40%) and ladies top (40%). Hence the purchase is more for these garments compared to bed linen. Ladies and girls being more fashion conscious, choose most comfortable kurtas and tops while purchasing the garments that provide comfort and functionality.

Meanwhile 56.70 percent of the boys purchased shirt may be as formal wear followed by lungi (23.30%) and kurtas (20.00%) (Table 41b). Boys very often use shirts for all occasions whereas lungi forms a home wear and kurta as occasional wear. *Khadi* jackets (16.70%) and pants (13.30%) neither formed formal or casual but opted on special functions, skits, drama or role plays.

None opted for coats which may be attributed to the present fact that *khadi* coats are used by the elder citizens but present younger generation being more fashion conscious would like to purchase trendy clothing.

5.7.3 Consumers' view on the concept of detachable garment components

5.7.3.1 Suitability of designer's NCC *khadi* fabrics for ladies and gents apparel The designer's *khadi* fabrics produced from naturally coloured cotton (brown) and white cotton have very good aesthetic characteristics apt for ladies and gents outfits, therefore cent percent of the respondents expressed the suitability of designer's *khadi* fabrics for apparels (Table 42).

5.7.3.2 Appropriateness of NCC *khadi* fabrics for designer's apparel

Each individual has his/her own preference for type of apparel of different colours, woven patterns (plain, stripe or checks), texture and so on. In fact when the respondents were asked to rank on the suitability of designer's *khadi* fabrics for apparel, most of them opted for plain woven naturally coloured cotton (control) fabric for all the three outfits viz., ladies top-cum-kurta (8.70 WAR), gents shirt (8.30 WAR) and gents kurta (8.27 WAR) than stripe and checked. This may be because that all types of embellishment appear bold on plain weave than stripe and checks. On the other hand, medium stripe fabric topped (8.03 WAR) as shirt material since stripes look elegant and dignified overall as formal wear.

Furthermore, second preference was given to small checks for all the garments such as ladies top-cum-kurta (7.80 WAR), gents shirt (7.33 WAR) and gents kurta (7.77 WAR) probably small checks fabric gives better illusion effect and appears almost plain fabric from a distance (Table 43).

5.7.3.3 Suitability of surface embellishments on designer's apparel

Surface embellishments play a vital role in adding aesthetic appearance, thus, attracts the customers in turn enhances the promotion. Irrespective of Home Scientists, boys and girls, the respondents showed inclination for hand embroidery on all the three garments viz., ladies top cum kurta (5.27 WAR); gents shirt (3.90 WAR) and gents kurta (3.90 WAR) as far as suitability is considered (Table 44). Hand embroidery is the manifestation of man's yearning of beauty, introducing grace and elegance to the monotonous life through motif, pattern and colour. Kasuti is the traditional embroidery of Karnataka state where 'kara' means hand and 'suti' is cotton thread. In other words 'Kasuti' is the handwork with cotton thread depicts the fine, intricate and delicate workmanship of the artisans.

On the other hand, machine embroidery suitable for all the garments such as ladies top (5.13 WAR), gents shirt (3.60 WAR) and gents kurta (3.60 WAR) was given the second preference may be because of its flat and gorgeous appearance that did not affect the functionality of the clothing.

However, zardosi was least preferred on ladies top cum kurta (4.60 WAR) may be due to its gaudy looks, embossed effect, short life and additional care that requires.

5.7.3.4 Compatibility design and colours in surface embellishment

Table 45 distinctly showed that the design (pattern) and colour combination are found to be compatible and perfect as far as hand embroidery was considered because the researcher made efforts to retain the traditionality of *kasuti* of Karnataka with reference to motifs and colour combinations. This was followed by machine embroidery on all the garments may be because of its flat structure and gorgeous look.

Surface embellishments are the means to add value to garments, when used with appropriate design and colour combination. It is difficult to assess the effect of design or colour combination on designer's apparel individually, because the overall appearance of the surface embellishment on apparel is a combined effect of all the entities.

5.7.3.5 Respondents' outlook for new concept of detachable garment components

Researcher constructed designer's apparel with a new concept of detachable garment components and the respondents expressed their outlook towards new concept. It was found that 89.30 percent of the respondents appreciated the concept of detachable neckline and 76 percent detachable lower panel on ladies top-cum-kurta. Collar though smallest, is one of the fundamental components positioned at significant part of the garment. This piece of band focuses the aesthetic appearance of a finished garment as well as gives an impression to one's personality. The results indirectly indicated that the respondents wished to use the top on pants without a lower panel, since top is multifaceted compared to kurta or probably the detachable lower component did not match with the tops (Table 46).

The detachable cuffs and collars were found to be convenient by 92 percent of the total respondents may be because, these two components on gents shirt are attached with open zipper which can be easily and comfortably detached and attached than the button stand.

Similarly, 90.70 percent of the respondents showed their penchant for detachable collar followed by detachable button stand (88.00%) on the gent's kurta. This may be attributed to the same reasons as that of gents shirt.

5.7.3.6. Mode of attachment of detachable garment components and suitability

The new concept of detachable garment components in the designer's apparel was introduced to bring in change suitable for youngsters. These detachable components were attached to the main garment with open zipper and button & buttonhole. It is clear from Table 47 that detachable necklines fastened with cloth buttons were much neater and secured than the open zipper for lower panel. The cloth buttons being functional assisted in holding the garment components firmly, did appear decorative too. Further, the detachable collar attached in the open zipper was more suitable followed by button – buttonholes for button stand and open zipper to cuffs. This may be because when the apparel is visualized from a distance, the component which attracts the onlooker first is the collar then button stand followed by cuffs and this probably lead the respondents to give the preference likewise. Among the kurta, detachable button stand with buttons – buttonholes was more comfortable than the collar with open zipper.

5.7.3.7 Lure towards the new concept of detachable garment components

It is apparent from Table 48 that 98.70 percent of the respondents appreciated and expressed that the new concept of detachable components is appropriate for the garments constructed. Further indicated that the garments with detachable components look excellent which can be used during different occasions according to one's choice, taste, interest and likings. Hence, the hypothesis stating the detachable garment components do match the designer's *khadi* apparel is proved.

5.7.3.8 Relevance of designer's apparel with detachable garment components for different age groups

The researcher constructed ladies and gents wears keeping in view the college going adolescent students who are fashion conscious and claim trendy designs. When the respondents were investigated, it was found from the results in Table 49 that the ladies top-cum-kurta and gents shirt are most relevant for adolescents (the hypothesis is accepted) whereas the gents kurta is found to be better for early adults (the hypothesis is rejected) followed by adolescents. This may be because college going adolescent students are always in the cliques and this age group is also called as 'gang age' who wants to show their own identity in the group by boasting or showing off with trendy clothing and accessories. They always demand group acceptance or otherwise develop inferiority complex when are not on par with them in fashionable outfits and they always require change.

Gents kurtas are most oftenly worn by early adults who are in their marriageable age may be between 21-35 years. As observed in the market, the purchase of gents kurtas are more during marriage season. Hence may be because of this reason the respondents have shown more relevance for early adults followed by adolescents. So also now-a-days early adults are not less than adolescents, when it comes to fashionable clothing.

5.7.3.9 Relevance of designer's apparel with various surface embellishments for different occasions

It is true that one of the factors considered while selecting clothes is the occasion. On examination the respondents revealed that hand embroidery is more befitting and relevant on all the three apparels as traditional wear. Mean while, machine embroidery was suitable as casual wear and zardosi as party wear, specially on ladies top whereas machine embroidery as party outfit for gents (Table 50).

This may be attributed to the type of hand embroidery selected in the present study as surface embellishment on ladies and gents apparel. The hand embroidery selected is Karnatak *kasuti*, represents the traditionality of Karnataka mainly because of the motifs applied without modification or adaptation. On the other hand, machine embroidery being simple and flat is most suitable on casual attire. Zardosi with beads, kundans, zari, sequins, salma and sitaras is always rich, lustrous and gorgeous with glittering effect thus, is most suitable as party wear which demand gleam.

On the other hand, machine embroidery on gents wear was found to be more relevant as party wear may because of its simplicity and elegance as heavy machine embroidery combined with some zardosi materials will definitely look good for parties.

Moreover now-a-days, a fashion has created a new horizon of combining zardosi accessories with machine embroidery on all kinds of outfits.

5.7.3.10 General opinion about the new concept of detachable garment components

Cent percent of the respondents opined that variegated *khadi* fabric gives a contemporary look when decorated with traditional surface embellishments. It may be attributed to the fact that these variegated *khadi* fabrics have been subjected to special finishes that brought a dramatic change in aesthetic appearance that allow the fabric to sustain in the contemporary world of fashion. The surface embellishments added colour, beauty, design, value and enhance the promotion by attracting the customers.

Designing a product involves visual exploration, arrangement of line, shapes, dimension, colours, spatial relation and so on. In the process of product development the designer created and controlled the image by thought provoking ideas, and the result in designer's apparel with a new concept of detachable components, that has a special place in the ever changing fashion world.

In totality, looking at each and every minute aspect of the concept of detachable components and fashion apparels, 78.67 percent of the respondents articulated them as excellent and rest opined as good. The rationale behind this may be attributed to the creative idea of the researcher to develop designer's apparel suitable for younger generation who always search for change (Table 51).

Thus, the hypothesis stated that the surface embellishments do give a trendy look to the designer's *khadi* apparel is proved.

5.8 Cost of production of designer's *khadi* apparel

Production cost of a material is much lesser than its selling price which includes a range of profit (%). The profit margin differs from seller to seller, which is added to the production cost depending upon the seller's ethics.

The cost of production of ladies top-cum-kurta, gents shirt and kurta with embellished detachable components is three, two and half times more than the garment without detachables. This may be attributed to the fact that the cost of production depends on the materials, and accessories required. In fact, the amount of fabric and accessories requirement to produce the garment without detachables is relatively lesser than the designer's apparel with detachable components.

The production cost of designer's garments with variegated embellishments observed in the Tables 17 to 21, increased from control *i.e.* garment without any detachables to machine embroidery, to hand embroidery, to zardosi work and finally along all the detachable components. This increase in the trend of cost of production may be due to the variation in cost of accessories and labour charges. It is clear from tables that the labour cost of machine embroidery was lower than hand embroidery inspite of marginal increase in accessory cost between the two. On the other hand, though the charges of zardosi was much lesser than hand and machine embroidery, the cost of production was higher, mainly due to expensive accessories.

SUMMARY AND CONCLUSIONS

The present research on “Naturally Coloured Cotton Designer’s Apparel: An emerging trend in *Khadi* World” was carried out with the objective, to explore the possibilities of designing and weaving variegated stripe and checks *khadi* fabrics of naturally coloured cottons yarns, to assess the impact of special finishes on newly designed naturally coloured *khadi* fabrics, to design, construct, embellish the trendy *khadi* apparel and enumerate its consumer’s acceptance and to calculate the cost of production of designer’s *khadi* apparel.

The DDCC-1 (Dharwad Desi Coloured Cotton-1) naturally coloured cotton and Jayadhar white cotton variety lint were hand spun into 2-ply doubled yarns, and further hand woven to produce variegated six designer’s *khadi* fabrics viz., two control (DDCC-1 and white cotton), two stripes (pin and medium stripe) and finally two checks (small and medium checks) fabrics. These designer’s *khadi* fabrics were bio-desized, bio-polished and silicon softener finished to make the fabric soft at handle and to improve its flexibility, drape and pliability. Further quality assessment was done to know the structural, performance and durable properties and compared between the control and treated NCC *khadi* fabrics. Then designer’s *khadi* apparel viz., ladies top cum kurta, gents shirt and gents kurta were constructed with a new concept of detachable garment components i.e. detachable lower panel with detachable matching necklines for ladies top-cum-kurta, detachable shirt collar, cuffs with button stand for gents shirt and detachable stand collar with button stand for gents kurta. However, hand embroidery, machine embroidery and zardosi techniques of surface embellishment were used on detachable units of ladies top-cum-kurta and only first two techniques on gents wear.

The information about consumer’s preference for type of surface embellishment and acceptance of designer’s naturally coloured cotton *khadi* apparels was enumerated by conducting a survey on each 120 adolescent boys and girls along with 60 Home Scientists. Frequency tables, percentages, Weighted Average Ranking (WAR) and multiple linear regression analysis were used to draw valid inferences. Later, the cost of production of these designers *khadi* apparel was worked out to enlighten the consumer’s about the economics of new concept.

The results of the present study in summarized as follows:

Quality assessment of DDCC-1 and white cotton yarns

- White cotton yarn was relatively finer with higher lea strength value and higher Tpi than DDCC-1. Hence it was found that the C.S.P was better for white cotton than DDCC-1.

Fabric information of variegated designer’s naturally coloured cotton *khadi*

- All the six varieties of fabrics were woven on pit loom with reed count 40, reed width 30”, cloth width 28” and the denting order of 2 threads per dent.

Assessment of structural properties of newly designed *khadi* fabrics

- The weftway yarn was relatively finer than warpway and after treatment the fineness has slightly increased for both the yarns.
- Further the warp and weft yarns have become relatively compact after treatment.
- Irrespective of type of fabric and treatment, the warp density is relatively greater than the weft.
- The cloth thickness of the entire designer’s *khadi* fabrics has decreased after treatment.
- The warp percentages of all the fabrics are greater than the weft percentages for both control and treated samples whereas the total GSM has decreased after treatment in all of them.
- The total GSM of DDCC-1 control, medium stripe and medium checks are greater than white cotton control, pin stripe and small checks respectively both before and after treatment.

Assessment of performance properties of newly designed *khadi* fabrics

- The weft crease recovery of all the test samples was greater than the corresponding warpway at control and after wet treatment.
- All the test fabrics have shown an improvement in cloth crease recovery after softener and enzyme finish.

- All the test samples showed higher bending length in the warpway compared to weftway, except white cotton control.
- The cloth stiffness is higher at control both in warp and weftways than the special finished samples for all the samples.
- All the test samples irrespective of their constructional designs, draped with 5 nodes after the wet treatment except the WC control which draped with 6 nodes.
- The drape coefficient has decreased after treatment showing better drapability.

Assessment of durable properties of newly designed *khadi* fabrics

- The warpway elongation was higher than weftway and after treatment, the elongation percentage has gradually decreased both in warp and weftways for all the samples.
- Maximum tensile strength was observed in the entire test samples in both the directions at control than treated ones which indicates decrease in tensile strength.
- All the fabrics before and after treatment are able to withstand above 10,000 abrasion cycles except pin stripe at control has shown a negligible deviation of 9,777 abrasion cycles.
- Each and every sample both at control and after treatment have shown very good pilling resistance with no pills on the fabric.

Consumers' preference for type of surface embellishments

- The collective opinion of Home Scientists, adolescent boys and girls indicated that surface embellishments are desirable on ladies kurta followed by ladies top, gents kurta and lastly on gents shirt.
- Irrespective of category of respondents, hand, machine and zardosi embroideries are preferred on ladies wear and only hand and machine embroideries on gents wear.
- Least preference was given to ties and bows on ladies top and belt and buckles on ladies kurtas. But none preferred zardosi and lace work on gents shirt and very meager per cent of them preferred belts and buckles and ties and bows for gents kurta.

Designing and construction of *khadi* outfits with a new concept of detachable garment components

- Three trendy outfits viz., ladies top-cum-kurta, gents shirt and kurta were designed and with a new concept of detachable garment components and constructed by using five designer's *khadi* fabrics such as NCC control, pin and medium stripe, small and medium checks.
- Ladies top-cum-kurta was designed with two detachable garment components, one being the lower panel to add length attached to the base garment with open zipper and second being the matching necklines attached with cloth buttons.
- Gents shirt was planned with three detachable components viz., cuff, shirt collar and button stand and gents kurta with stand collar and button stand as two detachable components. Cuffs on shirt and collars on both the gents wear were fastened with the help of open zipper whereas button stand on both were attached with matching buttons.
- This innovative idea of detachable garment components was introduced as a new concept to develop trendy outfits for elite group of college going adolescent students who always demand change and can mix and matching the detachable components with the main garment depending upon their mood, interest, fashion and occasion.

Designing embellishments on detachable garment components

- Ladies top-cum-kurta was embellished with hand, machine and zardosi embroideries whereas gents wear with hand and machine embroidery.
- The designs were developed for embellishing the attire keeping in view the concept of traditionality with a contemporary touch. The motifs were selected with a inspiration from nature and planned on the detachable garment component according to elements and principles of design as well as dimension of the detachable.

- The mix-n-match concept is designed not only with the embellishments but also with the designers' *khadi* fabrics which are used to construct ladies and gents wear.

Consumers' acceptance for designer's *khadi* apparel

A. Consumers' choice for naturally coloured cotton

- Most of the Home Scientists followed by adolescent boys and girls are aware of naturally coloured cotton.
- Irrespective of the category of respondents, about 81 per cent of them are aware that NCC is eco and skin friendly followed by anciently known to mankind, short staple and excludes dyeing process. NCC is available in multi colours naturally is known only to 49.33 per cent of the respondents.
- About 93 per cent of adolescent boys followed by Home Scientists (80.00%) and adolescent girls (70.00%) opined that these stripe and checks designer's *khadi* fabrics were excellent; whereas rest rated them as good.
- Irrespective of the category of respondents, small checks, NCC control, narrow stripe, WC control, medium stripe and medium checks were the order of choice of respondents.
- The total respondents viewed that NCC *khadi* fabrics are more suitable for outer wear followed by decoratives, home furnishings, bed linen, towels, curtains and draperies, rugs and carpets and lastly the intimate garments.
- Cent per cent of the Home Scientists, adolescent girls and boys opined that the control *khadi* fabric which was coarse, dull, crisp, stiff, open and heavy turned into fine, lustrous, soft, flexible, light weight and closed structured after treating it with enzyme and softener finish.

B. Consumer's acceptance for *khadi* fabrics

- About 97 per cent of adolescent girls followed by Home Scientists and adolescent boys showed their flare for *khadi* materials.
- Irrespective of the category of respondents, *khadi* was desired by them because of its eco-friendliness followed by comfort, cool in summer and warm in winter swadeshi, unique, national costume but not due to its fashion and trendiness and for its compulsion.
- About 8 per cent of the respondents showed disliking for *khadi* may be because of old fashioned, dull in appearance, extra care and maintenance, limited designs and few of them disliked it due to its expensiveness, no novelty and monotonous nature.
- Most of the respondents are aware about Mahatma Gandhiji being the first designer of *khadi* followed by that it is hand spun and hand woven, *khadi* spirit is swadeshi concept, symbol of non-violence and freedom and lastly *khadi* is link between rural and urban masses.
- About 77 per cent of the adolescent boys followed by Home Scientists and adolescent girls showed inclination towards purchase of *khadi*.
- Most of the Home Scientists and adolescent girls purchased *khadi* kurta and ladies top followed by bed linen, kameez, sarees and skirts. Whereas adolescent boys purchased shirts followed by lungi, kurta, jacket and pants. None of the boys possessed *khadi* coats.

C. Consumers view on the concept of detachable garment components

- Cent per cent of the respondents predicted that designer's NCC *khadi* fabrics are suitable for ladies and gents apparel.
- Irrespective of the category of respondents, NCC control *khadi* fabric was found to be appropriate for all the three designer's apparel along with medium stripe for gents shirt followed by small checks fabric and the last option was given to medium checks fabric.
- Hand embroidery was found to be suitable on all the three designer's apparel followed by machine embroidery as opined by respondents irrespective of their category.

- With respect to compatibility of design and colour, hand embroidery is found to be most appropriate followed by machine embroidery for all the three designer's apparel except in ladies top-cum-kurta where hand and machine embroidery with respect to design are of the same rank followed by zardosi.
- Irrespective of the category of respondents, in ladies top-cum-kurta, a detachable neckline was looked upon better than detachable lower panel. In gents shirt, detachable collar and cuff were given same preference followed by detachable button stand. Similarly, detachable collar was out looked well than detachable button stand in gents kurta.
- On similar lines, cloth buttons used to attach detachable necklines was found to be more suitable than open zipper for detachable lower panel in ladies top-cum-kurta. In gents shirt, open zipper used to fasten detachable collar was best suited followed by buttons-button holes for detachable button stand and open zipper for cuffs. Whereas, buttons-button holes were better than open zipper for collar.
- Cent per cent of the Home Scientists and adolescent boys followed by 97 per cent of adolescent girls showed lure towards the new concept of detachable garment components.
- Ladies top-cum-kurta with detachable garment components was found to be relevant for a adolescent followed by children of 6-12 years and not suitable for early adults. Similarly, designer's gents shirt was suitable for adolescents followed by early adults and not suitable for children belonging to 6-12 years. Whereas designer's gents kurta was relevant for early adults followed by adolescents and not suitable for children between 6-12 years.
- Hand embroidery on all the three apparels was relevant as a traditional wear. In ladies top-cum-kurta, machine embroidery is suitable for casual wears and zardosi for party wear. Whereas, both the gents attire with machine embroidery goes well as party outfits.
- Cent per cent of the respondents opined that variegated *khadi* fabric gives a contemporary look when used for designer's apparel with several traditional surface embellishments and occupies a special place in the ever changing fashion world.
- About 77 per cent of the total respondents have articulated designer's apparel with a new concept of detachable components as excellent and rest have opined them as good.

Cost of production of designer's *khadi* apparel

- The selling price of designer's NCC plain ladies top-cum-kurta with detachable components is higher (Rs. 1728) followed by garment without detachables (Rs.528), detachables with zardosi (Rs. 520), hand embroidery (Rs. 351) and machine embroidery (Rs. 330). Similar trend is followed as that of NCC control, that more cost is estimated for stripe ladies top-cum-kurta with detachable components (Rs. 1799) followed by garment without detachables (Rs. 560), detachables with zardosi (Rs. 533), hand embroidery (Rs. 364) and machine embroidered (Rs. 343). The increasing order of selling price in case of both the checks ladies wear are for detachable components with machine embroidery (Rs. 356), hand embroidery (Rs. 377), zardosi (Rs. 546), garment without detachables (Rs. 593) and designer's ladies top-cum-kurta with detachable components (Rs. 1871). Hence, selling price of designer ladies top-cum-kurta with detachable garment components is found to be about three times more than the garment without detachables.
- The selling price of plain NCC designer's gents shirt with detachable components is higher (Rs. 1360) followed by garment without detachables (Rs. 711), detachables with hand embroidery (Rs. 334) and machine embroidery (Rs. 315). Similar trend is followed as that of NCC control that more cost is estimated for stripe shirt with detachable components (Rs. 1422) followed by garment without detachables (Rs. 753), detachables with hand embroidery (Rs. 343) and machine embroidery (Rs. 325). The increasing order of selling prices in case of checks shirt are for detachables with machine embroidery (Rs. 335), hand embroidery (Rs. 353), designer's shirt without detachable components (Rs. 796) and garment with embellished detachables (Rs. 1483). Hence, the selling price of designer gents shirt with detachable garment components is found to be about two times more than the control.

- The selling price of designer's plain NCC gents kurta with detachable components is higher (Rs. 972) followed by garment without detachables (Rs. 661), detachables with hand embroidery (Rs. 163) and machine embroidery (Rs. 148). Similar trend is followed as that of NCC control that more selling price is estimated for stripe kurta with detachable components (Rs. 1024) followed by garment without detachables (Rs. 707), detachables with hand embroidery (Rs. 166), machine embroidery (Rs. 151). The increasing order of selling price incase of checks kurta are detachables with machine embroidery (Rs. 154), hand embroidery (Rs. 170), designer's kurta without detachable components (Rs. 752) and garment with detachables (Rs. 1076). Hence, the selling price of designer gents kurta with detachable garment components is found to be about one and half times more than the control.

IMPLICATIONS AND RECOMMENDATIONS

Latest research on "Naturally Coloured Cotton Designer's Apparel: An emerging trend in *Khadi* World" has ample opportunities for variety of people in the field of agriculture, *khadi* and handloom sectors such as cotton growers and breeders, spinners, loom processors, weavers, designers and fabric manufacturers.

The present study apparently depicts that tremendous scope and wide horizon are there for using the eco and cuticle friendly naturally coloured cottons in producing variety of fabrics by using different techniques of fabric production to improve the fabric properties as well as to bring novelty in the collection of fabrics available in the market.

Fashion tends to change every now and then; and so also we should, to meet the present demands of society. The study gives a clear picture to the fashion makers and adopters to create few more new designs with this reviving concept of detachable garment components. The fashion makers are the designers who can show their creativity in adapting this technique to produce variable trendy outfits to suit the present world. The fashion adopters are the college going adolescent students who are more fashion conscious who can adopt this technique in getting their trendy dresses stitched according to their needs. Furthermore, researchers can make efforts in producing such apparels with this technique suitable for different age groups and occasions to satisfy the needs of remaining group with varying occasions.

This study is also useful for self entrepreneurs who want establish themselves in the production or marketing of fashion garments. They can try out to produce these outfits with variety of embellishments and sell them to earn profit and generate their income for livelihood.

Suggestions for the further study

Further study can be conducted in the following areas:

- Naturally coloured cottons can be blended with other yarns produce variety of union fabrics with different weaves.
- Such designer's *khadi* fabrics can be finished with several other special finishes such as flame retardant, water repellent, anti soil *etc.* to improve their functional properties.
- Development of eco-friendly NCC designer's outfits with detachable garment components for other different age groups and occasions depending upon their needs.
- Embellishment of such *khadi* designer's wear with other variety of decoratives can be produced.

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APPENDIX I

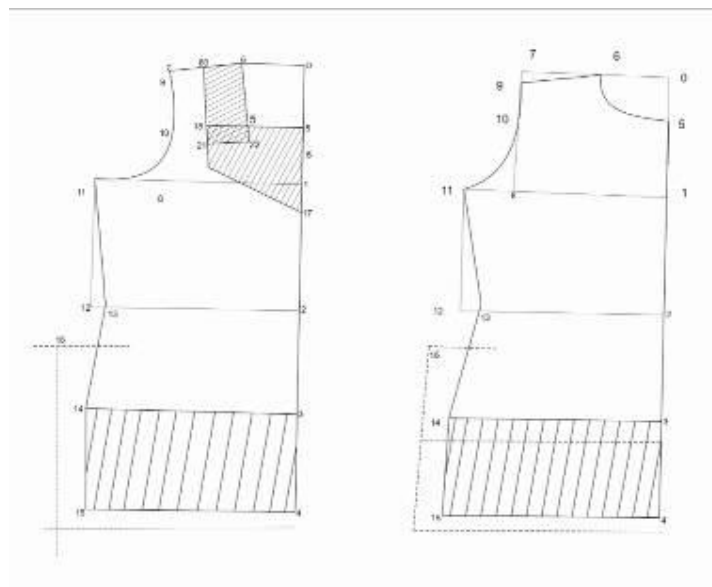
Drafting of ladies and gents designer's apparel with detachable garment components

Ladies top-cum-kurta

Measurements

- Full length for pant top – 22"
- Full length for short kurta – 32"
- Round bust – 36"
- Round waist - 28"
- Waist length – 16"
- Round seat – 38"
- Shoulder – 14"
- Sleeve length – 5"
- Sleeve round – 11"
- Bottom flare – 22" 20"
- Front neck width – 6"
- Front neck depth – 5½"
- Back neck depth – 3"

Draft pattern



1. Front

2. Back

Drafting procedure

1. Front

Square lines from 0, fold at 4-0

1-0 = One-eight bust + 6.5 cm (2½")

2-0 = Waist length + 2 cm (¾")

3-0 = Full length for pant top + 2 cm (3/4")

4-0 = Full length for short kurta + 2 cm (3/4")

Square out from all these points

5-0 = Front neck depth

5-5' = Front neck width

6-0 = Same as 5-5' + 2 cm (3/4")

Shape neck 6-5

7-0 = Shoulder + 1 cm (1/4")

Square down from 7 to 8

9-7 = 2.5 cm (1"), Join 6-9

10-8 = Nearly 2.5 cm (1")

11-1 = One fourth bust + 4 cm (1½")

Shape scye 9-10-11

Square down from 11 to 12

13-12 = 2 cm (3/4")

14-3 = Bottom flare + 4 cm (1½")

15-4 = Bottom flare + 5 cm (2")

Shape side seam 11-13-14-15

16-14 = 15 cm (6") for side opening

17-0 = 0-5, + 15 cm (6")

18-5 = 5-5' + 7.5 cm (3")

19-19 = 10 cm (4") Join 17-19-18-5'

20-6 = 17-5'

21-19 = Front neck depth + 2.5 cm (1")

21-22 = Same 20-6

2. Back

Square lines from 0, fold at 4-0

1-0 = One-eight bust + 6.5 cm (2½")

2-0 = Waist length + 2 cm (3/4")

3-0 = Full length for pant top + 2 cm (3/4")

4-0 = Full length for short kurta + 2 cm (3/4")

Square out from these points

5-0 = Back neck depth

6-0 = Same as 6 to 0 of front

Shape neck 6-5

Except 10, the proportions of points 7 to 15 are the same like front.

Join 6-9

9-10 = nearly 2.4 cm (1")

Shape scye 9-10-11

Keep 4 to 5 cm (1½" to 2") inturns at 3-14, 4-15, 16-14 and 14-15, for front and back

Keep side opening at 16-15

Note:

Two detachable garment components (as marked in the draft pattern) should be cut on separate fabric.

a. Lower panel to increase length (both on front and back side)

Cut 3-4-15-14 with 4 to 5 cm ($1\frac{1}{2}$ " to 2") in turns as mentioned above.

Finish 3-14 with open zipper

b. Neck line components (only on front side)

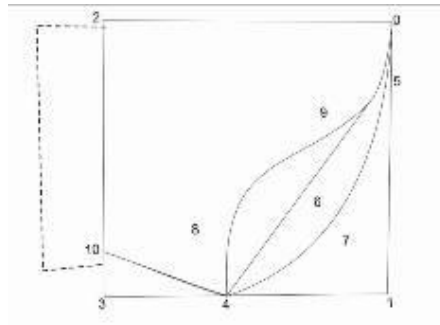
Cut the pieces of 5-17-19-18 with 1.25 cm ($\frac{1}{2}$ ") inturns

Cut two pieces of 6-20-21-22 with 1.5 cm ($\frac{1}{2}$ ") inturns

Cut lining material for all the three neckline components and finish them separately with couture method.

Button holes should be made as shown in draft pattern

3. Plain sleeve



Square lines from 0, fold at 2-0

1-0 = One-eighth bust + 6.5 cm ($2\frac{1}{2}$ ")

2-0 = Sleeve length + 1 cm ($\frac{1}{4}$ ")

3-2 = Same as 1 to 0 Join 3-1

4-1 = One-eighth bust

5-0 = 2.5 cm (1"), Join 4-5

6 is midway 4 to 5

7-6 = 2 cm ($\frac{3}{4}$ ")

Shape back-side 4-7-5-0 as shown square up from 4 to 8

8-4 = 5 cm (2")

Join 8-5 Taking 1 cm ($\frac{1}{4}$ ") above point 4,

Shape front side 4-8-9-0 as shown

10-2 = half sleeve round + 1.5 cm ($\frac{1}{2}$ ")

Keep 3 cm ($1\frac{1}{4}$ ") in turns at 10-2

Keep 2 cm ($\frac{3}{4}$ ") in lays at 10-4

Gent's shirt

Measurements

Full length – 26"

Chest – 34"

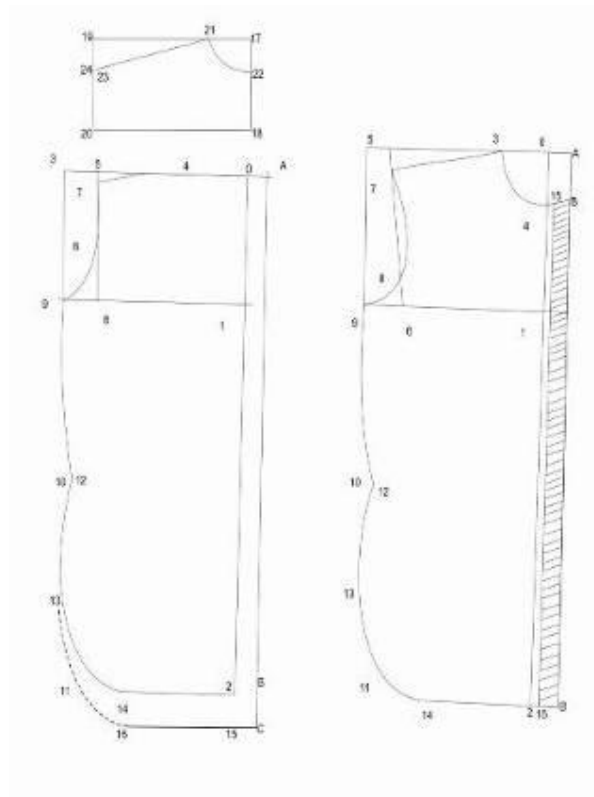
Shoulder – 17"

Sleeve length – 24"

Neck – 15"

Draft pattern

Yoke



Back

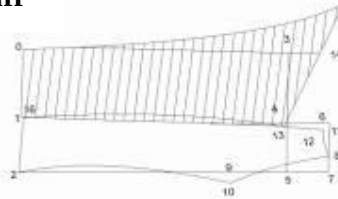
Front

Full sleeve with cuff



Cuff

Full sleeve



Shirt collar

Drafting procedure

1. Front

Draw line 0-1-2 at a distance of 4 cm ($1\frac{1}{2}$ ") from the fold A-B

1-0 = One-fourth chest

2-0 = Full length + 2.5 cm (1")

Square out from 0, 1 and 2

3-0 = One-sixth neck

4-0 = One sixth neck + 0.75 cm ($\frac{1}{4}$ ")

Shape neck 4-3 as shown

5-0 = Shoulder + 0.75 cm ($\frac{1}{4}$ ")

6-1 = One-fourth chest

Join 5-6

7-5 = One-fourth of 5 to 6

Join shoulder 3-7

8-6 = about 3 cm ($1\frac{1}{4}$ ")

9-1 = one-fourth chest + 5 cm (2")

Shape scye 7-8-9

Square down from 9 to 10 and 11

10-9 = about one fourth chest

12-10 = 1.5 cm ($\frac{1}{2}$ ")

13 is mid way 10 to 11

14-11 = about one-eighth chest

Shape 9-12-13-14 as shown

15-4 = 1.5 cm ($\frac{1}{2}$ ")

16-15 = Parallel to 0-2

C-A = Same as 3 to 0, Join 4-C

2. Back

Cut the front and use it for back in such way that lines 1-2 and 1-9 of front and back will coincide.

Square lines from 0, fold at 0-2

1-0 = Same as 1 to 0 of front less 4 cm ($1\frac{1}{2}$ ")

2-1 = Same as 2 to 1 of front

Square out from 0, 1 and 2

5-0 = Same as 5 to 0 of front

Square down from 5 to 6

7-5 = 1.5 cm ($\frac{1}{2}$ ")

4 is mid way 5 to 0

Shape 7-4 as shown

Except , the proportions of 9 to 1 are the same as front

Shape scye 7-8-9

3. Yoke

Square lines from 17, fold at 17-18

18-17 = One-eighth chest

19-17 = Shoulder + 0.75 cm ($\frac{1}{4}$ ")

20-18 = Same as 19 to 17

Join 20-19

21-17 = One-sixth neck + 0.75 cm ($\frac{1}{4}$ ")

22-17 = half of 21 to 17 + 1 cm ($\frac{1}{4}$ ")

Shape neck 22-21

23-19 = 3 cm ($1\frac{1}{4}$ ")

Join 21-23 and produce 0.75 cm ($\frac{1}{4}$ ") to 24

Join 24-20

4. Full sleeve with cuff

Square lines from 0, fold at 0-2

0-1 = One-fourth chest less 1.5 cm ($\frac{1}{2}$ ")

2-0 = Sleeve length from shoulder, less cuff-width, + 2.5 cm (1") for seams

3-2 = Same as 1 to 0, Join 3-1

4-1 = One-eighth chest less 1.25 cm ($\frac{1}{2}$ ")

5-0 = 4 cm ($1\frac{1}{2}$ ")

Join 4-5

Shape back side 4-6-5-0 as shown

Square up from 4 to 7

7-4 = One-twelfth chest

Taking 1 cm ($\frac{1}{4}$ ") above point 4

Shape front side 4-7-0 as shown

8-2 = half cuff-length + 4 cm ($1\frac{1}{2}$ ") for pleats and seams

Join 4-8 by straight line

9-2 = 1.25 cm ($\frac{1}{2}$ "), Join 9-8

10-8 = Half of 8 to 9 + 1.5 cm ($\frac{1}{2}$ ")

11-10 = One sixth chest, cuff opening

5. Shirt collar

Square lines from 0, fold at 0-2

1-0 = 6 cm ($2\frac{1}{4}$ ")

2-1 = 4 cm ($1\frac{1}{2}$ ")

3-0 = Half neck + 1 cm ($\frac{1}{4}$ ")

4-3 = Same as 1 to 0

5-4 = Same as 2 to 1

6-4 = 4 cm ($1\frac{1}{2}$ ")

7-6 = Same as 2 to 1

8-7 = 1 cm ($\frac{1}{4}$ ")

9-5 = 2 cm (2")

10-9 = 1 cm ($\frac{1}{4}$ ")

Shape 8-5-10-2 as shown

11-6 = 1.5 cm ($\frac{1}{2}$ ")

12-11 = 0.75 cm ($\frac{1}{4}$ "), Join 12-8

13-4 = 1 cm ($\frac{1}{4}$ ")

Shape 12-13-1

14-3 = 2.5 cm (1")

Join 13-14 and produce the line to 15

15-13 = 10 to 13 cm (4 to 5")

Shape 15-0 as shown

16-1 = 1 cm ($\frac{1}{4}$ ")

Shape 16-13-12

After cutting the material at 1-13-16 (shaded area) we get two separate parts as follows.

Fall : 0-15-13-16-0

Stand : 1-12-8-10-2-1

Note:

Three detachable garment components (marked in the draft pattern) should be cut on separate fabric.

a. Button stand: Cut double layer of 15-16-B-C with 1.25 cm ($\frac{1}{2}$ ") in turns keeping one side onfold and finish it with couture method.

Button holes should be made as shown in draft pattern

b. Cuff: Cut double layer of 12-13-14-15 with 1.25 cm ($\frac{1}{2}$ ") in turns and finish it with couture method.

Finish 12-15 with open zipper

c. Fall of the collar: Cut double layer of 0-16-13-15-0 with 1.25 cm ($\frac{1}{2}$ ") in turns and finish it with couture method.

Finish 16-13 with open zipper.

Gent's kurta

Measurements

Full length – 34"

Waist length – 16"

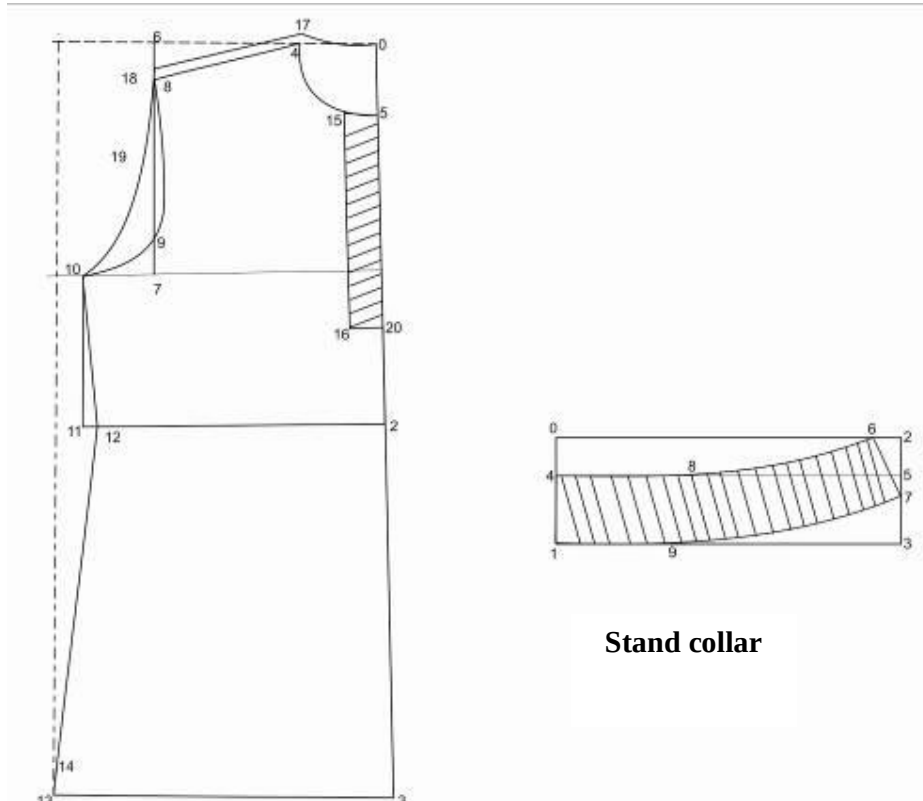
Chest – 36"

Shoulder – 17"

Sleeve length – 24"

Neck – 15"

Draft pattern



Front and Back

Drafting procedure

1. Front

Square lines from 0 with fold at 0-1-3

1-0 = One-fourth chest

2-0 = Waist length

3-0 = Full length + 2.5 cm (1")

Square lines from these points

4-0 = One-sixth neck + 1 cm ($\frac{1}{4}$ ")

5-0 = Same as 4 to 0

Shape neck 5-4

6-0 = Shoulder + 1 cm ($\frac{1}{4}$ ")

Square down from 6 to 7

$8-6 = 4 \text{ cm } (1\frac{1}{2}")$

Join shoulder 4-8

$9-7 = \text{about } 2.5 \text{ cm } (1")$

$10-1 = \text{One-fourth chest} + 5 \text{ cm } (2")$

Shape scye 8-9-10

Square down from 10 to 11

$12-11 = 1.5 \text{ cm } (\frac{1}{2}")$

$13-3 = \text{Same as } 10 \text{ to } 1 + 5 \text{ cm } (2")$

$14-13 = 2 \text{ cm } (\frac{3}{4}")$

Shape bottom 3-14

Shape side seam 10-12-14

Draw line 15-16 at a distance of $0.75 \text{ cm } (\frac{1}{4}")$ from 5-2

$16-15 = \text{One fourth chest} + 2.5 \text{ cm } (1")$ or to taste

Cut the upper layer at 15-16, thus keeping the right side wider than the left.

2. Back

$17-4 = 1.25 \text{ cm } (\frac{1}{2}")$

Shape neck 0-17

$18-8 = \text{Same as } 17 \text{ to } 4$

Join 17-18, Shape scye 18-19-10

3. Stand collar

Square lines from 0, fold at 0-1

$1-0 = 5 \text{ cm } (2")$

$2-0 = \text{half neck} + 2 \text{ cm } (\frac{3}{4}")$

$3-1 = \text{Same as } 2-0$

$4-0 \text{ and } 5-2 = 1.5 \text{ cm } (\frac{1}{2}")$ each

$6-2 = 1.5 \text{ cm } (\frac{1}{2}")$

$7-3 = 2 \text{ cm } (\frac{3}{4}")$, Join 6-7

Shape 6-8-4 and 7-9-1 as shown

Note:

Two detachable garment component (marked in the draft pattern) should be cut on separate fabric.

a. Collar: Cut two pieces of 1-4-6-7 with $1.5 \text{ cm } (\frac{1}{2}")$ in turns and finish it with couture method.

Finish 1-7 with open zipper.

b. Button stand: Cut two pieces of 5-15-16-20 with $1.5 \text{ cm } (\frac{1}{2}")$ inturns and finish it with couture method.

Button holes should be made as shown in draft pattern.

APPENDIX II

Questionnaire I

On

Preference for type of embellishments on ladies and gents apparel by the respondents

A. General Information

1. Name of the respondent:

2. Age :

Gender: Male / Female

3. Education:

4. Occupation:

5. Annual Family Income:

B. Preference for type of embellishments

1. Do the following need decorative/ surface embellishments? (Kindly √)

	Ladies		Gents	
	Ladies Tops	Kurtas	Gents Shirts	Kurtas
Decorative / surface embellishments				

2a. If yes, which are the suitable decorative/ surface embellishments (Kindly √)

Sl. No.	Decorative / surface embellishments	Ladies		Gents	
		Ladies Tops	Kurtas	Gents Shirts	Kurtas
1.	Appliqué / patchwork				
2.	Bead work				
3.	Belts and buckles				
4.	Block printing				
5.	Fringed edges				
6.	Glasswork				
7.	Hand embroidery				
8.	Honeycomb / smocking				
9.	Lace work				
10.	Machine embroidery				
11.	Pin tucks				
12.	Show buttons				
13.	Tie dye techniques				
14.	Ties and bows				

2b. If No, State the reason.

APPENDIX III

Questionnaire II

on

Consumer Acceptance for Naturally Coloured Cotton Khadi Designer's Apparel

A. General Information

1. Name :
2. Age : Gender: Female / Male
3. Education :
4. Occupation :
5. Annual Family Income:

NOTE: Who says cotton is *WHITE* ? Here's an opportunity for you to observe a new color in cotton which is eco and user friendly. Efforts have been made by the researcher to revive and utilize the almond coloured cotton viz.. Dharwad Desi Coloured Cotton-1 (DDCC-1) to produce Specially Finished Khadi Designer's Apparel for ladies and gents. A new concept of designing with detachable units i.e. detachable collars, cuffs and buttonstand for gents shirt and kurta and detachable lower panel and necklines for ladies top has been introduced. Hand embroidery (Kasuti), Machine embroidery and zardosi are used to surface embellish the apparel to make it suitable for ever changing world of contemporary fashion.

B. Naturally Coloured Cotton Fabrics

1. Have you heard about Naturally Coloured Cotton: Yes / No

2. If yes, which of the following features you know?

Sl. No.	Features of Naturally Coloured Cotton	Yes	No
a.	Eco and User friendly		
b.	Short staple fibre		
c.	Anciently known to mankind		
d.	Brown, Black, Mahogany red, Red, Khaki, Pink, Blue, Green, Dirty white and White shades are found in history		
e.	Dyeing process can be excluded		
f.	Any other		

3. What is your opinion about variegated Designer's Naturally Coloured Cotton fabrics produced by the researcher?

FAIR / GOOD / EXCELLENT

4. Which of the Designer's Fabrics do you prefer the most? (Rank)

Sl. No.	Designer's Fabrics	Rank
a.	White Cotton	
b.	Naturally Coloured Cotton	
c.	Small Stripe	
d.	Medium Stripe	
e.	Small Checks	
f.	Medium Checks	

5. Considering the features of Naturally Coloured Cotton, mention the end uses.

Sl. No.	End Use	Yes	No	Sl. No.	End Use	Yes	No
a.	Apparels			e.	Rugs and Carpets		
b.	Intimate garments			f.	Decorative Items		
c.	Home Furnishings			g.	Miscellaneous		
d.	Curtains and Draperies						

6. Comparison of softener finished fabrics with control

Sl. No.	Visual characteristics	Control fabrics	Softener finished fabrics
1	<i>Fabric Appearance</i>		
a.	Fine (2) or Coarse (1)		
b.	Lustrous (2) or Dull (1)		
2	<i>Fabric Handle</i>		
a.	Soft (2) or Crisp (1)		
b.	Flexible (2) or Stiff (1)		
3	<i>Fabric Texture</i>		
a.	Close (2) or Open (1)		
b.	Light (2) or heavy (1)		

C. Khadi Fabrics

1. Do you like khadi? Yes / No

Sl. No.	If Yes, Tick among the following reasons	Tick	Sl. No.	If No, Tick among the following reasons	Tick
1.	Represents Nation's Pride		1.	Old Fashioned	
2.	Unique		2.	Dull Coloured	
3.	Cool in Summer and Warm in Winter		3.	Coarse Fabric	
4.	Fashion Statement		4.	Extra Care and Maintenance	
5.	Comfort		5.	Limited Designs	
6.	Swadeshi		6.	Expensive	
7.	Compulsion		7.	Simple and Unattractive	
8.	National Costume				
9.	Ecofriendly				

2. Which of the following features you know about khadi fabrics?

Sl. No.	Features of Khadi fabrics	Yes	No
1.	Hand spun and Hand woven		
2.	Mahatma Gandhiji, the First Designer of Khadi		
3.	Symbol of Non-violence and Freedom		
4.	Khadi spirit is Swadeshi Concept		
5.	Link between Rural and Urban masses		

3. Do you have any khadi garment in your wardrobe: YES / NO

4. If yes, what are they?

Sl. No.	Ladies	Yes	No	Sl. No.	Gents	Yes	No
1	Sarees			1	Shirts		
2	Salwar kameez			2	Pants		
3	Chudidar Kurta			3	Kurta pyjama		
4	Ladies top			4	Lungi		
5	Towels			5	Towel		
6	Bed linen			6	Jacket		
7				7	Coat		

D. New Concept of Designing

1. State whether variegated Khadi fabrics are suitable for Ladies and Gents Designer's Apparel: YES / NO

2. Did you like the New Concept of Detachables.

Sl. No.	Type of Apparel	Detachable Units	Yes	No
1.	Ladies Top	Detachable Lower Panels		
		Detachable Necklines		
2.	Gents Shirt	Detachable Collar		
		Detachable Cuffs		
		Detachable Buttonstand		
3.	Gents Kurta	Detachable Collar		
		Detachable Buttonstand		

3. Rank which is most suitable variegated naturally coloured cotton khadi fabric for Designer's apparel?

Sl. No.	Designer's Fabrics	Ranks		
		Ladies Top	Gents Shirt	Gents Kurta
a.	Naturally Coloured Cotton			
b.	Small Stripe			
c.	Medium Stripe			
d.	Small Checks			
e.	Medium Checks			

4. Rank the suitability of Surface Embellishments on Designer's Apparel

Sl. No.	Type of Apparel	Type of Surface Embellishments	Rank
1	Ladies Top	Hand Embroidery (Karnatak Kasuti –Methi stitch)	
		Machine Embroidery	
		Zardosi	
2	Gents Shirt	Hand Embroidery (Karnatak Kasuti – Murgi and Gavanti stitch)	
		Machine Embroidery	
3	Gents Kurta	Hand Embroidery (Karnatak Kasuti – Methi stitch)	
		Machine Embroidery	

5. Mention the suitability of Design and Colour Combination of Surface Embellishment on the Designer's Apparel.

Sl. No.	Type of Apparel	Type of Surface Embellishments	Design		Colour Combination	
			Yes	No	Yes	No
1	Ladies Top	Hand Embroidery (Karnatak Kasuti –Methi stitch)				
		Machine Embroidery				
		Zardosi				
	Gents Shirt	Hand Embroidery (Karnatak Kasuti – Murgi and Gavanti stitch)				
		Machine Embroidery				
3	Gents Kurta	Hand Embroidery (Karnatak Kasuti – Methi stitch)				
		Machine Embroidery				

6. Does the variegated Naturally Coloured Cotton khadi fabric give contemporary look when used for Designer's Apparel: YES / NO

7. Do these Trendy Designer's Apparel have place in the ever changing fashion world: YES / NO

8. Give your overall opinion about the new concept of designing fashion apparel:

FAIR / GOOD / EXCELLENT

NATURALLY COLOURED COTTON DESIGNER'S APPAREL: AN EMERGING TREND IN *KHADI* WORLD

NAMRATA M.

2012

Dr. SHAILAJA D. NAIK
Major Advisor

ABSTRACT

The present study on “Naturally coloured cotton designer's apparel: an emerging trend in *khadi* world” was carried out with the objectives to explore the possibilities of designing and weaving variegated stripe and checks naturally coloured cotton *khadi* fabrics; to assess the impact of special finishes on naturally coloured cotton *khadi* fabrics; to design, develop and embellish the trendy *khadi* apparel and enumerate consumer's acceptance and to calculate the cost of production of designer's *khadi* apparel. Six types of designer's *khadi* fabrics viz., white cotton (WC), naturally coloured cotton (NCC), pin stripe, medium stripe, small checks and medium checks were constructed and subjected to bio-desizing, bio-polishing and silicon softener wash. On finishing, both WC and NCC yarns became finer with slight increase in cloth count. Further considerable reduction in bending length; improvement in crease recovery angle and better drapability of all the six fabrics was observed. Whereas, tensile strength and elongation reduced; and no considerable change in abrasion and pilling was observed. Except WC, all other fabrics were further taken for designing and construction of three garments with new concept of detachable components viz., ladies top with necklines and lower panel; gent's shirt with cuff, collar and buttonstand and gent's kurta with collar and buttonstand were produced. Then survey was conducted in Dharwad city with a sample consisting of each 120 adolescent boys and girls between 16-22 years and 60 Home scientists to identify the suitable surface embellishments on ladies and gents apparel. Accordingly, karnataka kasuti, machine embroidery and zardosi were planned on ladies top and karnataka kasuti and machine embroidery on gents shirt and kurta. Further, consumer acceptance of designer's *khadi* apparel was enumerated on the similar sample with a same sample size and locale. Ladies top-cum-kurta and gents shirt were found to be most relevant for adolescents whereas gents kurtas for early adults. Hand embroidery on all the three apparels was relevant for a traditional wear. The cost of production of designer's ladies and gents garments were much lower than the embellished ones with detachable garment components.