

# Consumer awareness and opinion regarding UV protective and antibacterial finished cotton fabrics

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■ **ABSTRACT** : The present study was conducted in Hisar city to assess the consumer's preferences as well as awareness about the cotton fabrics and their opinion regarding the developed UV protective and antibacterial finished fabrics. Thirty married females in the age group of 30-45 were purposively selected. The data revealed that consumers highly preferred cotton fabric for summer wear due to its comfort properties. Majority of the respondents (93.30%) were aware of 'wrinkle resistant' finish applied on cotton fabrics, followed by 'antiodor finish (13.3%), antibacterial finish (6.6%) whereas none of the respondents was aware about the 'UV protective' finish. Consumers' preferences regarding the developed finished fabrics showed acceptance of its use for apparel purpose being finished with UV protective and antibacterial finish.

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With the mercury scorching up in summer time, people prefer to hide behind cotton fabric due to its inherent properties like good absorbency, eco-friendly nature, light weight, soft hand, durability and many more. According to the Lifestyle and Retail Monitor™ Survey, more than 9 in 10 (almost 100%) consumers state that they would like to choose cotton over synthetic active wear if cotton could wick moisture, regulate temperature, be light weight, hold or lock colour and resist UV rays (Cotton Incorporated Lifestyle Monitor, 2015). Although being the most favorite choice for summer, cotton lacks in two major protection categories *i.e.* cotton is the poorest UV absorber, as compared to polyester (best UV absorber),

wool, silk and nylon (Crews *et al.*, 1999) as well as cotton textiles in contact with the human body offer an ideal environment for microbial growth (Salah, 2011). Cotton fabrics are susceptible to bacterial attack because they retain oxygen, water and nutrients (Crews *et al.*, 1999). Several antimicrobial agents *viz.*, triclosan, quarternary ammonium compounds, recently nanosilver as well as UV protective agents *viz.*, titanium dioxide and ceramic materials are available for textile finishing (Thilagavathi and Kannaian, 2010 and Hussain and Jahan, 2010). UV protection is one of the newer innovations just beginning to gain momentum in performance apparel for the outdoor and fitness market (<http://shodhganga.inflibnet.ac.in>)

However, due to their synthetic nature which creates environmental problems and health issues such as skin cancer, natural products in textile finishing are gaining significant momentum (Lee *et al.*, 2009). Fabric manufacturers can reduce or remove problem chemicals quickly without compromising the performance and aesthetics of the material (Silas *et al.*, 2007) with use of plant extracts which not only provides protection from environmental hazard but also safeguards the environment, prevents pollution and promotes eco-friendly textiles. Use of such products also ensures the health benefits to the individual as well as the masses. This study was directed to the health problems faced by the consumers due to environmental hazards like UV rays and microbes as well as understanding the importance of cotton in our life. Information about consumer preferences is helpful not only to those who are concerned with technical problems of improving fibres used in clothing but also to those who are concerned with marketing the finished clothing products as reported by U.S. Bureau of Agricultural Economics (1949). In light of the review of literature collected, the present study was conducted with the following objectives :

- To study the consumer preferences and awareness regarding the market availability of performance finishes applied on cotton fabrics.
- Consumer opinion regarding the utility of developed finished fabrics for apparel use.

## ■ RESEARCH METHODS

### Application of *Syzygium cumini* (L.) leaves extract on cotton fabrics :

Application of finish on cotton fabrics (woven and knitted) by using standard variables at optimized conditions (which were optimized during this study) was performed by using pad-dry-cure process. This process comprised three steps *i.e.* padding, drying and curing. The fabric was first immersed in the finishing solution using optimized conditions as presented in Table A. Fabric was dried at 110°C for 5 min and cured at 150°C for 3 min in a curing chamber.

### Consumer awareness and opinion about the cotton fabrics :

The study was conducted to evaluate the preferences regarding the developed UV protective and

Standard variables	Optimised conditions	
	Fabrics	Woven Knitted
Concentration of plant extract (%)	11	11
Material to liquor ratio	1:20	1:15
Resin cross linking agent (g/l)	60	40
Magnesium chloride (g/l)	10	10
pH	5.5	5.0
Treatment time (min)	30	30

antibacterial finished cotton fabrics, *i.e.* woven and knitted as well as their utility for apparels, using self-structured interview schedule. The assessment was conducted in Hisar city of Haryana state. Thirty married females in the age group of 30-45 were purposively selected as respondents as females falling in this age group were more receptive towards buying and caring for the clothing needs of the family members of different age groups. Information regarding the type of fabrics used by consumers in summer season and awareness regarding the performance finishes commonly applied on cotton fabrics was studied. The developed finished samples of woven and knitted cotton fabrics were shown to consumers and their opinion regarding the general appearance, evenness of finish, texture and fragrance of developed fabrics was studied. Consumers were also asked to give their preferences regarding the utility of these fabrics for apparels to assess the market potential of cotton fabrics treated with UV protective and antibacterial finishes. Consumer preferences were taken in three categories *i.e.* highly preferred, preferred and least preferred and weighted mean score was calculated.

## ■ RESEARCH FINDINGS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented under following heads :

### Consumer preferences regarding fabrics for summer:

Data presented in Fig. 1 show the respondents' preferences regarding different types of fabric for summer wear. Cotton fabric was highly preferred with weighted mean score of 3.00, followed by rayon (WMS 1.40), cotton blends (WMS 1.33) and comparatively linen was less preferred with WMS 1.20 by the respondents. The results are in line with the survey conducted by U.S. department of agriculture who

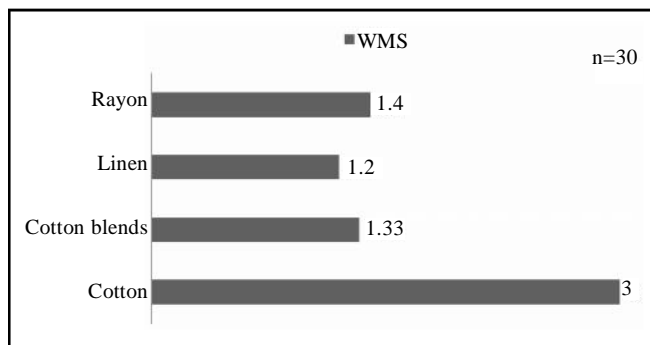


Fig. 1 : Preferred fabric for summer wear by the respondents

reported cotton as preferred fabric as compared to rayon due to its good wearing qualities, launderability, and appearance after laundering whereas undesirable qualities attributed to rayon by women were fraying and pulling at the seams, sticking to the iron and lack of durability.

**Consumer preferences in regard to the properties of preferred fabric :**

Data presented in Fig. 2 reveal the respondents’ preferences in regard to the different properties of preferred fabrics *i.e.* cotton. Comfort ‘property’ was highly preferred with weighted mean score of 3.00 followed by ‘absorbent’ (WMS 2.46), ‘drape’ (WMS 2.33) and ‘smooth texture’ (WMS 2.26). Comparatively ‘aesthetic property’ was less preferred with weighted mean score of 1.26 by the respondents. A survey conducted by U.S. Bureau of Agricultural Economics (1949) revealed that men’s preferred cotton over other fibers like rayon and wool due to its comfort properties followed by its coolness, pleasant feeling next to the skin as well as its durability. The result clearly explains that, among different genders and with change in time,

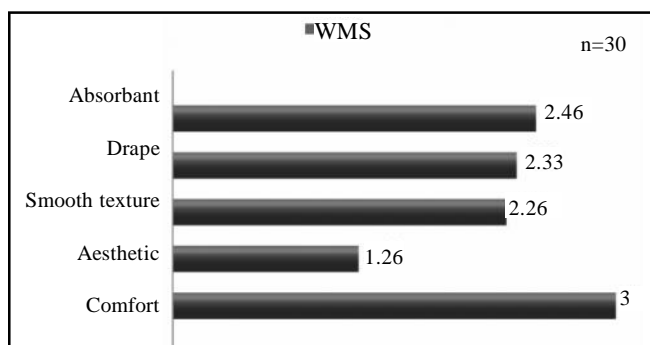


Fig. 2 : Properties that attracts the respondents to prefer fabric

cotton remains the most preferred fabric due to its comfort properties.

**Consumer awareness regarding the performance finishes applied on cotton fabrics :**

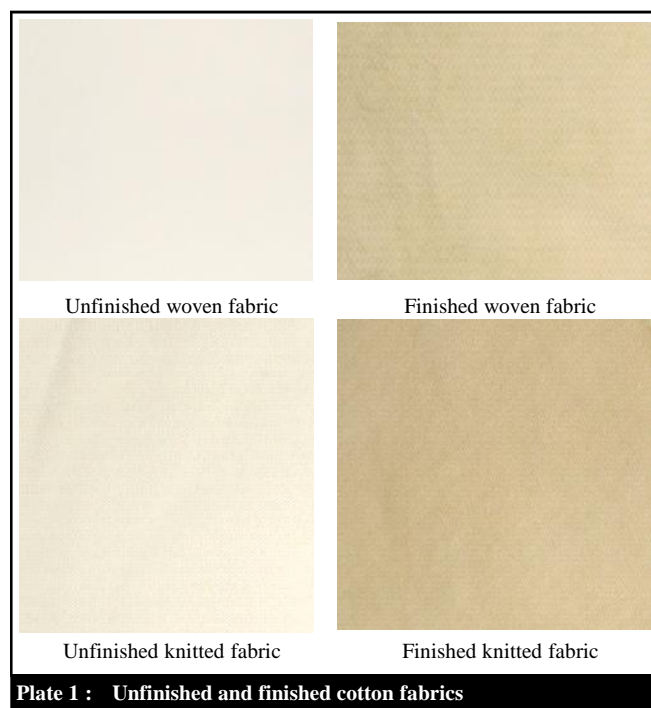
Findings regarding the respondent’s awareness about the ‘performance finishes’ applied on cotton fabrics are presented in Table 1. The results revealed that majority of the respondents (93.30%) were aware of ‘wrinkle resistant’ finish applied on cotton fabrics. Results also indicated that 13.3 per cent respondents were aware about the ‘antiodor performance’ finish and only 6.6 per cent respondents were aware about the ‘antibacterial finishes’ applied on cotton fabrics. However, none of the respondents was aware about the ‘UV protective’ finish. The reason might be attributed to the fact that the importance and need for such fabrics is felt only in the recent years due to increased health problems and toxic nature of synthetic products. As well as according to most experts, people have been led to believe over many decades that sunscreen lotions are an equivalent alternative to covering up with clothing. (Scott, 2005). Little selection and less availability of sun protective clothing in many retail stores could be the other reason for less awareness among consumers as reported by Black *et al.* (2001).

Performance finishes	Awareness	
	Frequency	Percentage
Antibacterial	2	6.6
Antiodor	4	13.3
UV protective	0	0.0
Wrinkle resistance	28	93.3
Multiple response		

**Consumer opinion regarding the developed finished cotton fabrics (woven and knitted) :**

Assessment of finished samples was conducted by showing the samples to the consumers (Plate 1 shows the unfinished and finished woven as well as knitted cotton fabrics) and their preferences regarding the developed fabrics were collected. Thirty respondents were purposively selected in the age group of 30-45 years, females and married. The results obtained are discussed below :

The data presented in Table 2 elucidate the respondent opinion regarding the developed finished

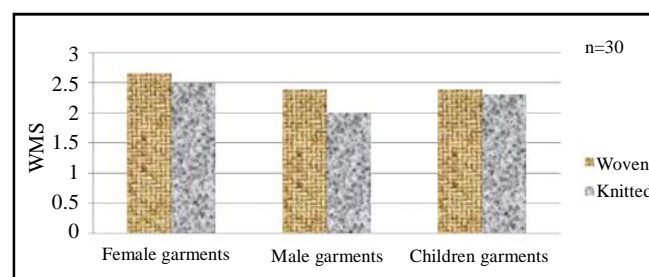


fabrics under different parameters *i.e.* ‘general appearance’, ‘evenness of finish’, ‘texture of fabric’ and ‘fragrance’. The results obtained indicated that regarding the ‘general appearance’, majority of the respondents found the general appearance of the woven (70.0%) and of knitted (76.0%) finished fabric as “fair”. This may be due to the natural colour of plant extract (*S. cumini* L.) appeared on white fabric. Whereas the appearance of the finished woven and knitted fabric was opined as “good” by 30.0 and 24.0 per cent respondents,

respectively. In regard to ‘evenness of finish’, majority of the consumers found the finish of woven (90.0%) and knitted (96.6%) fabric as ‘even’. Only 10.0 per cent (woven) and 3.4 per cent (knitted) respondents found the finish as partially “even”. In case of ‘texture’ of fabric 100 per cent consumers found the texture as “soft” for both woven and knitted finished fabrics. The results also indicated that 100 per cent of the consumers also found the ‘fragrance’ of finished woven and knitted fabric as “pleasant”.

### Consumer preferences regarding the utility of developed finished fabrics for apparel use :

The data presented in Fig. 3. reveal that consumers preferred developed finished fabrics for apparel use. Finished cotton woven fabric was highly preferred for female garments (WMS 2.66), followed by male and children garments with weighted mean score of 2.4 each. The finished knitted fabric was highly preferred for female garments (WMS 2.5) followed by children



**Fig. 3 :** Consumer preferences regarding the utility of developed finished fabrics for apparel use

Parameters		Frequency (%)	
		Woven	Knitted
General appearance	Good	9 (30.0)	7 (24.0)
	Fair	21 (70.0)	23 (76.0)
	Poor	-	-
Evenness of finish	Even	27 (90.0)	29 (96.6)
	Partially even	3 (10.0)	1 (3.4)
	Uneven	-	-
Texture of fabric	Soft	30 (100)	30 (100)
	Rough	-	-
	Medium	-	-
Fragrance	Highly pleasant	-	-
	Pleasant	30 (100)	30 (100)
	Unpleasant	-	-

Multiple response

Figure in parenthesis indicating percentage

garments (WMS 2.3) and male garments (WMS 2.0). Reason for such preference may be attributed to the dual properties provided by the developed fabrics and are safe to be used for children garments as their skin is usually very delicate and can get affected by allergies easily. In addition to this, kids like to play and the nature of children's activities means that their clothes should be durable and suitable for lively little lives (Duke, 2010). Such fabrics not only provide the protection from harmful environmental hazards but are also comfortable to be worn next to the skin. Fortunately, with such developments, performance can be found in safer alternatives that are now entering the market, and in natural fibres that have perhaps been overlooked for their performance attributes (Hoguet, 2014). Similar work related to the present study was also carried out by Gogoi and Gogoi (2016).

### Conclusion:

The innovative technological finishes in some apparel fabrics today have come a long way since scientist Ruth Benerito first helped make 100 per cent cotton wrinkle-resistant decades ago. Now, consumers can purchase clothing that can protect them from the sun, wick moisture away from their skin, and even dry faster. Textile technology continues to be vital for both business and consumers as consumers are seeking "garments with unique style, offering higher levels of comfort and performance with healthy and ethical content says Stylesight's Sophie-Lucie Dewulf, senior editor for materials (Cotton Incorporated Lifestyle Monitor, 2013). From the present, it is concluded that textile material with better performance finishes have market potential when developed with natural plant extracts and are preferred by the consumers for different apparel uses. The development and dissemination of such products should be encouraged and supported by accurate marketing initiatives and valid media information as these added value textiles will attract fresh consumer interest for healthy living active wear and beyond.

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