International Journal of Early Childhood Special Education (INT-JECSE)
DOI: 10.48047/intjecse/v12i2.201073 ISSN: 1308-5581 Vol 12, Issue 02 2020

ASSESSING THE SEWABILITY PARAMETERS OF THE PREPARED NON-CONVENTIONAL (AHIMSA) AND CONVENTIONAL SILK UNION FABRICS

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ABSTRACT

The quality of the textiles was evaluated according to industry standards by measuring their physical qualities and sewability factors. Compared to Cotton: Muga and Cotton: Tussar union fabrics, Cotton: Eri union textiles are the most desirable because to their superior fabric count, weight, thickness, moisture recapture, crease recovery, pilling resistance, and high drapability. In compared to Cotton: Muga and Cotton: Tussar, Cotton: Eri union textiles also demonstrated excellent seam strength, seam efficiency, seam thickness, and reduced seam pucker and seam slippage. The data as a whole suggests that Cotton: Eri union textiles are a good option for clothing due to their superior qualities compared to those of the other union fabrics.

KEYWORDS: Physical, Sewability, Parameters, Cotton-Conventional, Nonconventional, Silk, Union, Fabrics

INTRODUCTION

Silk is a protein filament fiber that occurs naturally. Because of its high quality, beauty, and softness, it is considered the "Queen of Textiles." India is the only nation in the world to produce all four commercial silk varieties—Mulberry, Muga, Eri, and Tussar. The tribal people who live in the forested parts of India typically make three types of silk: Tussar, Eri, and Muga. Vanya silks are the name given to the non-mulberry silks (Eri, Muga, and Tussar).

Thousands of pupae are boiled to death within their cocoons during the traditional silk making process. Most people who appreciate silk's luster have no idea that the cocoons must be boiled in order to unwind the silk. More silkworms were killed to create silk fabric because of increased demand in the industrial and commercial sectors, particularly in emerging countries.

While rural and tribal women devote their time and expertise to raising Eri silkworms and weaving Eri textiles, the Eri culture contributes significantly to the rural economy. The majority of Eri silk is now manufactured without harming or killing any silkworms. This silk is called Eri silk or Ahimsa silk. The Assamese word for "Castor" is "Era" or "Eranda," hence the origin of the world name "Eri" may be traced back to that word, say Ramachandran, kumar, and Pachiyappan (2016). The larvae of the Eri silkworm feed mostly on castor. Silk yarn is spun from open-ended or perforated cocoons, allowing adult moths to emerge alive during the manufacturing of Ahimsa silk. Ahimsa silk yarns are so named because they are made without harming any living thing.

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Eri is raised to be a multivoltine. The eggs have a ten-day incubation period. It's okay for the moth to fly free now. Moths are gathered from far and wide, just to be released into the wild again. Several strands of silk are used to wrap each cocoon. The inner layer is cemented together like paper, while the outside layer is quite light and fluffy. The cocoons from which the moth has emerged normally all have the same telltale gap at one end. Hence, there is a break in the filaments. Eri silk yarn is spun from these filaments because of their inconsistent thickness and inability to be reeled.

This novel technique of producing white silk without killing the silkworm is called the Ahimsa silk manufacturing process. The final product of this method is referred to as Ahimsa silk. The word "ahimsa" in Hindi translates to "nonviolence." Those who abstain from all products made possible by murdering sentient beings, like as humans, are blessed with access to Eri silk. Thus, in India, Ahimsa silk is favored by vegetarians, Buddhist monks, and other religious groups.

LITERATURE REVIEW

TURKER AND TURAN (2018) the physical qualities (such as breaking and tearing strength) of polyester/cotton textiles, both single and double layered, were examined. Fabrics were constructed using polyester yarn in the warp direction and cotton yarn in the weft direction. Fabric type and layer count were shown to be significant factors in the observed variation in fabric thickness. The sole source of the tensile strength difference between warp and weft is the resulting width differential during weaving, and weft textiles have previously showed negative tensile strength. The tensile strength of the cloth hardly budged as a result of the weaving component. The tearing strength of the weft was affected by the number of layers in the fabric, the quantity of weft yarn, and the frequency of the warp and the weft. Due to the low threading frequency, double-layered Panama textiles did not experience weft tears.

AKTER (2017) looked at the various mechanical qualities of cotton woven textiles. Fabrics' stiffness, crease recovery, abrasion resistance, pilling resistance, and wrinkle recovery were tested, among other physical qualities. In this test, only gray versions of the materials were used. According to the data, the stiffness of the cloth reduced as the weft count became higher. As compared to satin and twill, plain weave cloth had the highest levels of stiffness and abrasion resistance. When compared to satin and plain weave, twill weaves had better crease recovery. Fabrics with a plain, twill, or satin weave recovered from wrinkles well.

BANALE (2017) We compared the physical characteristics of Eri silk with silk from mulberry cocoons. The ASTM standard technique was used to evaluate the fiber fineness, moisture regain, cocoon quality, and cocoon weight. The results showed that mulberry fiber was finer than Eri fiber. When compared to mulberry silk fiber, Eri filament was more erratic. In comparison to the 1.55g of a mulberry silk cocoon, the 3.23g of an Eri cocoon is rather hefty. Eri silk regained 10% of its moisture, but mulberry silk recovered just 9%. Just sixty percent of the cocoons were robust due to the care and attention they received before harvest. Higher quality cocoons might be produced with the right methods of growing and care.

PRATHEEPA AND RATNA (2017) Batik printing with crayons was used to design and create this khadi cotton Kurtis for grownups. Batik printing with crayons and

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garment fabrication on khadi cotton fabric were decided upon after preliminary survey work. Out of a total of 20 concepts, only the top 5 were chosen to be made into actual garments. The results showed that people of all ages favored the built Kurtis because of their superior designs, material choices, conformity to trends, color palettes, and finishing touches. While Kurtis was somewhat more expensive, they were far more convenient.

SAINI, KHAMBRA AND YADAV (2017) looked at how well Phulkari embroidery on kurtas is received. Hisar city in Haryana is where the traditional phulkari embroidery motifs were gathered. Kurties were made using five different pattern locations and the standard pat thread colors. Students and educators in the field of clothing design were the most likely to react positively to the kurties. Exhibits were used to determine how people felt about kurties. The majority of respondents agreed that the price of phulkari kurties is reasonable. Kurties' general appeal was also praised by respondents.

RESEARCH METHODOLOGY

The methodologies, processes, and techniques utilized in data collection and analysis are all part of a systematic or ordered approach. Union textiles combining non-traditional (Eri as Ahimsa) silk and conventional (Muga and Tussar) silk yarns with handspun cotton yarn in varying ratios have been the focus of this research.

Sewability was tested after the physical qualities were assessed. Since the quantity and location of seams in a finished garment rely on the sewability properties of the fabric used to make it, these measurements are crucial in the design process. Seam quality was determined by measuring the team’s strength, slippage, efficiency, puckering, stiffness, and thickness. Before beginning seam manufacturing, the qualities of both conventional (Muga and Tussar) and nontraditional (Eri and Ahimsa) silk and cotton union textiles were evaluated. Stitch density was used to sew materials for the purpose of analyzing the sewability characteristics. All nine union fabrics, including both Non-conventional (Ahimsa) silk and Conventional silk with hand spun cotton yarn union fabrics, were put through a battery of tests to determine their weight per unit area and fabric count, both of which are crucial in determining the method to be used for assessing sewability.

RESULTS AND DISCUSSION

The purpose of this research was to compare the physical qualities and sewability parameters of conventional (Muga and Tussar) silk with cotton union textiles to those of non-conventional (Eri as Ahimsa) silk with cotton union fabrics. The generated union fabrics were evaluated for their potential end-user applications. Evaluation of physical and sewability aspects of non-traditional silk and traditional silk with cotton union textiles and product development"

ASSESSMENT OF PHYSICAL PROPERTIES OF YARN

Fabric qualities are directly influenced by yarn characteristics. While creating textile constructions, it is crucial to pay close attention to the proportions of the yarn and the structural elements. The influence of one yarn attribute on another may be determined with the use of yarn testing. The density of the fabric is directly proportional to the

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number of yarns per square inch. The Ne system is an indirect method of counting yarn. The lower the yarn count number in the indirect method, the finer or thinner the yarn. To conduct the analysis, we averaged the yarn counts shown in table 4.1.

Table 4.1 Physical Properties of Yarn Count Cotton, Eri, Muga and Tussar Yarns

Yarn	Yarn count
Cotton	46.9/2s
Eri	78.3 D/2
Muga	82.8 D/2
Tussar	74.3D/2

Cotton, Eri, Muga, and Tussar yarn counts are listed in Table 4.1. Cotton yarn is counted at 46.9/2s. Tussar yarn was 74.3 D/2, Muga yarn was 82.8 D/2, and Eri yarn was 78.3 D/2. Thus, Muga was the finest yarn, while cotton was the thickest. The yarns used had not been chemically treated or colored in any way.

ASSESSMENT OF PHYSICAL PROPERTIES OF THE DEVELOPED UNION FABRICS

Physical testing was performed on the woven textiles to identify the quality characteristics that are crucial in determining the overall quality of the fabric. The end result of the textile industry is fabric. Predicting a fabric's performance in real-world use is possible via testing. We tested and compared all of the fabric samples to determine the impact of the blended yarns on the fabric's characteristics and performance. The testing of fabrics also provides insight into the relationships between the features of the yarn and the properties of the fabrics, as well as the effects of individual parameters on the quality of the finished goods. Fabrics were examined for their capacity to retain moisture, prevent wrinkles from forming, resist pilling, maintain their drape, strength, dimensions, and abrasion resistance. Results were derived from an analysis of data collected on a number of different factors.

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Table 4.2 Fabric Count of the Prepared Union Fabrics

Fabric count (Numerical expression)						
Union fabrics/ Blend ratio	33:67		50:50		67:33	
	EPI	PPI	EPI	PPI	EPI	PPI
Cotton : Eri	62.8	25.4	60.4	25.8	53.6	25.8
Cotton : Muga	52.2	26.2	51.1	26.4	50.2	26.4
Cotton : Tussar	56.2	26	55.8	26	52.2	25.6

According to Table 4.2, the EPI for Cotton: Eri in the ratio of 33:67 is the greatest at 62.8, while the EPI for Cotton: Muga in the same ratio is the lowest at 50.2. Cotton: Muga 50:50 and 67:33 (26.4) has the highest and lowest PPI values, respectively, while Cotton: Eri 33:67 (25.4) has the lowest.

According to the findings, owing to variations in yarn structures and fineness, Cotton: Eri union textiles are the finest of the union fabrics studied. There was some difference in the end and pick density of the woven textiles throughout the union fabrics. Cotton: Tussar union textiles are more substantial than other union fabrics due to the thicker yarn used to make them.

Table 4.3 Fabric Weight of the Prepared Union Fabrics

Fabric weight (g/sq.mt)			
Union fabrics/Blend ratio	33:67	50:50	67:33
Cotton : Eri	90.91	96.59	112.64
Cotton : Muga	90.91	98.04	110.86
Cotton : Tussar	85.40	93.94	95.75

Fabric weight data for union fabrics is included in table 4.3. The highest value for 67:33 was determined to be Cotton, Eri minimum 33:67 minimum weight (112.64g/sq. m). Tussar cotton (85 g/m2) is used.

The findings show that when the coarseness of the yarn increases, the weight of Cotton: Eri and Cotton: Muga union fabrics rises beyond that of Cotton: Tussar union fabrics. Denser textiles are heavier than their lower-density counterparts. The maximal density of the yarn results in the heaviest possible fabric.

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Table 4.4 Fabric Thickness of the Prepared Union Fabrics

Fabric thickness (mm)			
Union fabrics/Blend ratio	**33:67**	**50:50**	**67:33**
Cotton : Eri	1.02	1.01	1.04
Cotton : Muga	0.88	0.93	0.98
Cotton : Tussar	0.80	0.84	0.86

Cotton: Eri 67:33 has the thickest value (1.04mm) in Table 4.4, while Cotton: Tussar 33:67 has the thinnest (0.67mm) (0.80mm). The variation in thread density is to blame.

The findings for fabric thickness show that as fabric weight rises, so does fabric thickness. Cotton: Eri union textiles were discovered to be thicker than Cotton: Muga and Cotton: Tussar because Cotton: Eri yarn is coarser, has a higher yarn count, and has a more uneven yarn surface. Cotton: Eri union fabric is thicker than other textiles because the yarns used to make them have different counts.

ASSESSMENT OF SEWABILITY PARAMETERS OF UNION FABRICS

Seam strength, seam slippage, seam efficiency, seam puckering, seam stiffness, and seam thickness are all contributors to the overall seam quality and seam performance.

Table 4.12 Seam Strength of the Prepared Union Fabrics

Seam strength (N)						
Union fabrics/ Blend ratio	**33:67**		**50:50**		**67:33**	
	Warp	**Weft**	**Warp**	**Weft**	**Warp**	**Weft**
Cotton : Eri	225.8	189.3	241.0	204.0	259.9	249.7
Cotton : Muga	144.3	159.0	142.9	155.6	180.2	213.7
Cotton : Tussar	204.2	198.7	208.6	177.7	199.9	217.0

Table 4.12 displays the developed union textiles' seam strength. Cotton: Eri 67:33 (259.9) has the maximum seam strength in the warp direction. Cotton: Muga 50/50 (142.9) warp direction has the worst seam strength. Cotton: Eri 67:33 has the highest weft seam strength at 249.7, while Cotton: Muga 50:50 has the lowest (155.6).

The following data shows that Cotton: Eri union fabrics have a better seam strength than Cotton: Muga and Cotton: Tussar union fabrics due to the greater suitability of polyester core spun thread and the higher stitch density for Cotton: Eri. The durability of the seams is determined by the quality of the cloth. Cotton Eri union textiles provide more seam strength than other union fabrics due to the heavier fabric weight.

Table 4.13 Seam Slippage of the Prepared Union Fabrics

Seam slippage (N)						
Union fabrics/ Blend ratio	33:67		50:50		67:33	
	Warp	Weft	Warp	Weft	Warp	Weft
Cotton : Eri	39.95 (SS)	>80 (FBS)	69.56 (SS)	>80 (FBS)	70.66 (SS)	>80 (FBS)
Cotton : Muga	>80 (FBS)	>80 (FBS)	>80 (FBS)	>80 (FBS)	>80 (FBS)	75.7 (SS)
Cotton : Tussar	52.02 (SS)	>80 (FBS)	74.94 (FBS)	75.84 (FBS)	>80 (FBS)	>80 (FBS)

According to table 4.13, the seam slippage for the warp direction ranges from 39.95 SS for Cotton: Eri 33:67 to 70.66 SS for Cotton: Eri 67:33. There is a seam failure (>80 FBS) in the weft direction for all three union fabrics at all three ratios.

CONCLUSION

This research demonstrates that the seam strength of Eri*Cotton is superior to that of any other fabric tested. Sewability metrics (seam strength, seam recovery) for Tussar*Cotton, Muga*Cotton, and Eri*cotton union fabrics are high. friction and seam efficiency). The eco-friendly production process used to create Ahimsa silk*cotton union textiles makes them stronger, softer to wear, and more durable, as well as suitable for use in all seasons. This means that Ahimsa silk*cotton union textiles are just as acceptable for use in the production of garments as union fabrics created from regular silk*cotton. The invention of union fabric has the potential to be a watershed moment in the history of fabric innovation generally, and in the creation of sustainable and ethical fabric specifically, for the manufacture of clothing and the fashion and textile industries. In the grand scheme of things, it will help ensure that future generations may enjoy a thriving ecosystem and a clean, safe world. Furthermore, these union textiles are inexpensive, so they may serve a variety of purposes.

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