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# Effect of twist factor of yarn on sensorial comfort of single jersey knitted fabrics

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The influence of twist factors on the sensorial comfort of single jersey knitted cotton fabrics has been studied. Four single jersey knitted fabrics have been produced from yarns with different twist factors and their compression, tensile, shear, bending, and surface properties are measured using Kawabata Evaluation System. The findings show that the twist factors have a significant influence on tensile, shear, bending, compression, and surface properties. The change in tensile energy and its linearity in course direction are higher than that in the wale direction, because of the geometry and structure of knitted fabrics. Also, it is found that the fabrics produced from higher twist yarns have higher bending stiffness, less compressibility, lower surface friction, and less bulkiness than fabrics composed of low twist yarn.

**Keywords:** Bending properties, Compression properties, Cotton, Sensorial comfort, Shear properties, Single jersey fabric, Surface roughness, Tensile properties, Twist factor

## 1 Introduction

Nowadays, the standard of life getting better and better and it is ever enhancing[1]. As a result, customers' perception of clothing comfort is increasing. Comfort is a fundamental property in the selection of apparel products. Therefore, understanding fabric properties and characteristics are vital in the design and manufacturing of textile products. The selection of cloth is mostly, influenced by different factors, such as comfort, need, aesthetics, etc[2]. Generally, comfort is the fundamental property that influences the performance and quality of textile products[3]. Knitted fabrics are a basic and essential part of textile products. Knitted fabrics have a wider application because of their cheap manufacturing cost, elastic nature, lightweight, etc. The concern of consumers is not only limited to color and aesthetics but also the handle or comfort. This is due to the increase in their perception of improved life standards[4,5]. The comfort of textile products is mainly affected by the type of fibre, yarn, fabric structure, and finishing treatment[6].

Comfort can be categorized into physiological, sensorial, and psychological comfort[7]. Sensorial comfort can be expressed as "fabric hand or feel". These include the smoothness or stiffness, prickling, itching, etc. It can also relate to its attributes related to physiological comfort, for instance wet clinging and wet feeling affect sensorial comfort[8]. Sensorial comfort involves not only fabric hand, but also next parameters, for example, the effect of moisture on skin/fabric friction, moisture spreading and buffering ability, number of contact points, etc. Evaluation of sensorial comfort plays an important role in the selection of textile materials[9].

A few kinds of research have been done on the influence of fibres, fibre blend ratios, fibre morphology, yarn parameters, finishing treatments, and fabric constructions on the hand feel properties of knitted and woven fabrics. The effect of finishing treatment on the mechanical properties of textile fabric was studied by Yan *et al.*[10]. The study showed that treated fabrics have a coarse handle and a lower fullness than untreated fabrics. Effects of yarn fineness and the weave structure on compression and bending properties have also been investigated[11]. The results showed that coarse yarn has a higher bending stiffness and compression value than finer yarns. The compression properties of textile material are significantly affected by the type of structure, yarn property, fibre surface characteristics, etc[12]. The compression properties of knitted fabrics are affected by the loop length cover factor as well as the type of raw materials[13-15].

In staple fibre yarn, increasing twists reduced the softness and bulkiness[16]. The structure of yarn mainly

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folded yarn, also affects the handle properties[17]. Fabrics made of coarser filament yarn have higher thickness and compression properties than the fabrics made of finer filament textured yarns[18]. The static friction of fabrics made of rotor yarn is higher than the fabrics made of ring-spun yarn. Yarn type has a significant effect on the handle properties of the fabrics[19]. This is due to a large number of wrapped fibres which is more visible in rotor yarn than in ring-spun yarns. Knitted fabric made from siro spun yarn has softer, thicker, smooth, and less stiff properties. Air-jet spun yarn gives increased extensibility, thickness, and stiffness but reduces compressibility of fabrics to ring-spun yarns[20].

Many researchers[6,21-25] have investigated the influence of fibre morphology, yarn characteristics, fabric structure, and finishing treatments on the comfort properties of knitted fabrics. The handle properties of the fabric are significantly affected by fabric density[26].

The type of fibre, its population and their length distribution affect the frictional properties of a fabric[27]. In addition to that, the frictional properties of filament yarn fabric are better than those of the fabrics made of staple fibre yarns[28].

The effect of yarn fineness on low-stress mechanical properties was investigated[29]. The study revealed that the coefficient of friction, surface roughness, MIU, compression, tensile bending, and shear properties of bleached fabrics was significantly affected by yarn fineness. Researchers have examined the effect of finishing treatment, such us dyeing, bleaching and scouring, on the sensorial properties of a fabric through the increased disturbance in surface fibres as well as fabric surface irregularities[30]. In general, the influence of twist factor on tactile comfort of knitted fabrics has not been deeply studied yet. This research is designed to study the influence of twist factor on the sensorial comfort of single jersey knitted fabrics.

## 2 Materials and Methods

### 2.1 Materials

Experimental samples were knitted using 100% cotton fibre with a count of 16 tex carded ring-spun yarn having four different kinds of twist factors (3.2, 3.6, 4.0, and 4.4). For yarn production, fibre with properties (Sudan cotton with 30.6 mm staple length, 9.4 short fibre index, 206.5 neps/g, 3.41% trash and 3.92 micron air) was used.

Cotton yarn of 16 tex produced in ring frame with different twists was used for the study. The yarn parameters were kept constant except for the yarn twist. The parameters were evaluated by using a Universal Strength Tester at 50 cm gauge length and 20 s time to break. The yarn parameters are shown in Table 1.

### 2.2 Methods

#### *2.2.1 Sample Fabric Production*

Four fabric samples were produced from different kinds of yarn twists with the same material, machine setting, and process parameters using a circular knitting machine with parameters as: Orizio, Italy single jersey machine, 16 rpm speed, 76.2 cm diameter, 24 gauge, 2220 number of needles, latch needle, 90 number of feeders and 4 number of camtrucks.

After production, the physical properties of knitted single jersey fabric samples were evaluated (Table 2).

Table 1 — Yarn parameters

| Twist factor | Unevenness, % | Coefficient of variation of mass, % | Thin (-50%) | Thick (+50%) | Neps (+200%) | Strength cN/tex | Elongation % |
|---|---|---|---|---|---|---|---|
| 3.2 | 12.81 | 17.00 | 40.6 | 580.5 | 852.3 | 1.52 | 4.82 |
| 3.6 | 12.97 | 16.80 | 35.4 | 602.6 | 848.4 | 1.72 | 4.56 |
| 4.0 | 12.56 | 16.58 | 28.3 | 598.3 | 832.6 | 1.95 | 4.27 |
| 4.4 | 12.74 | 16.46 | 22.8 | 610.8 | 822.4 | 1.89 | 3.99 |

Table 2 — Knitted fabric characteristics

| Sample code | Twist factor of yarn | Fabric parameters | | | |
|---|---|---|---|---|---|
| | | Stitch length, mm | Stitch density, (CPC×WPC) | Thickness, mm | Tightness factor |
| Sj1 | 3.2 | 3.36 | 162 | 8.6 | 1.78 |
| Sj2 | 3.6 | 3.31 | 200 | 8.4 | 1.81 |
| Sj3 | 4.0 | 3.22 | 238 | 8.3 | 1.86 |
| Sj4 | 4.4 | 3.08 | 270 | 8.1 | 1.94 |

To measure WPC, CPC and, to calculate stitch density, as shown below, a counting glass was used:

$$\text{Stitch density (cm}^2) = WPC \times CPC \quad \ldots (1)$$

where WPC is the wales per centimeter; and CPC, the courses per centimeter.

Determination of fabric thickness was done using a digital thickness gauge (MESDAN, model: D-2000) at 100 KPa. It was measured as per the ASTM D1777-96 test standard

#### *2.2.2 Experimental Analysis*

The sensorial comfort of single jersey knitted fabric was measured using Kawabata Evaluation System (KES). The test includes compression, surface friction, and roughness, tensile, shear, pure bending. All specimens were conditioned before testing at the standard atmospheric condition of 21 ± 1 C temperature and 65 ± 2% relative humidity.

#### *2.2.3 Tensile and Shear Properties*

The tensile and shear properties of sample knitted fabrics were evaluated using the KES-FB1-AUTO-A method. The tensile property of the sample was measured in both wale and course directions. The load extension properties of a sample fabric (20 × 20 cm) were measured at 500 gf/cm (490 N/m) load. During the tensile properties test, the instrument can measure the tensile linearity, energy, resilience, and strain of the sample fabrics. For tensile test evaluation, six tests were conducted from each sample fabric and average was calculated. In the 2nd mode of operation, the Kawabata instrument KES-FB1-AUTO-A was also used to measure the sample shear deformation between a shear strain of ±8°. The instrument also measures the shear recovery of the samples. For shear test evaluation, six tests were conducted from each sample fabric and average was calculated.

#### *2.2.4 Bending Properties*

The bending parameters used to characterize bending properties are bending rigidity (B) and bending hysteresis (2HB). Bending rigidity is the resistance of fabric against flexion by its weight and external force. The bending hysteresis is a measure of fabric recoverability after bending. KES-FB2-AUTO-A measures the characteristics of a couple–curvature of 200×1cm sample in cyclic bending deformation at curvatures of $\pm 25\text{mm}^{-1}$. From each structure, five tests were conducted separately in both wale and course directions.

#### *2.2.5 Surface Friction and Roughness Properties*

KES-FB3-AUTO-A tester was used to measure the coefficient of friction (MIU) and geometrical surface roughness mean deviation (SMD). A specimen size of 20×20 cm size was secured on a sample plate and moved horizontally at a speed of 1 mm/s. The system gets data using sensors that measure MIU and roughness in a 20×20 cm sample size. A total of eight samples were tested. The frictional coefficient (MIU) can be calculated using the following equation:

$$MIU = \frac{F}{P} \quad \ldots (2)$$

where F is the frictional force (N); and P, the sensor load (N).

The value of MIU ranges from 0 to 1; the value approaching 1 is interpreted as increasing friction and roughness. Surface roughness SMD can be calculated using the following equation:

$$SMD = 1/L_{max} \int L\, max_0 |Z_0 - Z|\, dL \quad \ldots (3)$$

where $L_{max}$ is the distance traveled by the sensor over the fabric; and $Z_{0,}$ the standard sensor position[31]. The SMD value ranges from 0 and 20. When the value is approaching 20, it indicates higher surface roughness and irregularities.

#### *2.2.6 Compression Properties*

The compression properties test is useful for determining fabric thickness, fullness, softness, and smoothness, at selected loads[32]. The thickness and pressure of samples were measured at 50 gf/cm$^2$ (4.9 kPa) using Kawabata Evaluation System (KES-F3). The fabric recoverability, thickness, and work of compression were measured. Eight tests were conducted from each sample structure and average was calculated.

## 3 Results and Discussion

### 3.1 Tensile Properties

Tensile properties of the fabric are important properties that affect the fabric performance characteristics. These properties can be evaluated using the KES as RT (tensile resilience), WT (tensile energy), EMT (extensibility) and LT (linearity of WT). As shown in Fig. 1, the LT value of knitted fabrics increases with an increase in yarn twists (from Sj1 to Si4). LT has a value ranging from 0 to 1 and this value indicates the hardness and stiffness of a fabric. Fabric produced from higher twist factor yarn (Sj4> Sj3> Sj2> Sj1) has a higher LT value in both

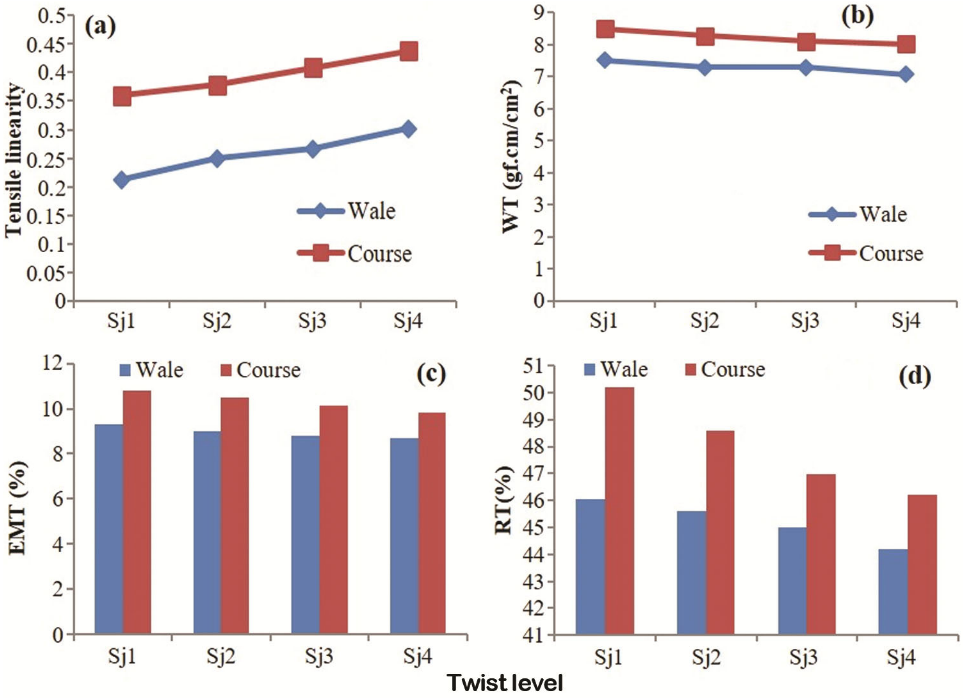

Fig. 1 — Tensile properties of single jersey knitted fabrics (a) LT, (b) WT, (c) EMT (%) and (d) RT(%) [Twist factors: Sj1 - 3.2, Sj2 - 3.6, Sj3 - 4.0 and Sj4 -4.4]

wale and course directions. Hence, fabric Sj4 is a stiffer and harder fabric as compared to fabrics made from Sj3, Sj2, and Sj1 twist-level yarns. Similarly, fabric made of Sj3 is stiffer and harder than Sj2, and Sj1 fabrics. This is because of yarn twist; when yarn twist increases the fibre-to-fibre friction within the yarn structure increases, which makes the yarn denser and harder. This makes the fabric harder and stronger.

The value of the tensile energy (WT) decreases with an increase in twist. Tensile energy (WT) indicates the fabric's softness. The softer the fabric, the higher is the stretch ability and tensile energy. As shown in Fig. 1, the WT value is decreased from Sj1 to Sj4 in both course and wale directions. When twist increases, it causes fibre obliquity, thus reducing fibre orientation onto the axis of yarn. This tendency reduces the bulkiness and softness of the fabric.

In both LT and WT, the change in value in course direction is higher than those in wale direction. This is because of the geometry and structure of knitted fabrics. EMT indicates fabric extensibility. The higher the EMT value, the more is the extensibility of the fabric. The extensibility of fabric under a tensile load (EMT) value is decreased with an increase in yarn twist. Similarly, tensile resilience or recovery (RT %) decreases with an increase in twist factor. RT reflects recovery from tensile deformation. When the RT % value is increased the fabric will have better tensile resilience and comfort property.

The elongation (EMT %), and tensile resilience or recovery (RT %) values of the knitted fabrics are reduced with increase in twist factor. The change in value in course direction is also higher than in wale direction. This is because of the geometry and structure of knitted fabrics.

In general, from ANOVA statistical analysis (Table 3), the tensile energy (WT), tensile linearity of (LT), elongation (EMT %), and tensile resilience or recovery (RT %) values of the knitted fabrics are significantly affected by the yarn twist factor even though other parameters are kept constant.

### 3.2 Shear Properties

Clothes need to be stretched or sheared to different degrees as the body moves. Shearing allows the fabric to conform to different shapes which allows free body movement[33]. As indicated in Fig. 2, the shearing rigidity (G) values of the knitted fabric are increased from Sj1 to Sj4. The shear rigidity value increases with an increase in twist factor. When twist is increased, the fabric becomes hard to deform. Similarly, the 2HG value is increased with an increase in the twist factor. Comparatively, sample Sj4 has the highest 2HG value. A higher 2HG value indicates less recoverability of a

Table 3 — ANOVA statistical results of tensile properties

| Property | Position | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| LT wales | Between groups | 0.0252 | 3 | 0.008383 | 88.24561 | 1.05E-11 |
| | Within groups | 0.0019 | 20 | 0.000095 | | |
| LT course | Between groups | 0.021313 | 3 | 0.007104 | 63.14815 | 2.23E-10 |
| | Within groups | 0.00225 | 20 | 0.000113 | | |
| WT wales | Between groups | 0.607917 | 3 | 0.202639 | 20.43417 | 2.65E-06 |
| | Within groups | 0.198333 | 20 | 0.009917 | | |
| WT course | Between groups | 0.828333 | 3 | 0.276111 | 40.4065 | 1.12E-08 |
| | Within groups | 0.136667 | 20 | 0.006833 | | |
| EMT wales | Between groups | 1.363333 | 3 | 0.454444 | 19.0676 | 4.4E-06 |
| | Within groups | 0.476667 | 20 | 0.023833 | | |
| EMT course | Between groups | 3.307917 | 3 | 1.102639 | 33.32914 | 5.64E-08 |
| | Within groups | 0.661667 | 20 | 0.033083 | | |
| RT wales | Between groups | 11.61 | 3 | 3.87 | 22.96736 | 1.1E-06 |
| | Within groups | 3.37 | 20 | 0.1685 | | |
| RT course | Between groups | 57.36833 | 3 | 19.12278 | 160.0232 | 3.8E-14 |
| | Within groups | 2.39 | 20 | 0.1195 | | |

LT- Linearity of tensile; WT- tensile energy; EMT%- elongation and RT% - tensile resilience or recovery.

fabric. Therefore, Sj4 fabric has less resilience (recoverability) property. Fabrics made from low twist yarn (Sj1) has better resilience (recoverability) property than fabrics made from higher twist yarn (Sj4). In the same manner, the value of 2HG5-hysteresis of shear force at 5° is increased with an increase in twist factor. From the ANOVA analysis (Table 4), it is clear that the twist factor has a significant effect on the shear properties of knitted fabrics.

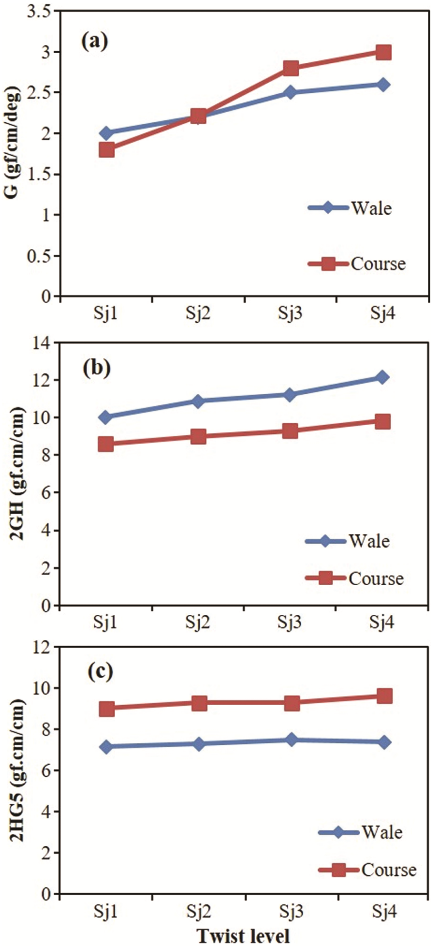

Fig. 2 — Shear properties of single jersey knitted fabrics (a) G-Shear rigidity (b) 2HG - hysteresis of shear force at $0.5^0$, and (c) 2HG -hysteresis of shear force at $5^0$

### 3.3 Bending Properties

Bending rigidity (B) indicates the rigidity or softness of the fabric. The larger the bending rigidity value, the harder the object is to bend. A smaller B value indicates softer fabric. The bending resilience or hysteresis describes the fabric recoverability to its original shape or position after being bent. A larger 2HB value indicates less recoverability, while a smaller 2HB value indicates better recoverability.

As seen in Fig. 3 (a) and (b), the bending rigidity (B) and bending resilience (2HB) of fabric are increased with an increase in twist multiplier. Fabric produced from low twist yarn (Sj1) has the least bending rigidity (B) and highest bending resilience (2HB) values, while fabrics produced from high twist yarn (Sj4) has the highest bending rigidity and the least bending resilience (hysteresis) values.

As shown in the ANOVA (Table 5), the bending rigidity (B) properties of knitted fabrics are found significantly different in both wale and course

Table 4 — ANOVA statistical results of shear properties knitted fabrics

| Property | Position | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| Shear G wales | Between groups | 1.365 | 3 | 0.455 | 113.75 | 9.75E-13 |
| | Within groups | 0.08 | 20 | 0.004 | | |
| Shear G course | Between groups | 5.41125 | 3 | 1.80375 | 243.2022 | 6.68E-16 |
| | Within groups | 0.148333 | 20 | 0.007417 | | |
| Shear 2HG Wale | Between groups | 13.607917 | 3 | 4.535972 | 220.3711 | 1.74E-15 |
| | Within groups | 0.4116667 | 20 | 0.020583 | | |
| Shear 2 G course | Between groups | 4.73125 | 3 | 1.577083 | 151.4 | 6.46E-14 |
| | Within groups | 0.208333 | 20 | 0.010417 | | |
| Shear 2HG5, wale | Between groups | 0.354583 | 3 | 0.118194 | 19.42922 | 3.84E-06 |
| | Within groups | 0.121667 | 20 | 0.006083 | | |
| Shear 2HG5, course | Between groups | 1.086667 | 3 | 0.362222 | 35.05376 | 3.71E-08 |
| | Within groups | 0.206667 | 20 | 0.010333 | | |

Table 5 — ANOVA statistical results of bending properties of knitted fabrics

| Property | Position | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| Bending B wale | Between groups | 0.0486 | 3 | 0.0162 | 202.5 | 3.94E-15 |
| | Within groups | 0.0016 | 20 | 0.00008 | | |
| Bending B course | Between groups | 0.0354 | 3 | 0.0118 | 196.6667 | 5.23E-15 |
| | Within groups | 0.0012 | 20 | 0.00006 | | |
| Bending 2HB wale | Between groups | 0.00848 | 3 | 0.002827 | 97.08262 | 4.31E-12 |
| | Within groups | 0.000582 | 20 | 2.91E-05 | | |
| Bending 2HB course | Between groups | 3.31E-05 | 3 | 1.1E-05 | 20.38462 | 2.69E-06 |
| | Within groups | 1.08E-05 | 20 | 5.42E-07 | | |

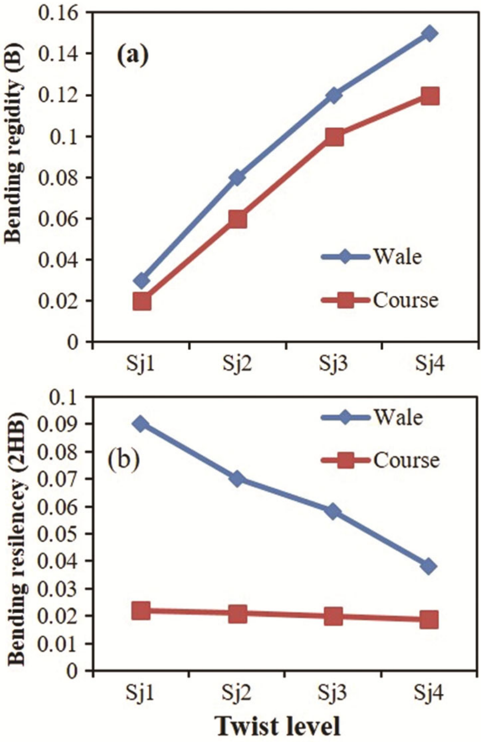

Fig. 3 — Bending properties (a) bending rigidity and (b) bending resiliency (2HB)

directions sat F-value = 202.5, p-value = 0.000 and F-value = 196.66 p-value = 0.000 respectively. Similarly, 2HB properties of knitted fabrics are significantly different in both wale and course at F-value = 97.082, p-value = 0.000 and F-value = 20.384 p-value = 0.000 respectively. This is due to the difference in yarn twists; fabrics made of higher-twist yarn are stiffer and harder than fabrics made from a low-twist yarn. Fabrics produced from higher twist level yarn have higher bending rigidity and less compressibility[18]. This study also proves that the fabrics composed of higher twist yarn have less compressibility and higher bending rigidity.

### 3.4 Surface Properties

Figure 4 shows the surface properties (MIU and SMD) of single jersey knitted fabric samples made from different twists of yarns. The test result shows that the MIU (coefficient of friction) and SMD (surface roughness) values of sample fabrics are increasing as the twist factor of the yarn increases. The value of MIU ranges from 0 to 1; where 0 represents smooth surface and 1 shows rough surface. Fabrics made from Sj4 yarn has higher MIU and SMD values than fabrics produced from low twist yarns (Sj1, Sj2 and Sj3). Larger values of SMD indicate the roughness and unevenness of a fabric. Therefore, Sj4 fabric has an uneven and rough surface than other knitted fabrics produced from low twist yarns (Sj1, Sj2and Sj3). A fabric produced from a low-twist yarn will be softer than fabrics produced from high-twist yarn.

The statistical analysis (Table 6) shows that twist multipliers has a significant difference in MIU (coefficient of friction) of knitted fabrics at F-value = 56.79, p-value = 0.000 and F-value = 36.532 p-value = 0.000 respectively. Similarly, SMD (surface roughness) properties of knitted fabrics are significantly different in both wale and course directions at F-value = 23.181, p-value = 0.000 and F-value = 11.502, p-value = 0.000 respectively.

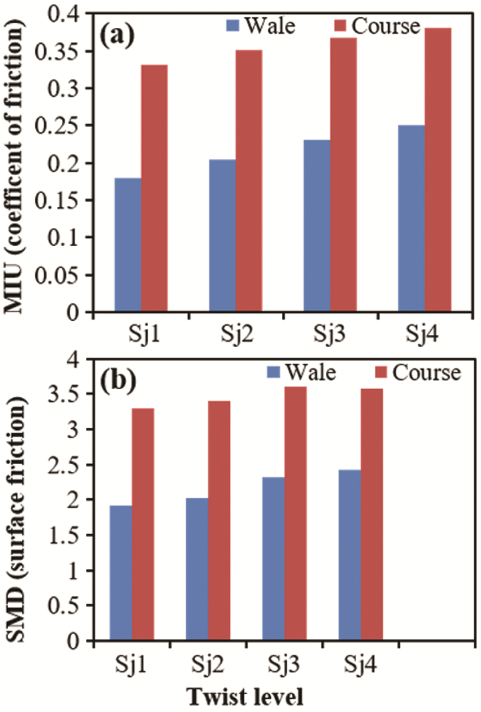

Fig. 4 — (a) Surface friction (MIU) and (b) roughness (SMD) properties of knitted fabrics

### 3.5 Compression Properties

The compression parameter of a knitted fabric is an important property for determining fabric appearance, resilience, softness and stiffness. The compression properties of single jersey knitted fabrics produced from different twist factor of yarn saree valuated using the Kawabata fabric evaluation system (KES-FB3-AUTO-A). This test evaluation includes linearity compression (LC), compression energy (WC), compression resilience (RC), and fabric thickness (T). The compressional energy (WC) indicates the amount of energy required for the compression and deformation of a textile fabric. It is also a measure of the thickness and compressibility of a fabric. As was shown in Fig. 5, the LT and WC values are increasing with an increase in twist factor. This is because of yarn twist; low twist yarn is soft and bulky, and hence is easy to compress. As a result, fabric produced from low twist yarn has a high compression value than fabrics produced from high twist yarn. Fabrics made from low twist yarn are thicker and more compressible than fabrics produced from high twist yarn. Similarly, the RC and thickness values are decreased with an increase of twist. Fabrics produced from low twist yarn are bulky and thicker and have higher compressional resiliency (RC) than fabrics produced from high twist yarn. Higher RC values indicate a softer and smoother feel of textile fabric. In addition to other factors like stitch length, yarn count, structural parameters and type of fibre, the LC, WC, RC, and thickness values of a knitted fabric are significantly affected by the twist factor of yarn. The statistical analysis of compression properties is shown in Table 7.

Table 6 — ANOVA statistical results of surface properties

| Property | Position | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| MIU wale | Between groups | 0.016613 | 3 | 0.005538 | 56.79487 | 5.76E-10 |
| | Within groups | 0.00195 | 20 | 9.75E-05 | | |
| MIU course | Between groups | 0.007945833 | 3 | 0.002649 | 36.53257 | 2.63E-08 |
| | Within groups | 0.00145 | 20 | 7.25E-05 | | |
| SMD wale | Between groups | 1.02 | 3 | 0.34 | 23.18182 | 1.02E-06 |
| | Within groups | 0.293333 | 20 | 0.014667 | | |
| SMD course | Between groups | 0.408333 | 3 | 0.136111 | 11.50235 | 0.000134 |
| | Within groups | 0.236667 | 20 | 0.011833 | | |

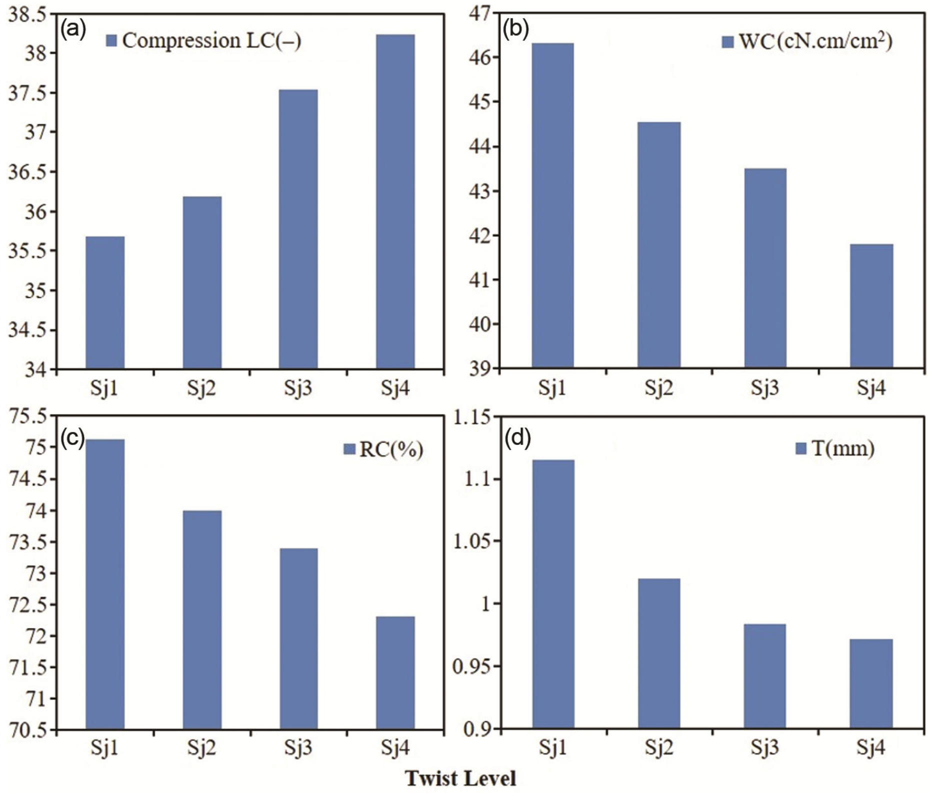

Fig. 5 — Compression properties (a) linearity compression (LC), (b) compression energy (WC), (c) compression resilience (RC), and (d) fabric thickness (T)

Table 7 — ANOVA statistical results of compression properties

| Property | Position | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| LC(-) | Between groups | 25.035 | 3 | 8.345 | 31.70994 | 8.5E-08 |
| | Within groups | 5.263333 | 20 | 0.263167 | | |
| WC, gf/cm/cm$^2$ | Between groups | 64.78911 | 3 | 21.59637 | 294.5127 | 1.03E-16 |
| | Within groups | 1.466583 | 20 | 0.073329 | | |
| RC, % | Between groups | 25.165 | 3 | 8.388333 | 86.77586 | 1.22E-11 |
| | Within groups | 1.933333 | 20 | 0.096667 | | |
| T, mm | Between groups | 0.076083 | 3 | 0.025361 | 1.843327 | 0.171832 |
| | Within groups | 0.275167 | 20 | 0.013758 | 0.275167 | |

## 4 Conclusion

The main goal of the study is to investigate the influence of twist factor on sensorial properties of single jersey knitted fabrics. Four single jersey knitted fabrics are produced using the same machine and process parameters. Except for the twist factor, all parameters have been kept constant. The sensorial properties of knitted fabrics' tensile shear, compression, bending rigidity, surface friction, and geometrical roughness characteristics have been measured and analyzed. The study proves that the sensorial properties are significantly affected by the twist factor. The results show that WT, EMT, and RT values decrease with an increase in yarn twist, but the tensile linearity LT values have a direct relation with yarn twist. The compression properties of the fabric have also an indirect relation with yarn twist. Bending rigidity has increased with an increase of TM, but bending resilience reduces with an increase of twist. The study shows that the change in value in course direction is higher than that inwale direction. This is because of the geometry and structure of knitted fabrics. In general, fabrics produced from higher twist yarns have higher bending stiffness, less compressibility, lower surface friction, and less bulkiness than fabrics composed of low twist yarn.

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