

**EFFECT OF BLENDING TREATMENTS BETWEEN UPLAND COTTON (*Gossypium hirsutum* L.) AND GIZA 95 CULTIVAR (*Gossypium barbadense* L.) ON FIBER AND YARN QUALITY**

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**ABSTRACT**

The present study was carried out during 2018 season in the Misr Helwan Spinning and Weaving Company, Helwan, Cairo, and the laboratory of Cotton Technology Research Division, Cotton Research Institute, Agricultural Research Center, Giza, Egypt to study the effect of five cotton materials, *i.e.* pure Egyptian cotton (*Gossypium barbadense* L.) of Giza 95, pure upland cotton (*Gossypium hirsutum* L.), blend of 65% Giza 95 + 35% upland cotton, blend of 50% Giza 95 + 50% upland cotton and blend of 35% Giza 95 + 65% upland cotton and three yarn counts, *i.e.* 20's, 25's and 30's on fiber and yarn technological properties significantly using the rotor open-end spinning system. Pure Egyptian cotton Giza 95 recorded the highest mean values for upper half mean length (mm), fiber uniformity (%), fiber strength (g/tex), maturity, maturity ratio (%), reflectance degree, yarn strength, it gave the lowest mean values of short fiber index, No. of neps/100m, No. of thin places/100m, No. of thick places/100m. On the other hand, upland cotton recorded the highest value of short fiber index, fiber elongation and micronaire value and lowest mean values of maturity ratio, reflectance degree (RD%), Yellow-ness( $b^+$ ). Increasing yarn counts from 20's and 25's to 30's caused significant increase in mean values of some studied traits. In contrast, for the rest traits it decreased. The yarns produced at yarn count of 30's significantly recorded the maximum mean values of evenness (C.V %), No. of neps/100 m, No. of thin places/100m and No. of thick places/100m while gave the lowest mean values of yarn strength and hairiness. Meanwhile, the maximum mean values of yarn strength and hairiness, as well as, the lowest mean values of evenness/100m, No. of neps/100m, No. of thin places/100m and No. of thick places/100m were obtained from yarn count of 20's. The interaction between five cotton materials and three yarns obtained was significant for all yarn quality characters.

**Key words:** *cotton gossypium hirsutum l., gossypium barbadense l., blending, fiber, yarn.*

**1. INTRODUCTION**

Textile industry in Egypt requires amounts of long stable cotton cultivars suitable for the technology of Egyptian textile industry mills. Recently, Egypt imports a lot of upland longstaple cotton. There is a trend in Egypt now, to introduce and cultivate upland cotton cultivars, especially in the new reclaimed lands to provide the needs of the Egyptian textile industry without dependence on imports (Nassar *et al.*, 2013). In Egypt, the total cotton cultivated area decreased in recent years due to increasing costs of production and the great competition of other food crops. As a result of the great increase in population and consumption of both raw cotton and fabrics, Egypt can export Egyptian

cottons of high quality and price and import American upland cottons of low quality and price to produce blended coarse yarns. Fiber blending is the process of combining different fiber components, together, either of the same, or different fiber types to produce a fiber strand (sliver or yarn) of consistent desirable characteristics. Blending of cottons extremely different in their quality and price was investigated as a possible economic way using these cottons in the blend form. In an effort to show the merits of recalculated blending of cotton, a systematic study of blends containing varying amounts of some American upland and Egyptian cotton varieties have been made. It is worth mentioning that large amounts of annual

cotton fiber wastes are produced by Misr Helwan Spinning and Weaving Company. The Egyptian cottons, in fact, possess the longest, finest and the strongest fibers among world cottons. About 30% of the world's supply of the extra long staple cotton is produced in Egypt. As a matter of fact, the extra-long staple cottons are the most valuable, the most difficult to produce and the least abundant. Ashour *et al.*, (1991) reported that the fiber length and length uniformity ratio were the primary factors in determining yarn uniformity and defect level, where short fibers are usually used as an evidence of fiber breakage. Deussen (1992) concluded that yarn evenness, coefficient of variation, neps count, thin places and thick places significantly increased with increasing yarn count and twist factor from 3.4 to 4.2. Meanwhile, there was a significant increase for neps count, thin places thick places due to increasing the twist factor from 3.4 to 3.8 and to 4.2 for some Egyptian cotton cultivars. Also, single yarn strength and yarn elongation % significantly decreased as yarn count increased. Ali (1994) reported that under three blend ratios of cotton (extra-long staple and long staple) 80:20, 70:30 and 60:40 blending of Extra-long staple and long staple, which were spun into 10 tex (Ne 60) recorded the greatest values for yarn tenacity, yarn elongation %, evenness, thin and thick places. Marinus (2007) observed that blending of cotton fibers and cotton waste recovered from ginning process with three different proportions (50/50, 35/65 and 65/35%) reduced the production costs and improved most physical properties for yarn. Shanbeh *et al.*, (2011) observed varietal differences between cotton varieties concerning single yarn strength, (C.N/Tex), evenness (C.V %) and number of neps/100m. The maximum value of single yarn strength was obtained from the yarn spun at 80's, while the minimum value was obtained from count 140's, and the lowest values were obtained at 80's count. On the other hand the highest values for evenness (C.V %) and number of neps/100m were obtained from count 140's, while the lowest values were obtained from 80's count. The interaction between cotton cultivars and yarn count was significant for all studied traits. Rizk *et al.* (2016) reported that imported upland cottons are of inferior fiber quality characteristics compared to Egyptian cotton. Hence blending between the two categories of cotton lint may offer an opportunity to obtain yarns with higher quality than that of upland

cotton and of lower prices (Hsien *et al.*, 2000). However, blending of cottons with different quality characteristics may have an effect on fiber characteristics of the blend and resulting yarn quality (Majumdar, 2004 and Nomer and Abd El-Hameed, 2005). Ureyen and Kadoglu (2006) observed that cotton yarn properties were significantly affected by fiber properties such as strength, elongation and fineness, and to a lesser extent by uniformity, length and short fibers content. Similarly, Faulkner *et al.* (2012) reported that yarn properties were most frequently correlated to fiber length, strength and fineness. Cai *et al.* (2013) strongly emphasized the importance of fiber length as a key property for yarn production and quality.

The objective of this study was to evaluate the quality of fiber and yarn spun from Egyptian cotton and its blends with upland cottons to achieve an optimum quality yarns and usefulness of blending Egyptian/upland cottons as a potential way of reducing the costs of popular fabrics.

## 2. MATERIALS AND METHODS

The present study was carried out during 2018 season in Misr Helwan Spinning and Weaving Company, Helwan, Cairo and the Laboratory of Cotton Technology Research Division, Cotton Research Institute, Agricultural Research Center, Giza, Egypt. Using samples of good lint grade Giza 95 Egyptian cotton (*Gossypium barbadense* L.) cultivar to study the effect of cotton materials under levels of blend proportions, *i.e.* 100 % Giza 95, 100 % upland cotton (*Gossypium hirsutum* L.) and blends of 65% Giza 95 + 35% upland cotton, 65% upland cotton +35 % Giza 95 and 50 % Giza 95+ 50 % upland cotton as the main factor. The experiment was performed for three different yarn counts, *i.e.* 20's, 25's and 30's carded for constant twist multiplier (3.6). Three replicates were spun/each sample on cotton fiber and yarn properties using the open – end spinning system in the Misr Helwan Spinning and Weaving Company, Helwan, Cairo as the sub factor. Blending was performed by the Sandwich blending technique based on the standard method designs by Hollen and Saddlers (1973).

### 2.1. Studied characters

**2.1.1.Fiber quality characters:** The properties of pure fiber and blends were tested using H.V.I (High Volume Instrument) according to A.S.T.M standard test method to determine upper half mean length (UHML) in mm, length

uniformity index (UI%), short fiber index (SFI%), fiber strength (g/tex), fiber elongation%, micronaire value, maturity ratio (MR%) and fiber color attributes, *i.e.* fiber reflectance (RD%) and fiber yellowness degree ( $b^+$ ) according to A.S.T.M., (1986 D:4605). While, fiber fineness (mill/tex) was determined by using Micromat tester according to A.S.T.M.,(1998 D:3818-79).

**2.1.2. Yarn quality characters:** Yarn strength expressed in terms of Lea Count Strength Product (LCSP) in pounds is measured by using the Good-Brand Lea Tester (A.S.T.M., 1967 D-1578). Coefficient of variation of the yarn evenness (C.V %), No. of neps/100m, No. of thin places/100m, No. of thick places/100m and hairiness of the yarn were measured by the Uster Evenness Tester III as described by the designation of the A.S.T.M., (1984 D-2256). All fiber and yarn tests were carried under controlled constant relative humidity 65 % ( $\pm 2$ ) and temperature 21°C ( $\pm 2$ ) in the laboratory of Cotton Technology Research Division, Cotton Research Institute, Agricultural Research Center, Giza, Egypt.

**Statistical analysis:** The experiment data were statistically analyzed as split plot complete design with three replicate. Data were subjected to analysis of variance according to Steel *et al.* (1997). Treatment means were compared based on least significant difference (LSD) at probability level of 0.05. Finally, all statistical analyses were carried out using "MSTAT-C" program 1991.

### 3. RESULTS AND DISCUSSION

#### 3.1. Fiber quality characters

Analysis of data (Table 1) showed that all the studied fiber characteristics were significantly affected by varietal blends. Egyptian cotton (*Gossypium barbadense* L.) of Giza 95 significantly recorded the greatest mean values of upper half mean length (30.13mm), uniformity ratio (85.24%), fiber strength (37.66g/tex), maturity (0.95), maturity ratio (78.63%) reflectance degree (66.65%) and yellow-ness (11.69). Upland cotton (*Gossypium hirsutum* L.) gave the greatest mean values of short fiber index (15.23), fiber elongation (9.63) and Micronaire value (5.47). On the other hand, pure upland cotton gave the lowest mean values of uniformity (74.35) maturity(0.83), reflectance degree (63.66) and yellow-ness (9.67). Meanwhile, the fibers obtained from pure upland

cotton significantly had the maximum mean values of short fiber index (15.23%), fiber elongation (9.63 %), micronaire value (5.47) and produced the minimum mean values of upper half mean length (28.50 mm), uniformity (74.35%), fiber strength (28.66g/tex) maturity ratio (75.03 %), yellow-ness (9.67). These results were in harmony with El-Hariry (1980), Kamal (1980), Kamal and Ragab (1995), Smith (1995), Beheary (2004), Pramanik and Patil (2009), Ahmed *et al.*, (2014), Hager and Hassan (2016), Abd El Samad *et al.* (2017), and El-Gedwy *et al.*(2018) .

#### 3.2. Yarn quality characters

**3.2.1. Yarn strength:** data presented in Table (2) showed that, mean values of yarn strength in the produced yarns were significantly influenced by cotton blends during 2018 seasons. The yarns obtained from Egyptian cotton of Giza 95 significantly gave the maximum mean value of yarn strength (2531.7), but the minimum value of yarn strength (2343.9) was obtained from blend of 35% Giza 95 + 65% upland cotton. The yarns obtained from Egyptian cotton of Giza 95 significantly surpassed the other five cotton blends in yarn strength, recording 2531.7, followed by upland cotton with 2510.6 blend of 65% Giza 95+ 35% upland cotton by 2388.3, blend of 50% upland cotton + 50% Giza 95 by 2363.3, blend of 35% Giza 95 + 65% upland cotton by 2343.9. These results are in accordance with Abdel-Mohsen (1978), Afzal (1980), Kamal (1980 Mabrouk and Nour (2005), Hassan (2006), Marinus (2007), Shanbeh *et al.* (2011), Ahmed *et al.* (2014) and Rizk *et al.* (2016).

Concerning the effect of yarn counts, data presented in Table (2) indicate that the mean values of yarn strength in the produced yarns were significantly decreased by increasing yarn counts from 20's 25's to 30's. The maximum mean values of yarn strength were obtained from yarn count of 20's being 2444. On the other hand, the minimum value of yarn strength (2393.3) was obtained from yarn count of 30's. These results may be due to the yarn cross section satisfactory spinning if the number is below the acceptable level increase in end breakage, irregularity and loss in yarn strength become prohibiting. These results are agreement with Shabayek (1991), Ali (1994), Khalaf (1994), Sief (1994), Mansour *et al.* (1995), Ureyen and Kadagla (2007) and Tolba (2017).

**Table (1:) Effect of cotton materials on fiber quality characters and color attribute as estimated by (H.I.V) during 2018 season.**

Characters	UHML (mm)	Uniformity (%)	SFI%	Fiber strength (g/tex)	Fiber elongation %	Micronaire value	Maturity	Maturity ratio	Color attributes	
									RD%	(b <sup>+</sup> )
<b>100% Pure Egyptian cotton Giza (G) 95</b>	30.13	85.24	8.60	37.66	8.46	4.23	0.95	78.63	66.65	11.69
<b>100% Pure Upland (U) cotton</b>	28.50	74.35	15.23	28.66	9.63	5.47	0.83	75.03	63.66	9.67
<b>Blend of G 95 (65/ 35)% U cotton</b>	29.33	81.46	10.83	35.08	8.40	4.70	0.91	77.20	65.43	11.06
<b>Blend of G 95 (50/50) % U cotton</b>	29.53	82.66	11.66	35.53	8.70	4.66	0.92	77.43	65.33	11.03
<b>Blend of G 95 (35/ 65)% U cotton</b>	28.50	79.81	12.80	31.53	8.72	4.70	0.87	77.53	65.17	10.53
<b>LSD at 5%</b>	<b>0.41</b>	<b>0.56</b>	<b>0.43</b>	<b>0.49</b>	<b>0.35</b>	<b>0.54</b>	<b>0.01</b>	<b>1.07</b>	<b>0.62</b>	<b>0.77</b>

High Volume Instrument (H.I.V), Upper half means length (UHML), Short fiber index (SFI %), Fiber reflectance (RD %), Fiber yellowness degree (b+)

**Table (2): Effect of cotton materials, yarn count and the interaction on some yarn quality characters during 2018 season.**

Characters		Yarn strength (g/tex)				Evenness (C.V %)				No. of neps/100m			
Treatments		20's	25's	30's	Means	20's	25's	30's	Means	20's	25's	30's	Means
Pure Egyptian cotton Giza (G) 95		2630.0	2455.0	2510.0	<b>2531.7</b>	12.2	14.3	12.9	<b>13.66</b>	75.60	95.37	84.43	<b>85.13</b>
Pure Upland (U) cotton		2503.3	2516.7	2511.7	<b>2510.6</b>	13.3	12.9	13.5	<b>13.26</b>	89.43	86.47	80.77	<b>85.56</b>
G 95 (65/ 35)% U cotton		2335.0	2455.0	2375.0	<b>2388.3</b>	15.6	14.6	14.8	<b>15.02</b>	110.67	90.70	99.57	<b>100.31</b>
G 95 (50/50) % U cotton		2331.7	2373.3	2363.3	<b>2356.1</b>	15.1	15.9	13.2	<b>15.45</b>	103.83	114.83	104.57	<b>107.74</b>
G 95 (35/ 65)% U cotton		2420.0	2405.0	2206.7	<b>2343.9</b>	14.4	14.4	16.9	<b>15.24</b>	75.47	88.77	131.33	<b>98.52</b>
Means		<b>2444.0</b>	<b>2441.0</b>	<b>2393.3</b>	<b>2426.1</b>	<b>14.2</b>	<b>14.4</b>	<b>14.7</b>	<b>14.43</b>	<b>91.00</b>	<b>95.23</b>	<b>100.13</b>	<b>95.45</b>
LSD at 5%	Cotton material	<b>6.69</b>				<b>0.19</b>				<b>0.91</b>			
	Yarn count	<b>5.18</b>				<b>0.15</b>				<b>0.71</b>			
	Interaction	<b>11.59</b>				<b>0.33</b>				<b>1.59</b>			
Characters		Hairiness				No. of thin places				No. of thick places			
Treatments		20's	25's	30's	Means	20's	25's	30's	Means	20's	25's	30's	Means
Pure Egyptian cotton Giza (G) 95		4.80	6.23	5.39	<b>5.47</b>	15.53	25.13	19.33	<b>20.00</b>	7.8	17.9	10.67	<b>12.12</b>
Pure Upland (U) cotton		5.81	5.88	4.58	<b>5.42</b>	22.20	20.23	19.10	<b>20.51</b>	14.47	14.17	11.43	<b>13.34</b>
G 95 (65/ 35)% U cotton		5.78	4.81	5.46	<b>5.38</b>	28.10	23.17	25.17	<b>25.48</b>	23.30	15.57	19.57	<b>19.47</b>
G 95 (50/50) % U cotton		4.42	4.79	4.90	<b>4.70</b>	25.53	28.43	27.20	<b>27.06</b>	20.50	24.23	23.43	<b>22.72</b>
G 95 (35/ 65)% U cotton		5.31	4.10	5.15	<b>4.85</b>	24.07	21.07	30.90	<b>25.34</b>	20.13	16.50	28.50	<b>21.71</b>
Means		<b>5.22</b>	<b>5.18</b>	<b>5.09</b>	<b>5.17</b>	<b>23.09</b>	<b>23.61</b>	<b>24.39</b>	<b>24.67</b>	<b>17.24</b>	<b>17.67</b>	<b>18.72</b>	<b>17.87</b>
LSD at 5%	Cotton material	<b>0.02</b>				<b>0.34</b>				<b>0.24</b>			
	Yarn count	<b>0.02</b>				<b>0.26</b>				<b>0.18</b>			
	Interaction	<b>0.05</b>				<b>0.59</b>				<b>0.42</b>			

The interaction effect between the studied five cotton blends and three yarn counts was significant on the yarn strength in the produced yarns, (Table 2). The results showed that the greatest mean value of yarn strength (2630.0) was obtained from Giza 95 with yarn count (20's). In contrast, the lowest mean value of yarn strength (2206.7) was recorded by using upland cotton with yarn count of 30's. Similar observations have been indicated by Sawires *et al.* (1989, Mohammed and El-Sayed (2002), Mabrouk and Nour (2005) Rizk *et al.* (2016) and Tolba (2017).

**3.2.2.Yarn evenness (C.V %):** The data presented in Table (2) indicate that, the mean values of yarn evenness/100 m (C.V %) in produced yarns were significantly influenced by changing cotton blends, *i.e.* Egyptian cotton of Giza 95, upland cotton and blends of 65% Giza 95 + 35 % upland cotton, 35 % Giza 95 + 65% upland cotton and 50 % Giza 95+ 50 % upland cotton . The yarns which were obtained from 50 % Giza 95 + 50 % upland cotton significantly gave the highest mean value of yarn evenness (C.V %) which was (15.45). While, the minimum mean value of yarn evenness (13.26) was obtained from yarns of upland cotton. These results agree with those reported by Nour (1997), Beheary (2001), Mohammed and El-Sayed (2002), Rizk *et al.* (2016), Abdel-Khalik *et al.* (2017).

The results presented in Table (2) show that the mean values of yarn evenness (C.V %) were significantly increased by increasing yarn counts from 20's, to 25's and 30's. The highest mean value of yarn evenness (14.7) in this respect was produced from the yarn count of 30's. On the other hand, the lowest mean value of yarn evenness (14.2) was obtained from the yarn count of 20's. Increasing yarn count from 20's, to 25's and 30's significantly increased mean values of yarn evenness (C.V %). These results may be due to the yarn cross section satisfactory spinning if the member is below the acceptable level increase in end breakage, irregularity and loss in yarn evenness (C.V %) become prohibiting. Similar observations were reported by Nomeir *et al.*, (1980), Ahmed *et al.*, (1987), Sawires *et al.* (1989), Ali (1994), Rizk *et al.*, (2016), Abdel-Khalik *et al.*(2017) and Tolba (2017).

Mean values of yarn evenness/100m (C.V %) in the produced yarns were significantly affected by the interaction between five cotton blends and three yarn counts (Table 2). The

highest mean value of yarn evenness/100m (16.9) was obtained from the 35% Giza 95 + 65% upland cotton at yarn count of 30's. On the other hand, the yarns which obtained from Giza 95 at yarn count of 20's gave the lowest mean values of yarn evenness being (12.2) These results were in agreement with those obtained by Mansour *et al.* (1995), Nour (1997), El-Sayed (2000), Mohammed and El-Sayed (2002), El-Sayed *et al.* (2003), and Mabrouk and Nour (2005).

**3.2.3.Number of neps/100m:**The data presented in Table (2) indicate that, mean values of No. of neps/100m were significantly influenced by changing cotton blends, *i.e.* Egyptian cotton of Giza 95, upland cotton and blends of 65% Giza 95 + 35% upland cotton, 35% Giza 95 + 65% upland cotton and 50% Giza 95 + 50% upland cotton . The yarn obtained from blend of 50% Giza 95 + 50% upland cotton significantly gave the greatest mean value of neps number (107.74) neps/100m), as compared with the other four cotton blends. On the other hand, the lowest neps number (85.13 neps/100 m) was obtained from yarn of Egyptian cotton of Giza 95. Data recorded that cotton blends could be ranked in descending order according to their mean values of neps number/100m as follows:, blend of 50% Giza 95 + 50% upland cotton, blend of 65% Giza 95 + 35% upland cotton, 35% Giza 95 + 65% upland , upland cotton and Egyptian cotton of Giza 95 by 107.74, 100.31, 98.52, 85.56 and 85.13 neps/100m, respectively. These results were in harmony with Garawain and Abdel-Salam (1981), Ashour (1984), Mohammed and El-Sayed (2002), Mabrouk and Nour (2005), Hassan (2006), Marinus (2007), Rizk *et al.* (2016), Abdel-Khalik *et al.* (2017) and Tolba (2017).

The results in Table (2) showed that the mean values of No. of neps/100m were significantly increased by increasing yarn counts up to 30's during 2018 seasons. The maximum neps number/100m was obtained when count yarn at 30's while, the yarn count at 20's gave the minimum mean value of No. of neps/100m which was 91.00 neps/100m. These results may be due to the yarn cross section satisfactory spinning if the member is below the acceptable level increase in end breakage, irregularity and loss in yarn number of neps/100m become prohibiting. These results agree with those reported by Sawires *et al.* (1989), Ali (1994), Khalaf (1994), Mansour *et al.* (1995), Nour (1997), El-Sayed (2000), Mohammed and El-

Sayed (2002), Mabrouk and Nour (2005) as well as Ureyen and Kadagla (2007).

In Table (2) the results showed that 35% Giza 95 + 65% upland cotton gave the highest mean values for this trait with yarn count 30's, and gave the lowest mean values with yarn count 20's. The results agree with those reported by Mohammed and El-Sayed (2002), Mabrouk and Nour (2005), Taher *et al.*, (2009), Rizk *et al.*, (2016) and Tolba (2017).

**3.2.4. Hairiness:** The data show in Table (2) indicate that mean values of hairiness was significantly influenced by changing five cotton blends. The yarns obtained from Egyptian cotton of Giza 95 significantly gave the highest mean value of hairiness (5.47) while, the minimum mean value of hairiness (4.7) was obtained from 50% Giza 95 + 50% upland cotton. Similar observations have been marked by Ahmed *et al.* (1987), Aly (1987), Sawires *et al.*, (1989), Ismail *et al.* (1990), Taher *et al.* (2009), Shanbeh *et al.* (2011) as well as Hager and Hassan (2016).

The data presented in Table (2) indicated that mean values of hairiness of yarns produced significantly decreased with increasing yarn counts from 20's to 30's. Yarn count of 20's significantly recorded the highest mean value of hairiness and gave (5.22). In contrast, the lowest mean value of hairiness (5.09) which was obtained from the yarn count of 30's. These results may be due to the yarn cross section satisfactory spinning if the member is below the acceptable level increase in end breakage, irregularity and loss in hairiness become prohibiting. These results are agreement with Clapp (2001), Sanad (2005), Hassan (2006), El-Sayed (2009), Taher *et al.* (2009) as well as Hager and Hassan (2016).

The obtained data in Table (2) indicated that, the mean values of hairiness of yarns produced were significantly affected by the interaction between five cotton blends and three yarn counts under study. It is clear that the yarn obtained from Giza 95 at yarn count of 25's gave the maximum mean value of hairiness being 6.23 while, the minimum mean value of hairiness (4.10) was obtained from 35% Giza 95 + 65% upland cotton when yarn count of 25's. These results were in agreement with those obtained by Ismail *et al.* (1990), Taher *et al.* (2009), Shanbeh *et al.* (2011) as well as Hager and Hassan (2016).

**3.2.5. Number of thin places/100m:** The data presented in Table (2) indicate that mean values of No. of thin places/100m of the produced

yarns were significantly influenced by changing cotton blends (Egyptian cotton of Giza 95, upland cotton, 65% Giza95 + 35% upland cotton, 35% Giza 95 + 65% upland cotton and 50% Giza 95 + 50% upland cotton). The yarn produced from 50% Giza 95 + 50% upland cotton significantly produced the maximum mean value of No. of thin places/100m which was 27.06 thin places number/100m while, the minimum mean value of thin places number/100m 20.0 thin places number/100m was obtained from Egyptian cotton of Giza 95. Data in Table (2) indicated that cotton blends could be ranked in ascending order according to their mean values of thin places number/100m as follows: Egyptian cotton of Giza 95, upland cotton blend of 35% Giza 95 + 65% upland cotton, blend of 65% Giza 95 + 35% upland cotton and blend of 50% Giza 95 + 50% upland cotton by 20.0, 20.51, 25.34, 25.48 and 27.06 thin places/100m, respectively. These results are in harmony with Mohammed and El-Sayed (2002), Mabrouk and Nour (2005), Hassan (2006), Marinus (2007), Taher *et al.* (2009), Shanbeh *et al.* (2011) and Tolba (2017).

Data in Table (2) indicated that yarn counts had a significant effect on mean values of thin places number/100m. Mean values of thin places number/100m was increased by increasing yarn counts up to 30's. The highest mean value of thin places number/100m was obtained from yarn count of 30's being 24.34 thin places number/100m. On the other hand, the lowest mean value of thin places number/100m (23.09) was obtained from yarn count of 20's. These results may be due to the yarn cross section satisfactory spinning if the member is below the acceptable level increase in end breakage, irregularity and loss in thin places/100m become prohibiting. These results were in harmony with Nour (1997), El-Sayed (2000), Mohammed and El-Sayed (2002), Taher *et al.* (2009) and Tolba (2017).

The data shown in Table (2) indicated that, Giza 95 gave the lowest mean value (15.53) for this trait with yarn count of 20's. While, 35% Giza 95 + 65% upland cotton gave the highest mean value (30.9) with yarn count of 30's. Similar observations have been marked by Nour (1997), Mohammed and El-Sayed (2002), Mabrouk and Nour (2005), Taher *et al.* (2009) and Tolba (2017).

**3.2.6. Number of thick places/100m:** Data presented in Table (2) showed that mean values of thick places number/100m were significantly

influenced by changing cotton blends. It is clear that yarns was obtained from 50% upland cotton + 50% Giza 95 significantly gave the maximum mean value of thick places number/100m which was (22.72) thick places. However, the yarns produced from Egyptian cotton of Giza 95 significantly gave the minimum mean value of thick places number/100m which was (12.12). These results were in agreement with those obtained by Ahmed *et al.*, (1987), Aly (1987), Sawires *et al.* (1989), Beheary (2001), Mohammed and El-Sayed (2002), Mabrouk and Nour (2005) and Tolba (2017).

The effect of yarn counts on mean values of thick places number/100m was significant (Table 2). The yarn count of 30's significantly recorded the maximum mean value of thick places/100m (18.72) while, the minimum mean value of thick places number/100m (17.24) obtained from the yarn produced at yarn count of 20's. These results may be due to the yarn cross section satisfactory spinning if the member is below the acceptable level increase in end breakage, irregularity and loss in thick places number/100m become prohibiting. These results were in harmony with El-Sayed (2000), Mohammed and El-Sayed (2002), Mabrouk and Nour (2005), Taher *et al.*, (2009) and Tolba (2017).

The data, presented in Table (2) showed that 35% Giza 95 + 65% upland cotton gave the highest mean value (28.5) for this trait with yarn count of 30's whereas, Egyptian cotton of Giza 95 gave the lowest mean value (7.8) with count of 20's. These results are in agreement with the results of Mohammed and El-Sayed (2002), Mabrouk and Nour (2005), Taher *et al.* (2009) and Tolba (2017).

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## تأثير الخلط بين القطن الأبلند والقطن المصري صنف جيزه 95 على جودة التيلة والغزل

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### ملخص

أجريت هذا الدراسة في شركة مصر حلوان للغزل والنسيج - القاهرة ومعامل بحوث تكنولوجيا القطن - معهد بحوث القطن - مركز البحوث الزراعية - الجيزة - مصر خلال موسم 2018. الغرض من هذا البحث دراسة تأثير خمسة خلطات من القطن الخام 100 % جيزة 95، 100 % قطن ابلند ، 65 % جيزة 95 + 35 % قطن ابلند ، 50 % جيزة 95 + 50 % قطن ابلند و35% جيزه 95 + 65% قطن ابلند وثلاثة نمر إنجليزي (20 - 25 - 30) على الصفات التكنولوجية للتيلة والخيوط تحت نظام الغزل ذو الطرف المفتوح. وكانت أهم النتائج ما يلي:

أظهرت النتائج الى أن الإختلاف بين خامات القطن الخمسه تحت الدراسة كانت معنوية في معظم الصفات التكنولوجية للتيلة والخيوط. سجل القطن المصري جيزة 95 معنوياً أعلى القيم في صفات أطول الشعيرات (مم)، الإنتظامية في الطول (%، متانة الشعيرات (جم/تكس)، النضج، نسبة النضج (%، درجة الإنعكاس ومتانة الشلة وأعطى معنوياً أقل القيم في صفات نسبة الشعيرات القصيرة، وقراءة الميكرونير، عدد العقد/100م، عدد الأماكن الرفيعة/100م وعدد الأماكن السميكة/100م . وأوضحت النتائج أن زيادة نمرة الخيط من 20 و 25 إلى 30 نمرة إنجليزي أحدثت زيادة معنوية في قيم صفات معامل إختلاف الخيط (%، عدد العقد/100م، عدد الأماكن الرفيعة/100م وعدد الأماكن السميكة/100م على العكس من ذلك قلت معنوياً قيم صفات متانة الشلة والتشعير بزيادة نمرة الخيط. الخيوط الناتجة من نمرة خيط 30 نمرة إنجليزي حققت معنوياً أعلى القيم في صفات معامل إختلاف الخيط (%، عدد العقد/100م، عدد الأماكن الرفيعة/100م، عدد الأماكن السميكة/100م وأقل القيم في صفات متانة الشلة والتشعير. بينما تم الحصول على أعلى القيم في صفات متانة الشلة والتشعير وأقل القيم في صفات معامل إختلاف الخيط (%، عدد العقد/100م، عدد الأماكن الرفيعة/100م وعدد الأماكن السميكة/100م تم الحصول عليهما من الخيوط الناتجة من نمرة خيط 20 نمرة إنجليزي. أشارت النتائج أيضا الى ان التفاعل بين خامات القطن الخمسة ونمر العد الثلاثة معنوياً بالنسبة لكل الصفات جودة الخيط المدروسة.

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