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In the Mill Study on Fiber and Yarn Quality of Two Upper Egypt Egyptian Cotton Genotypes and Some Imported Upland Cottons

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Abstract
An experimental Study was conducted in spinning mills ,using two new Egyptian cotton genotypes belong to Upper Egypt LS category and three imported upland cotton genotypes i.e., (American, Greek, and Sudanese) aiming to evaluate the fiber and yarn properties of Upper Egypt cottons in comparison to the imported Upland cottons used in the domestic textile mills. All the cotton genotypes were spun to 30s Ne carded and combed ring spun yarn count at "4.0 twist multiplier, except the Sudanese cotton which could not be spun to combed yarns because of its inferior fiber properties and its high content of reducing sugar (sticky cotton). The results indicated that Upper Egypt LS genotypes gave the highest values of maturity ratio, fiber strength (g/tex), fiber elongation (%), fiber length (mm), length uniformity index % and +b (creamy), while showed lower values of micronaire (finer) and Rd% (darker) compared to the imported Upland American, Greek and Sudanese cottons. The Sudanese cotton gave the poorest fiber physical, mechanical and chemical properties. Upper Egypt genotypes surpassed the other upland imported cottons in yarn strength, Elongation, and evenness (Lower Yarn CV %), while, the Sudanese cotton showed inferior yarn quality compared to other cottons under study.
Key words: *cotton – fiber –yarn –strength –elongation- length-quality*

I. Introduction

The area of cultivated cotton in Egypt decreased due to many reasons the most important reasons affected the cultivated cotton area in Egypt are the global demand in cotton, and index a and the local cotton price in addition to the competition with other crops. This means that the quantities of cotton produced in Egypt are not adequate for the requirement of local consumption (Figure 1).

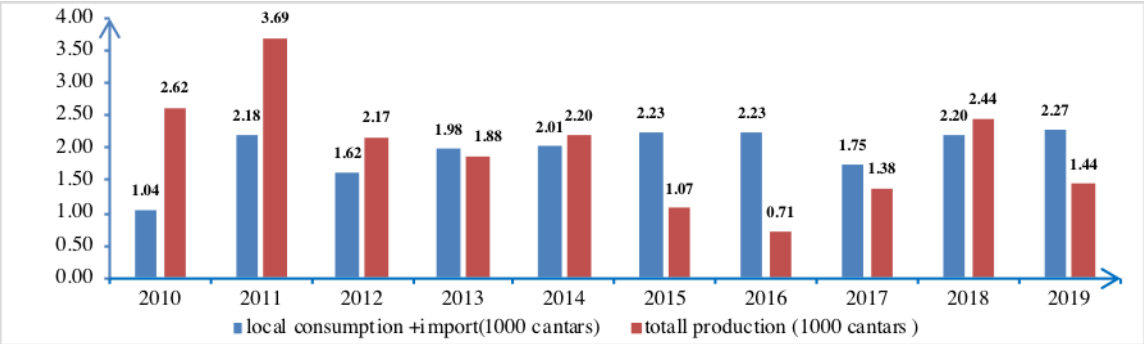

Figure 1, local consumption + import vs. total production (1000) acres last 10 years
Source: The Egyptian Cotton Gazette, ALCOTEXA, No. 155, Oct.Central Administration of Plant Quarantine of Egypt(CAPQ)

Thus, Egypt imports medium and short staple cottons from many countries as shown in (Figure 2), which fit for producing economic medium and coarse yarns to meet the needs of local textile industry. These cottons are either used alone or blended with Egyptian cotton. The target is the quality and a reasonable price of the cotton end product[1]. Most of these imported cottons belong to Gossypium hirsutum or upland cottons which are characterized by low fiber quality as compared to Egyptian cotton belongs to Gossypium barbadense, as explained in the results conducted by[2,3,4], Pure Egyptian cotton of upper Egypt genotypes significantly recorded the highest mean values for fiber quality[5]. The yarn produced from upland cottons are of inferior yarn quality compared to Egyptian cotton yarns[6]. These findings was indicted by many researchers such as[7,8].

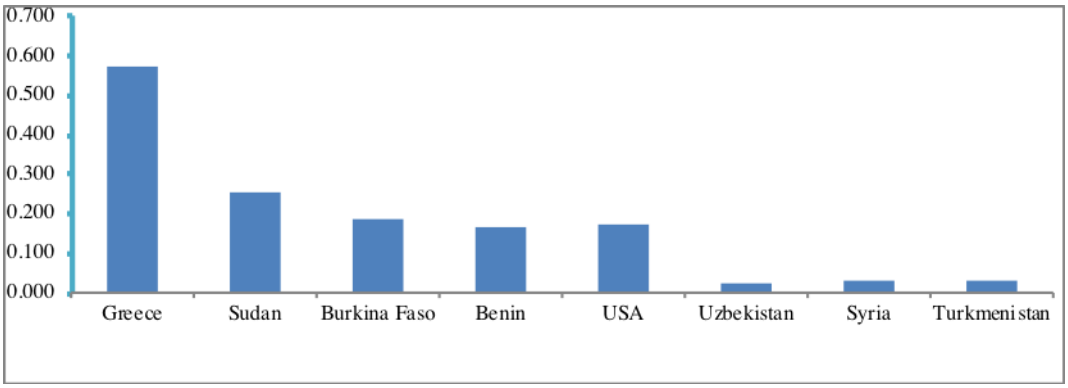

Figure 2 Cotton Imports (Average of last 10 years in 1000 kantar
Source: Central Administration of Plant Quarantine of Egypt(CAPQ)

The previous facts prompted Egypt to pay attention to produce new cotton varieties meet the requirements of the local spinners, with high yield potential, comparable fiber quality and reasonable price.

Egypt produces long and extra-long staple cotton varieties all of them belong to Gossypium barbadense. Long staple Egyptian cottons fall in two main categories according to their staple length; Delta long stable and Upper Egypt long stable cottons which are shorter and coarser than the Delta long staple ones.

Recently Cotton research institute succeeded to produce a lot of cotton varieties and promising crosses suitable for Upper Egypt region i.e., Giza 95 and the Promising Cross (PC) [(G.83xG.80) G.89}x A107 those cottons are characterized by low maturation period, resistance to adverse climatic stresses and surpass the old ones in yield and fiber quality as stated by[9,10,11,12]. These varieties are used to produce high quality coarse and medium yarn counts from 20's to 40's, using compact carded and combed ring spun yarns from those cotton genotypes[13,14].

II. Materials And Methods:

In a Large scale study conducted on the spinning mills during 2019/2020 season included two Upper Egypt long- staple (LS) cotton genotypes namely; Giza 95 variety and The promising cross (PC) [(G.83xG.80) G.89] x A107 in addition to three imported upland genotypes were; American, Greek, and Sudanese cottons, aiming to carry out a comparative study on fiber and yarn quality of the mentioned Upper Egypt cottons and the widely used aforementioned imported upland cottons. The two Egyptian cotton genotypes were introduced by Cotton research Institute (CRI). It was cultivated according to the annual varietal map of Egyptian cotton which distributes the varieties on the climatic zones according to CRI regional evaluation tests while the imported cottons were provided by the spinning company.

Methods and testes:

- **Producing the yarns:**

All the previous genotypes were processed to carded and combed ring spun yarns. The carded and combed yarns were spun from the same cotton except for the Sudanese cotton which could not Process on the combing machine and couldn't be spun to combed yarns due to its stickiness and poor fiber quality. 18% of noils were eliminated during combing. The carded and combed cottons were spun to 30s Ne count at "4.0 twist multiplier, the linear densities of the spun yarns were 19.68 tex.

- **Fiber and yarn studied characteristics:**

Fiber physical and mechanical properties

HVI system was used to determine the following fiber properties; Micronaire value, Fiber maturity ratio, Fiber Upper Half Mean length (UHM) mm. Fiber length uniformity Index (UI %), Fiber reflectance percentage (Rd %), Fiber yellowness degree (+ b), Fiber strength (g/tex) and Fiber elongation % according to[15] at the laboratories of Cotton Research institute, Agricultural Research Center,

Yarn properties:

Single yarn strength (cN/tex) and Elongation % was determined using Tensorapid instrument according to[15], while yarn Evenness (C V %) was tested using Uster tester 5[15]. All tests were performed under constant conditions of (20 ±1 0c) temperature and (65% ± 2%) of relative humidity.

Completely randomized design with 6 repetitions was used in this study, Moreover, for all data collected L.S.D. 0.05 % was used as a mean separation test to analyze the separation of means. Analysis of variance was done as to the methods described by[16,17].

III. Results and Discussion

Table 1: fiber properties of two Upper Egypt genotypes and imported Upland cottons

VAR	MICRONAIRE	MATURITY RATIO	UHM (MM)	UNIFORMITY INDEX %	STRENGTH G/TEX	ELONGATION %	COLOR ATTRIBUTES RD%	(+B)	TOTAL REDUCING SUGARS (%)
GIZA 95	4.30	0.94	30.70	85.70	39.20	8.30	67.00	11.60	0.21
PC	4.30	0.90	30.60	85.70	39.30	8.40	65.60	11.60	0.19
AMERICAN COTTON	4.70	0.87	28.05	84.12	38.00	6.20	77.10	9.70	0.22
GREEK COTTON	4.66	0.88	29.19	83.60	30.80	5.00	73.30	9.90	0.28
SUDANESE COTTON	3.60	0.83	27.60	83.60	23.30	6.30	65.10	11.40	1.70
LSD 0.05	0.02	0.075	0.24	0.54	0.58	0.13	0.72	0.21	0.02

Results obtained in (Table 1): revealed that there were significant differences between the studied genotypes for the average values of fiber technological characters under study.

Regarding the fineness and maturity properties, the inferred results indicated that, the American genotypes gave the highest micronaire value to be (4.7), Greek cotton showed slight difference being (4.66) while the two Egyptian cottons gave lower and similar micronaire value being 4.3 (Figure3). Considering Maturity ratio, the two Upper Egypt Ls cottons showed Higher values of fiber maturity being >0.90. It is of lower micronaire and higher maturity than both of the American and the Greek cotton thus, the two Upper Egypt cottons are Finer and more mature than both of the American and Greek cottons which will be reflected on the quality of the spun yarns. On the contrary, the lowest value of micronaire value (3.6) and maturity ratio (0.83) were obtained from the Sudanese cotton. It is worthy to report that the reduction in micronaire value of the Sudanese cotton (Figure3) is due to its low maturity as shown in Figure 4 not to its intrinsic fineness, since micronaire value represents a combination of fiber intrinsic fineness and maturity. Similar trend was described by[3].

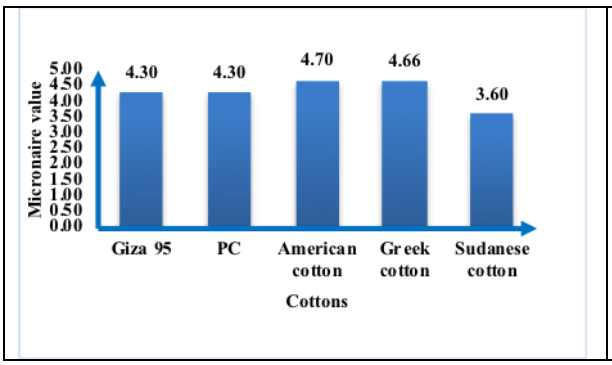

Figure (3): Micronaire value for two Upper Egypt genotypes and imported upland cottons.

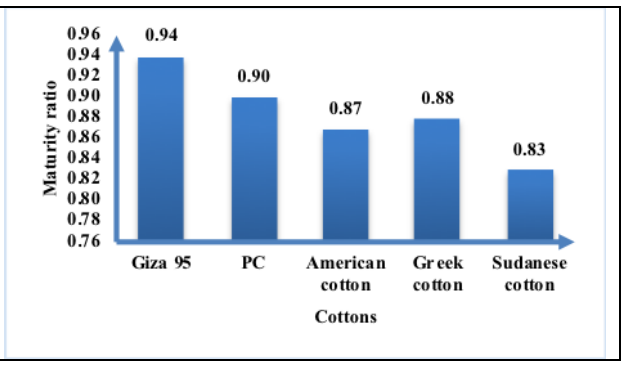

Figure (4): Maturity ratio for two Upper Egypt genotypes and imported upland cottons.

Referring to the length and length uniformity, (Figure5) and (Figure6), indicated that The Egyptian genotypes exhibited the highest values of fiber length and length uniformity index compared to the imported cottons while, the Sudanese cotton gave the shortest fiber length followed by the American one. Greek cotton showed longer fiber length than the American and Sudanese cottons. Moreover, Upper Egypt long stable cottons; Giza 95 and P showed equal higher means of length uniformity index (figure 6) compared to the imported cottons. Sudanese and Greek cottons exhibited the lowest means of length uniformity index. The increase in fiber length and length uniformity of the Upper Egypt LS genotypes will positively affect the quality of the spun yarns.

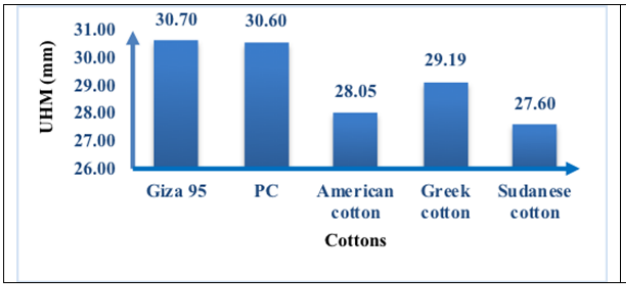

Figure (5): Fiber length for two Upper Egypt genotypes and imported upland cottons.

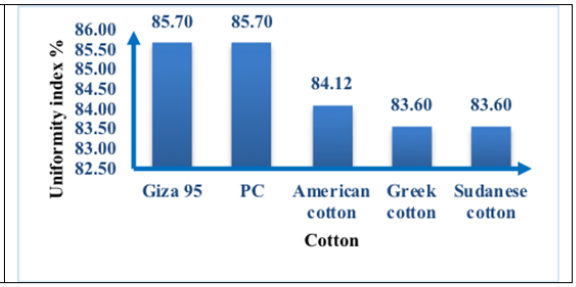

Figure (6): length uniformity index for two Upper Egypt genotypes and imported upland cottons.

In regard to the average readings of fiber mechanical properties, it is obvious from (Figure7) and (Figure8) that PC and Giza 95 Egyptian cotton genotype showed the highest means of fiber strength followed the American cotton. The Greek cotton showed extremely lower fiber strength and the Sudanese cotton proved to be the weakest cotton under study. This trend may be ascribed to the fact that most of Barbadense cottons are usually characterized by higher fiber quality than the Hiresutum cottons, also could to the climate conditions in Egypt during cellulose deposition stage, which drives the plant to accumulate compact layers of cellulose rings with narrow angle to the longitudinal axis of the fiber and less number of structural reversals (weak points) resulting higher fiber strength and to the continues efforts of the Egyptian cotton breeders to combine the high yield potential with the high fiber quality. Furthermore, the two Egyptian cottons Giza 95 and PC showed higher averages of elongation % being 8.30 % and 8.40 % respectively as shown in Figure 8, whilst, the imported cottons exhibited lower values of fiber elongation %. The Greek cotton recorded the lowest fiber Elongation to be 5.00 %. This will be reflected on the quality of the spun yarns[3] came to similar conclusion.

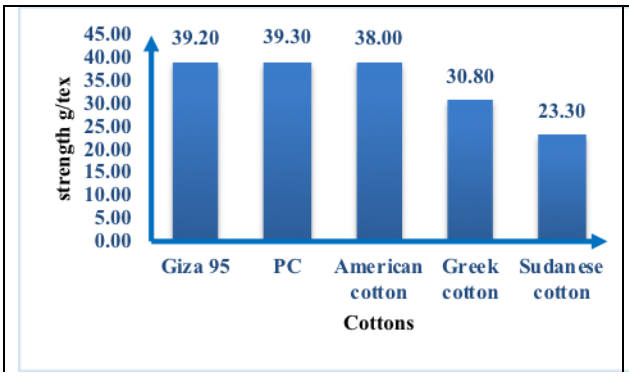

Figure (7): Fiber strength for two Upper Egypt genotypes and imported upland cottons.

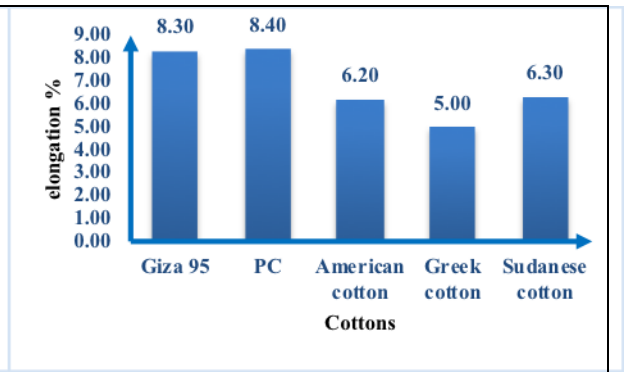

Figure (8): Fiber elongation for two Upper Egypt genotypes and imported upland cottons.

As to, the fiber color attributes, it's clear from (Figure9); and (Figure10): that the American cotton gave the highest reading of RD% and the lowest reading of +b being (77.10 and 9.70) respectively followed by the Greek cotton. Whereas, the Upper Egypt cottons showed lower values of Rd% (darker) and higher values of +b (creamy) compared to the American and Greek cottons. The Sudanese cotton exhibited the poorest color attributes. These results could be due to the genetic structure of each cotton under study. These results are in harmony with[7,8].

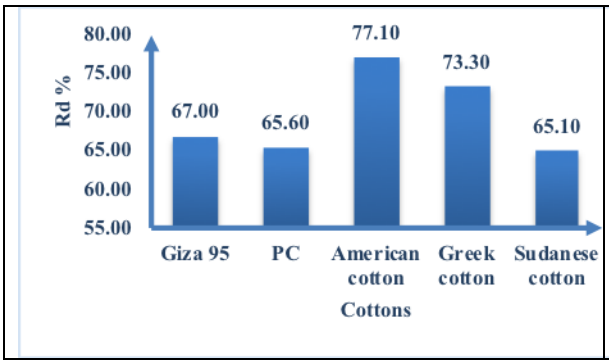

Figure (9): Color Rd % for two Upper Egypt genotypes and imported upland cottons.

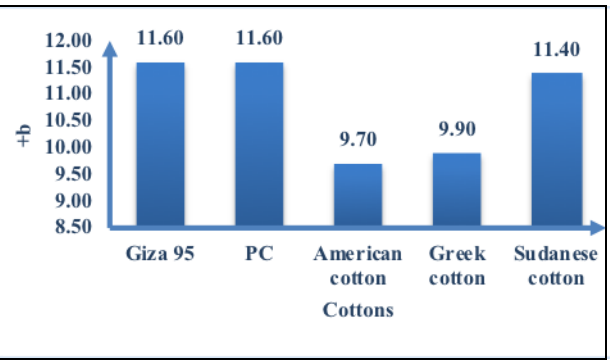

Figure (10): Color +b for two Upper Egypt genotypes and imported upland cottons.

With respect to fiber sugar content, it is well known that cotton considered sticky if the total reducing sugar percentage in this cotton is 0.3 % and more. Sticky cotton causes a lot of problems during the cotton processes and need to be blended with clean non-sticky cotton to prevent cotton from sticking to machine parts or mill downtime according to the report published by[18].

Data illustrated in (Figure 11) revealed that All the genotypes under study did not have the problem of stickiness except for the Sudanese one which showed very high value of reducing sugar content to be 1.7%. The stickiness of the Sudanese cotton may be refer to the growing conditions and insect infection in this season, furthermore, Upper Egypt cotton showed the lowest means of reducing sugar content.

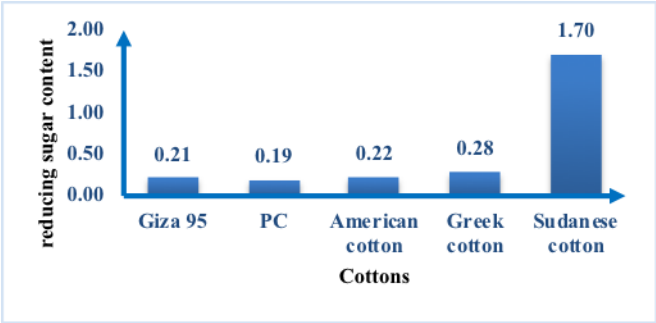

Figure (11): Reducing sugar content for the different cottons

Table 2: Yarn properties of two Upper Egypt genotypes and imported Upland cottons

COTTON VARIETY	2019/2020 SEASON					
	30s/4.0 T.M Carded Ring Yarns			30s/4.0 T.M Combed Ring Yarns		
	Strength (cN/tex)	Elongation (%)	Evenness (C.V.%)	Strength (cN/tex)	Elongation (%)	Evenness (C.V.%)
GIZA 95	16.5	5.9	14.2	17.5	5.7	11.5
PC	16.8	6.1	14.1	17.8	6.0	11.1
AMERICAN COTTON	14.3	5.8	14.9	15.5	5.4	12.1
GREEK COTTON	15.1	5.6	14.4	15.7	4.9	11.5
SUDANESE COTTON	14.1	5.6	15.2			
LSD 0.05	0.21	0.013	0.22	0.11	0.021	0.091

Results obtained in (Table 2): indicated that there were significant differences between the studied genotypes for the average values of yarn mechanical properties and unevenness CV %. The two Upper Egypt genotypes; Giza 95 and PC exhibited Higher values of carded and combed yarn strength being, 16.5 and 16.8 cN/tex for the carded yarns and being 17.5 and 17.8 cN/tex for the combed ones of the two genotypes respectively, Whilst, the three imported cottons recorded 14.3, 15.1 and 14.1 cN/tex for yarn strength of the American, Greek and Sudanese cotton respectively. Furthermore, the combed yarns of the American and Greek

cotton recorded 15.5 and 15.7 cN/tex for the combed yarn strength respectively. It is worthy to mention that Sudanese cotton showed a poor fiber quality, contains very high reducing sugar percentage and did not fit for producing combed yarns as mentioned before in the materials and methods

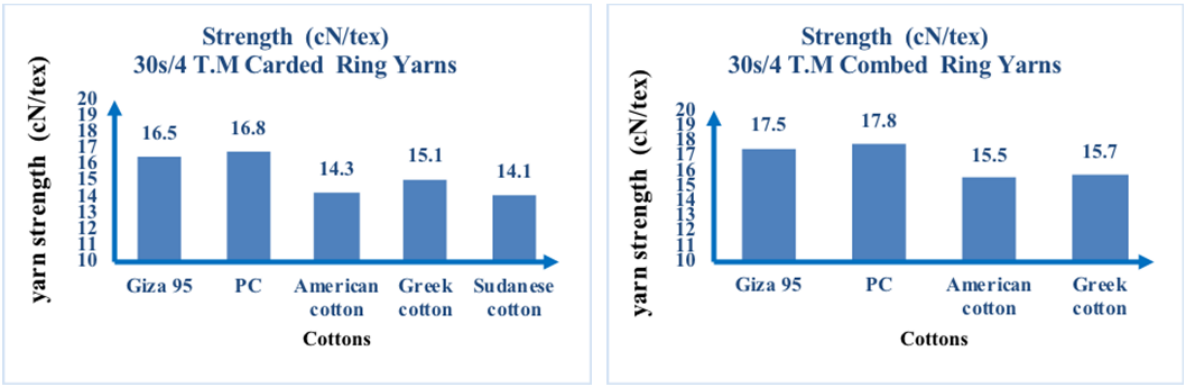

Figure (12): Single yarn strength of carded and combed 30s Ne ring yarns

It's obvious from (Figure 12), that as expected the combed yarn strength is higher than the carded ones[19] came to similar findings. In general, the Egyptian genotypes was the superior in this study followed by the Greek cotton then the American cotton.

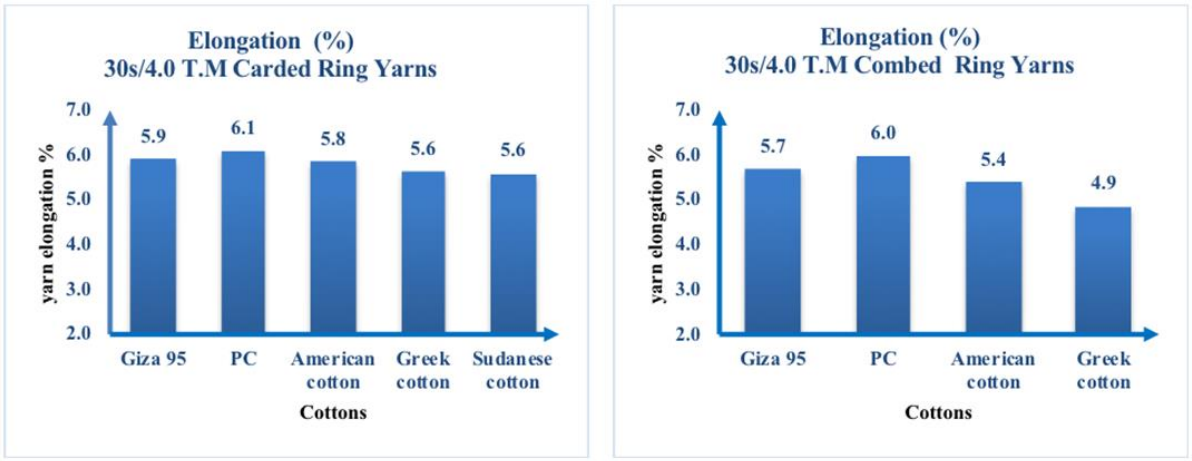

Figure (13): Yarn elongation % of carded and combed 30s Ne ring yarns

as to carded ring yarns, the cotton genotypes could be arranged in ascending order according to the yarn elongation percentage as follows: PC, Giza 95, American cotton, Greek cotton and Sudanese which cotton. The combed yarns follow the same trend but with a slight decrease in the reading as shown in (Figure13)

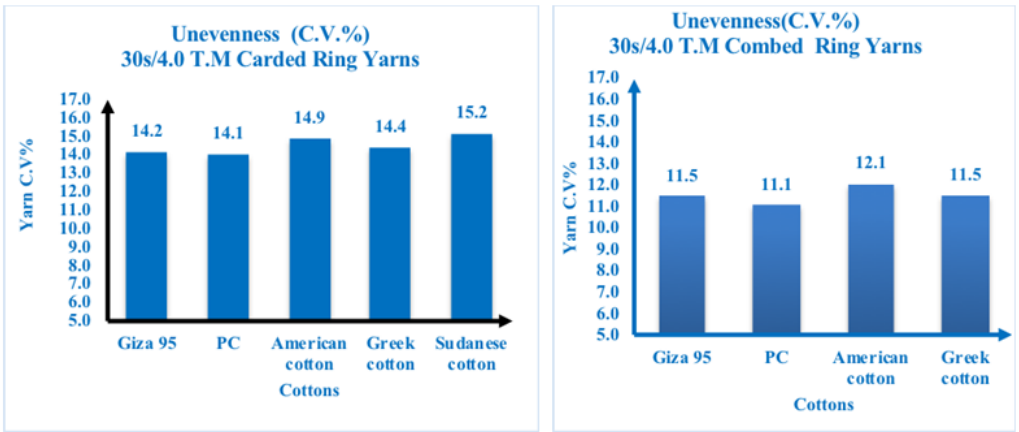

Figure (14): Yarn unevenness (CV %) of carded and combed 30s Ne ring yarns

Concerning yarn unevenness (C.V. %) It's true that as the CV % increased the yarn faults and imperfections increased. (Figure14) showed that combed yarns Were more uniform and have less yarn faults comparing to carded yarns. PC and Giza 95 Upper Egypt genotypes proved to be superior in evenness of both carded and combed yarns, on the other hand Sudanese cotton showed the highest yarn CV % for its carded yarns while, the combed yarns of the American cotton exhibited the highest yarn CV% for its combed yarns.

IV. Conclusion:

It could be concluded that the two Upper Egypt genotypes; Giza 95 and the promising cross PC are longer, finer, more mature, stronger, having higher length uniformity and elongation % but darker and creamy in color (lower Rd% and Higher +b) compared to the imported Upland American and Greek cottons. The high level of fiber quality of the two Upper Egypt Genotypes enabled them to produce carded and combed yarns of higher strength and elongation and more even yarns compared to the imported American, Greek and Sudanese cottons. Nevertheless, the Sudanese cotton showed the poorest fiber and yarn quality in this study.

References

[1]. Sanad, Suzan H | El-Sayed, M. A. M | Mohamed, A. M (2008) Quality characteristics of ring and O.E. yarns spun from Egyptian and Upland cotton blends. Egyptian J. Agric. Res., 86, (3) 1011-1025

[2]. Rizk , M.A.M.; Azab, A.M. E. ;Mesbah, E. A.; Hassan, A. A. and Yonis M. A. Sh. (2016) Technological study on some yarn properties of long staple in Egyptian cotton varieties. Al-Azhar. J. Agric. Res., 26:570-577.

[3]. Hassan, A.A. (2006). Production of low priced medium coars yarn with acceptable quality using rotor spinning system. Ph. D. thesis, Fac. Agric., Al-Azhar Univ., Egypt.

[4]. Gad Allah, A.E.M. and Rania, M.; Abdel-Twab (2019) Effect of blending treatments between upland cotton (Gossypium hirsutum L.) and Giza 95 cultivar (Gossypium Barba dense L.) On fiber and yarn quality. Bull. Fac. Agric., Cairo Univ., 70:351-361.

[5]. Entsar A. F. Abdel-Ghaffar; Gaber Y. M. Hammam; Ahmad A. A. El-Hosary; El-Saeed M. M. El- Gedwy and Abd El-Based A. Hassan (2019) Influence of Some Commercial Blends between the Imported Cotton and the Upper Egyptian Varieties on Technological Properties Annals of Agric. Sci., Moshtohor,Vol. 57 (1) , 31 – 38

[6]. Haitham A M 2019 Effect of low-quality and inexpensive cotton materials on yarn properties using rotor spinning system International Design Journal, Volume 9, Issue 4.

[7]. Mujumdar, A. (2004) Protection the breaking elongation of ring spun cotton yarns using mathematical ,statistical, and artificial neural network models. Textile Res. J., 74(7): 652-655.

[8]. Ureyen, M.E. and Kadoglu, H. (2007) Regressional estimation of ring spun cotton yarn properties from HVI fiber properties. Textile Res, J., 76(5):360-366.

[9]. Baker, K.M.A; Khalifa ,H.S.; Said, S.R.N. and Mahrous, H. (2015)Evaluation of The Promising Cross [G83 × (G75 × 5844)] × G80 special issue of J.Adv. Agric. Res. (Faculty of Agriculture-Saba Basha) Alex. Cotton Conf. (25-26 March) pp.,69-82

[10]. Badr, S.S. and El Tahan, S.A. (2016) comparative evaluation of promising line [(g83xG80) x G89] x Au. and long staple cotton genotypes in Egypt (2016) Egypt. J. Agric. Res., 94 (3),661-670.

[11]. El-Adly, H.H; Eissa, A.E.M.; Khalif, H.S.; Mohamed, A.A.; Baker, K.M.A.; Said, S.R.N; Soliman, A.M.M.; Awad, H.Y.; Awaad, M.M.; Mohamed, S.A.S. And Hussien, F.S. (2018) "Giza 95" A Long Staple Egyptian Cotton Variety For Middle And Upper Egypt. J. Agric. Res., 96 (2), 717-726.

[12]. El-Fesheikawy, A.B.A. (2019) Maintaining System For Producing The Nucleolus (Breeder's Seed) Of Giza 95. Egyptian Cotton Cultivar During (2016-2019) Seasons Egypt. J. Plant Breed. (23(6):1137– 1150).

[13]. El-Sayed, M.A.M. (2020) Poster At The 35th International Cotton Conference Bremen- The Hybrid Edition - March 17 And (18, 2021).

[14]. Abdel Daim, H. and Hassan, A. A. (2020) Effect of yarn structure variables on comfort properties for cotton towels. International Design Journal: Vol. 10:(2), 279-288.

[15]. ASTM, (1986). American standers for testing and materials (D2256-86, D1425-86 and D4605-86).

[16]. Snedecor, G.W. and Cochran, W.G.(1982) Statistical Method, Lowa Stat. Univ. press.

[17]. Draper, N.R. and Smith, H. (1966) Applied regression analysis. John Wiley & Sons Ltd., New York, 407 p.

[18]. Hequet, E. Henneberry, T.J. and Nichols R.L.(2007) Sticky Cotton: Causes, Effects, and Prevention United States Department of Agriculture Agricultural Research Service Technical Bulletin Number 1915 June 2007.

[19]. Sanad, Suzan H., H. E. M. Mahmoud And El-Sayed, M.A.M. (2011) Production Of Carded Compact Cotton Yarn Of Comparable Quality To The Combed Conventional Ring Yarn. Egypt. J. Agric. Res., 89 (1)203-212.

الملخص العربي

دراسة ميدانيه لصفات جودة التيلة والخيوط لإثنين من أقطان الوجه القبلي وبعض أقطان الأبلند المستوردة

هشام مسعد حمود ، شيماء عبدربه شحات، حنان محمود عرفه

معهد بحوث القطن– مركز البحوث الزراعية - الجيزة مصر

أجريت دراسة موسعة بمصانع الغزل ومعامل إختبارات الجودة بمعهد بحوث القطن بالجيزة لمقارنة صفات جودة التيلة وخيوط الغزل لإثنين من أقطان الوجه القبلي طويل التيلة هما الصنف جيزة 95 والهجين المبشر [{(G.83xG.80) G.89}x A107] (PC) مع ثلاثة من أقطان الأبلند المستوردة هي القطن الأبلند الأمريكي واليوناني والسوداني موسم 2019/2020 حيث تم سحب عينات من هذه الأقطان وتم تقسيمها الي ستة تكرارات وقدرت صفات جودة التيلة لها بجهاز HVI بمعامل الجوده بمعهد بحوث القطن . تم تشغيل هذه الأقطان بمصانع الغزل الي خيوط غزل حلقي مسرحة وممشطة حيث كانت نسبة العوادم المستخلصة بالتمشيط 18% ونمرة الخيوط المغزولة هي 30s Ne مسرح وممشط بمعامل برم 4.0 وقدرت صفات متانة الخيط المفرد وإستطالة الخيط % بجهازتنسورابيد ومعامل إختلاف الخيط (CV%) بجهاز Uster 5

وأستخدم في هذه الدراسة تصميم التام العشوائية بستة تكرارات وتم تحليل التباين في قياسات الصفات المدروسة وإختبار L.S.D. 5% لمقارنة المتوسطات المتحصل عليها وقد تبين من الدراسة مايلي:

- لم يمكن غزل خيوط ممشطة من القطن السوداني لإنخفاض جودته وإرتفاع نسبة السكريات المختزلة به (1,7 %).
- كانت الفروق بين الأقطان المدروسة في معظم صفات جودة التيلة وخيوط الغزل معنوية إحصائيا.
- أظهر قطن الأبلند الأمريكي واليوناني أعلي قراءة ميكرونير (4,7 ، 4,66) ودرجة نضج متوسطة 87, بينما تميز جيزة 95 والهجين المبشر (PC) بقراءة ميكرونير أقل ونسبة نضج أعلي مما يدل على أنهما أنعم وأكثر نضجا من القطن الأمريكي واليوناني بينما سجل القطن السوداني أقل قراءة ميكرونير 3,6 وأقل نسبة نضج 83,.
- سجل جيزة 95 والهجين المبشرأعلي قيم لطول التيلة 30,7 مم وأعلي إنتظام للطول 85,7% بينما كانت الأقطان المستوردة أقل في طول التيلة 1,5- 3 مم وفي انتظام الطول 1,5 – 2%.
- سجل جيزة 95 والهجين المبشر(PC) أعلي قياسات لمتانة التيلة (39,3 جم/تكس) وأعلي إستطالة (8,3%) يليهما القطن الأمريكي 38,0 جم/تكس ، 6,3% وسجل السوداني أقل متانة واليوناني أقل استطالة 5%.
- كانت أقطان الأمريكي واليوناني المستوردة أعلي في قياسات درجة ألإنعكاس Rd% (77%، 73%) وأقل في درجة الإصفرار b+(أكثر بياضا) بينما تميز قطنا الوجه القبلي باللون الكريمي وارتفعت فيهما قيم b+ الي 11,6 كما سجل القطن السوداني 11,4 لـ ة يم b+
- تميز جيزة 95 والهجين المبشر(PC) بانخفاض نسبة السكريات المختزلة في التيلة (19, ، 21,%) وسجل الأمريكي 22,% واليوناني 28,% بينما سجل السوداني 1,7% (أعلي من المسموح به).
- تفوق الصنف جيزة 95 والهجين المبشر(PC) علي الأقطان المستوردة الأمريكي واليوناني والسوداني في متانة وإستطالة وإنتظام الخيوط المسرحة والممشطة حيث سجلا 16,5 ، 16,8 cN/tex لمتانة الخيط 30 مسرح وسجلا 17,5 ، 17,8 cN/tex لمتانة خيوط النمرة 30 ممشط بينما سجل الأمريكي واليوناني والسوداني 14,3 ، 15,1 ، 14,1 cN/tex لمتانة خيوط النمرة 30 مسرح وسجل القطن الأمريكي واليوناني 15,5 ، 15,7 cN/tex للنمرة 30 ممشط بينما لم يمكن غزل خيوط ممشطة من القطن السوداني.
- كانت الفروق بين الأقطان المدروسة في إستطالة الخيوط قليلة رغم معنويتها إحصائيا خصوصا في الخيوط الممشطة وإن ظلت أعلي في جيزة 95 والهجين المبشر(PC) عن الأقطان المستوردة.
- تميزت الخيوط المغزولة من قطني الوجه القبلي بانتظاميتها العالية (CV% أقل) مقارنة بالمغزولة من القطن المستورد وكانت أقلها إنتظامية هي المغزولة من القطن السوداني والأمريكي.

Hesham M. Hamoud, et. al. "In the Mill Study on Fiber and Yarn Quality of Two Upper Egypt Egyptian Cotton Genotypes and Some Imported Upland Cottons." *IOSR Journal of Polymer and Textile Engineering (IOSR-JPTE)*, 10(2), 2023, pp. 01-08.