J. Text. Color. Polym. Sci., **Vol. 19,** No. 2, pp. 331-338 (2022)

Journal of Textiles, Coloration and Polymer Science
https://jtcps.journals.ekb.eg/

Evaluation Properties of Cotton/Flax/Polyester Blended Fabrics after Chemical Treatments and Dyeing

Hanaa A Saad * and Eman Y. Abd-Elkawe

AgriculturalResearch Center,Cotton Research Institute, Textile chemistry Dept.

AgriculturalResearch Center,Cotton Research Institute, spinning Dept. Giza, Egypt

Abstract

In this study, plain woven fabric was produced using a blend of cotton/flax /polyester (CFP). The purpose of the study was to examine the effect of alkaline treatments using sodium hydroxide and sodium hydroxide/ methanol via conventional and microwave irradiation techniques. Samples were dyed with reactive dye in one bath and measurements of tensile strength, abrasion tendency, air permeability, color efficiency and fastness properties of the fabric were done. The samples showed the advantages of mechanical properties, such as breaking force and elongation, color efficiency, abrasion resistance, fastness properties and air permeability.
Keywords: blended fabrics; microwave irradiation; reactive dye; alkaline treatments.

Introduction

Fiber blending has been a common practice in the textile industry for a long time, stimulated to a great degree by the availability of an ever-increasing number of synthetic fibers (1).Fiber blending can achieve quality products that canot be realized using one fiber type alone, and it can also reduce the cost by substituting more expensive fiber for a less costly one (2).

The blend of natural fibers with synthetic fibers had gained a lot of interest as it successfully combines the best properties of both fibers to overcome the disadvantages of using fibers separately and enhances the aesthetic features and performance of the produced fabric. Yarn quality is an essential target in fiber-to-yarn production and has a significant impact on post spinning processes.

Natural fibers have unique properties compared to synthetic fibers (3). Manufacturing processes of blending are considered in producing high-performance sportswear that have comfort properties, such as air transfer, moisture transfer, and wick ability which are essential when it comes to athletic wear.

In general, blending process is applied to improve various yarn properties such as; Durability while integration of more durable fibers may extend the functional life of a less durable one. For instance, when nylon or polyester fibers are blended with cotton or wool fiber, they provide strength and abrasion resistance while wool or cotton appearance retained. Economically, a considerable reduction in yarn costs could be achieved by an appropriate blend of expensive fibers with more plentiful fibers. Physical properties, a compromise utilizing the preferable characteristics of the blended fibers such as the use of rayon to give luster and softness to cotton fabrics and new designs can be created by incorporating multi-color effects (4). The properties of the blended yarns are depending on the characteristics of the constituent fibers and its proportions. Thus, fiber selection is a significant

*Corresponding author: Hanaa A Saad, e-mail: dr.hanaa794@hotmail.com
(Received 05/09/2022, accepted 19/09/2022)
DOI: 10.21608/JTCPS.2022.160703.1136

matter for three component blends as it is for the common binary blends (5). Flax fibers are characterized by their high tenacity, natural brightness and comfort properties (6,7). Polyester fibers play a vital role in all textile areas from traditional textiles to medical and geotextiles. They are characterized by their high strength, luster, aesthetics, low cost, but have a low moisture gain compared to cotton (6,8).Lidia et al 2007 had studied the quality properties of cotton yarns spun using ring, compact and Open-end rotor spinning machines. It was indicated that, Open-end yarns are characterized by their tenacity, low hairiness and unevenness (9).

The quality of the dyed fabric is affected by most important factors such as color uniformity and color strength. Fiber distribution in the yarn regards the yarn hairiness index, yarn evenness has vital impact on the color uniformity and color strength of fabrics (10). Darker shades found in fabrics made of yarns having low hairiness, and the rotor spun yarn has a higher dyeability than ring spun yarns because of its less compact structure (11). The dyeing behavior of fabrics made from ring, rotor and MVS yarns was studied and the fabrics were investigated for K/S values of dyed polyester, dyed cotton and dyed blend of polyester/cotton fabrics and their color fastness to crocking (12). The effects that spinning technology and spinning parameters have on the color strength (K/S), strength, and breaking elongation of post dyed yarns were investigated (13).The color values of fabrics knitted from single and plied ring spun and compact yarns have been investigated before and after dyeing (14). With respect to the spinning methods, open-end spun yarns have higher dyeability than ring spun or compact yarns as they yield more open structures (11).This is due to the noticeable differences in production methods which affect their structure.

In open-end yarns, the outer layer on the surface of the yarn has wrapper fibers or a belt, which is generally characteristic of rotor spun yarns (15). Therefore, this work has been conducted with the objectives of constructing fabrics using blends of (CFP) open yarns and evaluating their properties after the treatments and dyeing processes.

Material and methods

Materials

(CFP) Blended fabric

The experimental work was carried out in El-Sharkia Spinning and Weaving Co. (SharkaTex) in Zagazig city. The fibers were prepared and processed for the carding section and blended as done in a previous study (16). then experimental done on the fabric which the weaving process was done in El-Sharkia Spinning and Weaving Co. using Dobby machine German sulzer model 1962 with reed 11, denting 2 ends/dent, spindle speed 450 rpm, loom width113/inches and selvedge width 1.3(1/cm).

The tri-blended yarn (CFP) was chosen to be used as weft yarn in this fabric to investigate the advantage of chemical properties.

The specifications of the (CFP) blended fabric samples are listed in Table 1.

Table.1. Specifications of the (CFP) blended fabric samples

Fabric properties		
Weave structure	Plain 1/1	
Warp	100% cotton Ne 20/1 22 ends	
Weft*	Cotton/flax/polyester; Ratio 40:30:30 Ne 12/1 19 picks	
Twist multiplier	4	
Breaking force (N)	Warp : 341.31	Weft : 339.03
Elongation (%)	Warp: 10.98	Weft : 10.7
Air Permeability ($cm^3/cm^2.sec$)	559	

Chemicals:

All chemicals used were of analytical grade. Glauber's salt ($Na_2SO_4.10H_2O$) and NaOH were analytical grade (Koch-Light Co.), Methanol, Sodium chloride (LR grade), the wetting agent was the commercially Triton X-100 supplied by Merck. The reactive dye used in this study was ProcionMX-R blue. The chemical structure of the dye use is shown in Fig. 1.

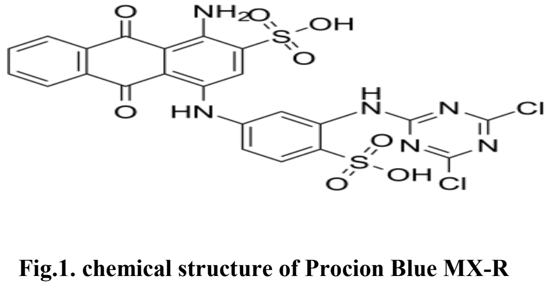


Fig.1. chemical structure of Procion Blue MX-R reactive dye

Treatment and dyeing process of the CFP blended fabric:

Pretreatment of fabric

Fabric samples were mild scoured using 2g/l Na_2CO_3 and 0.5 g/l non-ionic wetting agent (triton X100) at 80˚C for 3h. The treated samples were then thoroughly washed with water, and dried in open air.

Treatment of the CFP blended fabric samples were carried out by the following techniques:

1- **Treatment of CFP using sodium hydroxide via conventional technique (HC)**

CFP fabric samples were carried out according to (17), with some adaptation. The samples were immersed in a sodium hydroxide solution 6% NaOH at L: R 1:30. The first temperature was 40°C and the temperature was raised to boiling in 30 min. After the appropriate boiling time (1h), the samples were neutralized with 6% acetic acid, then rinsed with distilled water, and finally air dried.

2- **Treatment of CFP using sodium hydroxide via microwave irradiation technique (HM)**

CFP was impregnated in alkaline bath containing 6% NaOH at L: R 1:30. Then the sample squeezed using laboratory padder to get 100% wet pick up. The sample raped in a plastic sheet and put it in the microwave at power of 300 watt for 3 mins. the samples were neutralized with 6% acetic acid, then rinsed with distilled water, and finally air dried.

3- **Treatment of CFP using sodium hydroxide and methanol via microwave irradiation technique (H-MM)**

Similar experiment was carried out using methanol as an accelerator with concentration of 50%.the samples were neutralized with 6% acetic acid, then rinsed with distilled water, and finally air dried.

Dyeing process

ScouredCFP samples were dyed with ProcionBlue MX-R reactive dye, using conventional method. After dyeing, soaping was performed with 2 g/L detergent at 90oC for 10 minutes and finally the samples were dried according to (18). The dyeing curve is shown in Fig. 2.

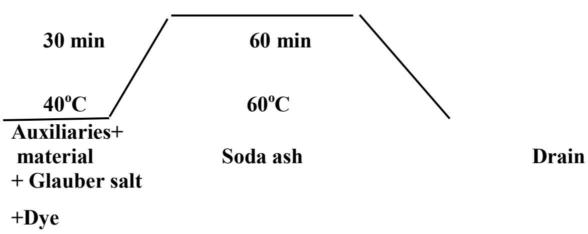


Fig.2.CFP fabric sample Dyeing curve

Characterization ofCFP fabric samples

Physical and mechanical properties of CFP fabric samples under different conditions

Air permeability was determined by prolific air Permeability tester (FX3300 SDL) as per the standard procedure ASTM D737-04 (2008). Five readings were taken for the fabric sample and then the mean was calculated. Abrasion resistance test was calculated with ASTM D4966-98standard method. The tensile test was done according to ASTM D5034. Five fabric strips in both warp and weft directions were subjected to the load and the average force was expressed as the fabric breaking strength and elongation% were measured according by the following Equation;

$$\mathbf{E\ \%\ [(L-L_0)/\ L_0]\ 100}$$

Where 'L_0' is the initial length of strip (strain gauge = 20 cm), 'L' is the length of strip at the rupture point

The dimensional changes of CFP Fabric were measured according tothe AATCC TM 187-2004.

Chemical and color measurements of CFP fabric samples under different condition

The color strength (K/S) of the treated samples using the untreated samples as blank was determined using Perkin Elmer Spectrophotometer, Model Lambda 35 equipped with integrated sphere with applying the (19).

$$\mathbf{K/S = (1-R)^2 / 2R}$$

Washing fastness of the untreated samples was done according to ISO 105- C01:1998(E). Two single fiber adjacent fabrics complying with the relevant sections of F01 to F08 of ISO 105-F: 1989. One adjacent fabric of cotton and the second of wool. Fastness to synthetic perspiration was measured according to ISO-E04: 1994. The dyed cotton fabric was measured according to ISO 105-B01:1994 Textiles- -Tests for color fastness, Part B01: Color fastness to light: Daylight

Results and Discussions

Effect of the pretreatment of CFP fabric samples on dyeing process

Cotton yarns blended with synthetic yarns are usually dyed usinga two-bath or one-bath two-step dyeing process. Blending is a complicated and expensive process, but it makes it possible to build in a combination of properties that are permanent (20). Blends are not only used to improve the serviceability of fabrics but they are also used for improved appearance and hand. Blends of synthetic yarns with natural yarns offer the most valuable possibilities for combining desirable physical properties, because the two components are so dissimilar. Different yarns can be blended in textile structures to obtain the desirable properties of each of the yarns in the blend. A blended yarn or fabric displays an averaging of the properties of the constituent fibers. When properly combined with cotton, polyesterincreases strength resulting in an exceptionally fine textures. It also reduces the weight of the fabric and increases its wrinkle resistance. Three treatment HC, HM, and HM-M were carried out to affect the polyester structure in order to dyeing CFP fabric samples in one bath- one dye.The hydrolysis reaction of NaOH with CFP fabric is initiated by the hydroxylation attack on the electron deficient carboxyl carbon atom of the ester linkages of polyester yarn. The formation of carboxylic groups (COO-) which is responsible for accepting cationic dyes to the fabric (21). The carboxyl group formed is immediately converted into carboxylate anion and the reaction goes to completion in the direction of hydrolysis. The polyester chains on the surface are etched away and alteration of fabric pore structure with increased severity of hydrolysis is expected. The reaction mechanism of CFP fabric sample with Procion MX- R was described by (22), and represented in Diagram 1. Conventional dyeing of CFP with Procion MX- R was requires the presence of electrolytes, which can neutralize negative charges on the cotton surface and thus increases dye-uptake in cellulose. The most common electrolytes used for industrial dyeing of cotton are the salts NaCl or Na_2SO_4

The dyeability of CFP fabric samples were shown in Fig. 3.

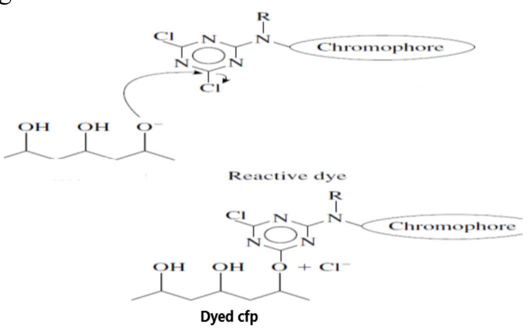
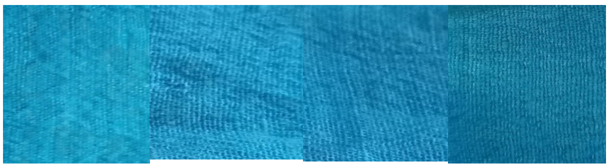


Diagram 1. Reaction mechanism of CFP with Procion MX-R



S1 HC HM HM-M

Fig. 3 Dyed CFP fabric samples with different treatments

Physical and mechanical properties of CFP fabric samples

The test results are shown in tables 2, and 3, indicate the tensile strength, elongation %, air permeability, and fabric dimensional changes behavior of CFP fabrics samples at the different treatment techniques before and after dyeing.

Tensile strength and elongation %

From the results obtained in Table 2 that the tensile strength and elongation% was better in scouring sample (S), than the other treated CFP fabric samples. It was assumed that a random attack of the NaOH on the carboxyl groups of the surface polymer molecules took place with removal of the shorter chains from the surface, which were further hydrolyzed by the NaOH present in the solution, and the hydrolysis was assumed to be taking place on the surface of the CFP fabric samples.This result is accordance with the results obtained by (23).

On the other hand, the loss of tensile strength and elongation% in HM and HM-M techniquesmay be due to the effect of the energy of microwave which causes a random motion of the particles of NaOH generating heat and speed of motion leading to hydrolysis occur causing decreases in tensile and elongation(24). Also, the treatment of the polyester fibers with 6 g/l of sodium methoxide in methanol causes weight loss of fiber, and the fiber acquires the silk-handle .Methanol-alkaline treatment resulted in a steeper tendency in the loss in weight, (25).From the results obtained in Table 3, it is observed that there is a significant drop in tensile strength of the CFP fabric sample along with the gain in elongation-at-break after dyeing in comparison of scouring and dyed fabric sample (S1). The drop in tensile strength might be due to the fact that polyester yarns get hydrolysis in the different treatment techniques, and also, due to the breaking of internal structural elements of the cotton and flax during reactive dyeing, (26).

Table 2. Physical properties of the treated CFP fabric sample before dyeing

Treatments	T. S (N)	E %	A. P ($cm^3/cm^2/Sec.$)
S	310.80	14.42	241.33
HC	287.90	14.29	248.67
HM	280.57	13.93	276.00
H-MM	261.50	13.32	285.00

Where, S;scouring fabric before treatment, T. S ; tensile strength, A. P; air permeability

Table 3. Physical properties of the treated CFP fabric sample after dyeing

Treatments	T. S (N)	E %	A. p (cm3/cm2/Sec.)
S1	301.27	12.45	227.00
HC	264.73	13.43	248.67
HM	255.63	13.49	249.33
H-MM	242.90	13.50	305.33

Air permeability after the alkaline treatments processes

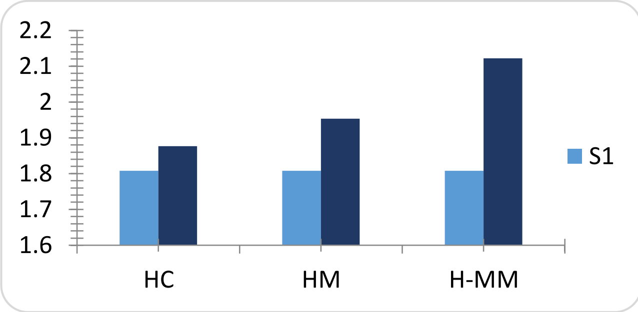
Air permeability is mainly affected by two parameters, porosity and fabric thickness. It can be observed that

the treatments cause the reduction of air permeability for CFP fabric where the air permeability rate for the S, and S1 (scoured with dyeing) was241.33 and 227respectively. While the maximum air permeability was 248.67, 276.00, 285.00 before dyeing and 248.67, 249.33, and 305.33 for HC, HM, and HM-M after dyeing process respectively. These results may be due to that as the more porosity, the more air permeability and vice versa.Due to the CFP treatment, the structural and superficial changes occurred in the fabrics, which were to increase the amount voids and pores in the fabrics where the air passes through it, which led to increase in the air permeability.The results also consistent with the results which showed that ends and picks density of the fabrics play a vital role in deciding the air permeability of woven fabrics(27).

Chemical and color measurements of CFP fabric samples

Color efficiency

The color efficiency of the CFP treated fabrics has been tested via a spectrophotometer under daylight conditions (D65). As expected, the CFP treated fabrics increases the dye take-up for and so the color efficiency of all the treated fabrics is higher than that of(S1) fabrics as shown in Fig. 4. The result indicates that the presence of NaOH increase the number of hydrophilic groups as -OH and -COOH groups due to alkali hydrolysis. The fabric cross-section becomes more complex and the damage because increased surface area (14), which makes the improved dye uptake in the alkaline finished fabric .It can be noted that the K/S values of the open-end (rotor) spun yarns are higher than those of the ring and compact yarns. This is due to the empty spaces in which the reactive dye can penetrate into the fibers of the latter two yarns (13). The microwave technique shows the best results than conventional technique because of microwave irradiation causes rapid heating in short reaction time, (28). Using the methanolic NaOH microwave technique shows the best result because of the acceleration of treatment time, this leads to absorb the irradiation energy directly, speeding up the hydrolysis of the polyester surface which increases the number of polar functional groups at the CFP fabric surface.



Fig(4): The effect of CFP fabric sample treatments on K/S

Fastness properties

The abrasion test, Perspiration test, light fastness, and washing fastness results are shown in Table 4.It was found that CFP fabric samples were found to have values of color fastness at "good" levels.Moreover, the shade of dyed color and the dyeing process can also affect color fastness.

Color fastness for perspiration is an important test for fabrics, especially those directly adjacent to skin cells. According to table 4, the color fastness of CFP fabric samples with the different treatments showed good perspiration fastness whether acid or alkali where the color change was found 3/4 to both acidic perspiration solution and alkaline perspiration solution. This confirms the high stability and bonding strength between the reactive dye and the surface of CFP fabric samples.

Color fastness to abrasion is an important test for measuring color fastness as it is checked the color transferred from the colored textile surface to other surface by abrasion in wet and dry condition. The Results of the color fastness to abrasion are reported in Table 4.Regarding color fastness to abrasion, it was found that color fastness under wet conditions of each fabric was at goodlevelsof 3/4 on gray scale. As for dry conditions, CFP fabric samples have values of 4/5 color fastness which means no or negligible color transfer. It can be seen from the results that fabrics in dry from provide better color fastness to abrasion than in wet form. As in wet form there are chance for dye to be desorbed and tend to leave a stain by transferring from the surface of dyed fabric. These results showed that majority of dye molecules is fixed well on CFP fabric samples and surface residual Dye molecules is minimal.

All colored materials have susceptibility to fading due to light, as the highest persistence of light indicates that these dyes absorbed the lengths that they do not reflect again, because light is energy and when this energy is absorbed and reflected again, damage to the dyes and colors may occur(29).Also, Light fastness of the fabric is influenced by physical state and concentration of dye, chemical, nature of the fibers and mordant type (30).According to the table 4, it found that light fastness for CFP fabric samples have the value at 3/4 to 4, which is "average" to "rather good, which indicated that these fabrics were able to withstand artificial light at a good level.

Color fastness to washing is the widespread characteristic parameter, which is one of the most important characteristics of fabrics and clothing from the viewpoint of consumers. This test determines the change &loss of color in the washing process by a consumer and the behavior of staining of lighter or other garments that may be washed with it. From the results in table 4, it is observed that CFP fabric samples have the value at 3to 3/4, which is fair to "average on gray scale.

Table 4. Fastness properties of CFP fabric

Properties	Abrasion test		Perspiration test		Light fastness	Washing fastness
Treatments	Dry	Wet	Acidic	alkaline		
S1	4\5	3\4	3	3\4	3\4	3
HC	4\5	3\4	3\4	3\4	3\4	3
HM	4\5	3\4	3\4	3\4	4	3
H-MM	4\5	3\4	3\4	3\4	4	3\4

Conclusions

In this research Blending natural fibers with synthetic fibers offers the possibility of combining the desirable performance properties of both components, and the ability to dye cotton/polyester/flax blends in one step and one dyeing bath using one dye, it's very important in textile industry ،The results obtained revealed that CFP have high color measurement values, fastness and high air permeability. The process featured shortened time, water and saved cost.

References

1- Smitarani, S., BinitaBaishya, k., Blending of Regenerated Bamboo fiber with Silk to produce value added product, IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS), Jun. vol8(6),(2015).

2- Muhammad, Q.,Tusief,Israr A., Spinning and Knitting of Flax, Bamboo and Soybean Fibre Blends: Qualitative evaluation of Spinning and Knitting performance of Flax, Bamboo and Soybean fibre blends, , March(2012).

3- Noor S, S., Zaid, G., Mohammad s., Duaa, A., Natural fibers and their applications: A review. Journal of Al-Farabi for Engineering Sciences, Vol. 1, No. 2, Jun (2022).

4- Suza,n H., sanad, Mohamed A. Mohamed .,Ahmed, M., Quality characteristics of Ring and O.E. yarns spun from Egyptian and Upland cotton blends September 2008 V 86(3), P.P1011-1025 (2008).

5- Rajalakshmi, M., Koushik, C.V., Prakash, C., Effect of cotton/micro polyester blends on physical properties of ring spun yarn. Journal of Textile Science and Engineering, 2(6), (2012).

6- Prakash, C., Ramakrishnan, G., Koushik, C.V., Effect of blend ration of quality characteristics of bamboo/cotton blended ring spun yarn, FIBERS TEXTILES in Eastern Europe, 19:6(89) (2011).

7- Sevkan, A., Kadoglu, H., An investigation on ring and open - end spinning of flax/cotton blends, TEKSTIL ve KONFEKSIYON, July, 22(3), 218, (2012).

8- Bhardwaj, S., Juneja, S., Performance of Jute Viscose/Polyester and Cotton Blended: Yarns for Apparel Use, Studies on Home and Community Science 6 (1), 33pp 33-38 (2012).

9- Lidia, J., S, Danuta, C., Jerzy C., Tadeusz J., Quality of Cotton Yarns Spun Using Ring-, Compact-, and Rotor-Spinning Machines as a Function of Selected Spinning Process Parameters, FIBRES & TEXTILES in Eastern Europe, 15(1): (60), 24 (2007).

10- Becerir. B., Ömeroglu, S., Comparison of Color Values of Plain Cotton Fabrics Knitted from Ring- and Compact-Spun Yarns, AATCC Review 7, 41(2007).

11- Micheal, M.N., Dyab, W.A., Effect of Spinning Method and Knitting Type on Dyeability and Fading Kinetics, ATTCC ReviewMarch, vol. 1, no. 3, pp. 53-56 (2001).

12- Wardah, A., Munir, A., Muhammad B., Qadir, Khurram, S., Akhtar, S., Ahmad, A., Afzal, T., Ullah, Influence of Yarn Manufacturing Techniques on Dyeing

Behavior of Polyester/Cotton Blended Woven Fabrics, Fibers and Polymers, V. 20, No.12, 2550-2555 (2019).

13- Ihab, El-S., and Salah,M.,Saleh. Effect of Spinning Systems on Properties of Dyed Egyptian cotton Yarns after Mercerization Treatment, RJTA Vol. 19 No. 4(2015).

14- Ozturk, M., Nergis, B. U, 'Determining the dependence of color values on yarn structure', Coloration Technologyvol. 124, pp. 145-150 (2008).

15- Ortek, H.G. &Ulkus, S., The comparison of the properties of Murata Vortex-Ring and rotor spun cotton yarns, The 5th International Istanbul Textile Conference Papers, Istanbul, (2005).

16- Eman, Y., Abd-Elkawe, Nermin, M., Aly, Comparative Study of Quality Properties for Open-end Spun Yarns Produced from Blending Natural and Synthetic Fibers, Journal of the textile Association, March - April. P. 425(2019).

17- Rizk,R., S, El Sayed, W., A, Ashour, N., S, Omnia, Kh. Ahmed, Surface Modification of Polyester Fabric Using Microwave Irradiation to Minimize Pollution in Textile Industry via Optimizing Energy and Time, Egypt. J. Chem., Vol. pp. 3367- 3380 (2020).

18- Debasree, P., Subrata, C., Das, Tarikul, I., Abu Bakar, S., Md. and Abdullah. Md., Al Mamun Effect of Temperature on Dyeing Cotton Knitted Fabrics with Reactive Dyes, Journal of Scientific and Engineering Research, 4(12): 388-393 (2017).

19- Kubelka, P., Munk, F. Z., An article on optics of paint layers, Tech. Phys., V. 12, pp 593 – 601 (1931).

20- Salah, M., Saleh, Kh, El-Badry., Dyeing of Cotton / Nylon Blended Fabric to a Solid Shade in one Bath, Global Journal of Science Frontier Research Agriculture and Veterinary Sciences ,Volume 12 Issue 7 Version 1.0. (2012).

21- Melkie, G., Chavanb, RB. , Catalyzation of Alkaline Hydrolysis of Polyester by Oxidizing Agents for Surface Modification International Journal of Sciences: Basic and Applied Research (IJSBAR), Vol. 22, No 2, pp 232-252 (2015).

22- Kin, Y., Tam, Elaine, R. Smith, Jonathan, B., Richard, G., Compton, M., Colin, Brennan, J, Atherton, H, Kinetics and Mechanism of Dyeing Processes: The Dyeing of Cotton Fabrics with a Procion Blue Dichlorotriazinyl Reactive Dye, Journal of Colloid and Interface Science, 186, 387–398 (1997).

23- Namboodri CGG, Haith, MS., Some Aspects of Alkaline Hydrolysis of Poly (ethylene terephthalate), J. Appl. Poly. Sci, 12 (1999).

24- Grewal, AS., Kumar, K., Redhu, S., Bhardwaj, S., Microwave assisted synthesis: a green chemistry approach, Int. Res. J. Pharm. App. Sci. 3:278 (2013).

25- Bendak, A., Raslan, W. M,, Pretreatment of proteinic and synthetic fibers prior to dyeing, textile Dyeing, Dec pp299-326 (,2011).

26- Memon, H., Ali, K., N, Memon, S., Effect of dyeing parameters on physical properties of fibers and yarns, Int. J. Appl. Sci. Eng. Res, 4(4) pp. 401(2015).

27- Noman, Haleem, Zulfiqar, A., Malik, Mumtaz, H., Malik, Tanveer, H., Qummer G., Aisha, R.,, Predicting the Air Permeability of Polyester/Cotton Blended Woven Fabrics, Fibers and Polymers Vol.14, No.7, 1172-1178 (2013).

28- Cata, A., ŞM, Ionescu, I., Tanasie, C., Miclau, M., Alkaline hydrolysis of polyethylene terephthalate under microwave irradiation. Rev. Roum. Chim. 62:531-538 (2017).

29- SEIF, M., A, HIJI, M. M., "Evaluating the Effect of Seams on Color Fastness Properties of Textile Fabrics", International Journal of Textile and Fashion Technology, Vol. 6, Issue 1, 1-14. 27 (2016).

30- Babel, S., Gupta, R, Screen Printing on Silk Fabric using Natural Dye and Natural Thickening Agent", Journal of Textile Science & Engineering. Vol. 6, 1-3 (2016).

خصائص تقييم الأقمشة المخلوطة من القطن/الكتان/البوليستر بعد العلاجات الكيميائية والصباغة

هناء احمد سعد[1]* ، ايمان يحيى عبد القوى[2]
[1] مركز البحوث الزراعية معهد بحوث القطن قسم الكيمياء والياف النسيج
[2] مركز البحوث الزراعية معهد بحوث القطن قسم بحوث الغزل -الجيزة -مصر

في هذه الدراسة تم إنتاج قماش مخلوط منسوج باستخدام مزيج من القطن / الكتان / البوليستر (CFP). وكان الغرض من هذه الدراسة هو فحص تأثير المعالجات القلوية باستخدام هيدروكسيد الصوديوم / الميثانول من خلال استخدام الطرق التقليدية والميكروويف ومعرفة مدى تأثير هذه المعالجات على الاقمشة المخلوطة .ثم تم اجراء عملية الصباغة باستخدام الصبغة النشطة في حمام واحد وتم إجراء القياسات اللازمة كمقاومة الشد ومقاومة التآكل ونفاذية الهواء وكفاءة اللون وخصائص الثبات للنسيج المخلوط. وأظهرت العينات المعالجة مزايا الخواص الميكانيكية ، مثل قوة الكسر والاستطالة ، وكفاءة اللون ، ومقاومة التآكل ، وخصائص الثبات ونفاذية الهواء.