EVALUATION OF SPECIFIC PROPERTIES OF FINISHED WOOL AND WOOL-BLENDED POLYESTER WOVEN FABRICS

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Abstract

This article presents experimental evaluations of 5 samples of finished woven wool and wool-blend polyester fabrics with different proportions of raw materials provided by Nam Dinh Silk Textile Joint Stock Company for research. Experimental evaluations are sequently performed with fabric capillarity determined according to TCVN 5073-90 standard, the wrinkle resistance degree of fabric determined according to TCVN 7425:2004 standard, the breathability of fabric determined according to TCVN 5092:2009 standard, the shrinkage of fabric after washing determined according to TCVN 8041:2009 ISO 5077:2007 standards. The research results prove that the material composition of the fabric affects some fabric properties, specifically concerning fabric sample PLE1 (LE (P/W/C 29.5/70/0.5) has the ability to the highest capillarity in the longitudinal and transverse directions of 0.83 cm/min and 0.93 cm/min, respectively; PLE2 fabric sample has the largest crease return angle in the longitudinal direction reaching 174.5° with anti-creasing coefficient is 96.4%; fabric sample PLE3 has the best air permeability at 53.3 $cm^3/s/cm^2$. fabric sample LE has the highest shrinkage in the longitudinal direction at 1.8%; fabric sample PLE3 has the highest shrinkage; the horizontal direction reaches 4.0%. The research results can provide suggestions for textile product designers to choose appropriate materials when designing to meet usage requirements, contributing to improving product quality textile products.

Keywords: *Woven fabric; wool-blend polyester; capillarity; wrinkle resistance; air permeability; post-wash shrinkage of the fabric.*

1. Introduction

Woven fabric is created by interlacing two systems of warp and weft yarns according to various weaving patterns. Changes in the structural factors of the fabric significantly influence its physical and mechanical properties. Properties such as mechanical strength, shrinkage after washing, breathability, and wicking ability are affected by alterations in the fabric's internal structure, including raw material composition, yarn density, thickness, and weave type.

When evaluating fabric quality, breathability is a critical criterion. It serves as an

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indicator for maintaining hygienic safety in textile products and greatly influences the thermal conductivity of fabrics. Depending on the intended application, specific requirements for breathability are set. Innerwear and undergarments require higher breathability compared to outerwear, and summer garments are more breathable than winter garments. Within the same unit area, fabrics woven from finer yarns have lower breathability. Increasing yarn twist can enhance the fabric's breathability. In the study by G. A. A. Nassif [1] on "The effect of weave structure and weft density on the physical and mechanical properties of micro polyester woven fabrics", it was shown that the breathability of woven fabrics depends on their structure and weight. Increasing the weft density raises the fabric's fill factor, thereby reducing its breathability, demonstrating that breathability is affected by changes in fabric density.

Wool fabrics are a unique material highly valued in the garment industry due to their natural and distinctive properties. Wool clothing is comfortable to wear, retains heat well in cold temperatures, and is breathable in warmer climates. In the study "The effect of structural characteristics of woolen suit fabrics on surface roughness and air permeability" by A. Gurarda *et al.* [2], the impact of yarn count, yarn type, and weave pattern on the surface roughness and breathability of wool fabrics was investigated. Six fabric samples with different structural characteristics were tested. The results indicated that changes in the weave pattern of wool woven fabrics affect both surface roughness and breathability.

A. K. Samanta [3] conducted research on "The effect of blend proportion on yarn uniformity and imperfection characteristics of ring-spun wool/polyester blends". The study utilized two yarn counts spun from four different blend ratios of wool and polyester. The findings revealed that yarn uniformity improved with an increase in polyester content in the blend.

In the report on "Pilot production of wool-polyester blended fabrics" by P. H. Chi [4], two wool-polyester blended fabrics (Wo/PES) with high wool content, namely Wo/PES 50/50 and Wo/PES 60/40, were studied. The project aimed to evaluate, collect, and refine technological processes and technical parameters for weaving, pre-dyeing treatment, and finishing of these fabrics. The results demonstrated that the project's outcomes could be applied immediately for large-scale industrial production of Wo/PES products meeting international standards, suitable for high-end garments such as coats and suits, thus fulfilling the demand for domestic raw materials and export requirements. Through pilot production of Wo/PES 50/50 and Wo/PES 60/40 fabrics (comprising five main product categories), the project confirmed the feasibility of producing high-wool-content Wo/PES fabrics with profitable outcomes. The products were quickly purchased by enterprises, proving the potential for scaling up production.

In this study, the authors selected five finished wool and wool-blend woven fabrics with different material compositions to evaluate the influence of material composition on: water wicking capacity, wrinkle resistance, breathability, and shrinkage of the fabrics.

2. Experimentation

2.1. Research subjects

The study utilized 5 types of woven fabrics, including 1 sample of 100% wool fabric (W100) and 4 samples of polyester-wool blended fabrics (PES/W) with varying ratios (P/W 30/70, P/W 50/50, P/W 60/40, and P/W 70/30). The fabric samples were coded as LE, PLE1, PLE2, PLE3, and PLE4, respectively, and were supplied by Nam Dinh Silk Textile Joint Stock Company, the technical specifications of the experimental fabric samples are presented in Tab. 1.

Tab. 1. Technical specifications of the fabric samples used in the study

No.	Fabric sample coding	Fabric composition (%)	Weave pattern	Fabric width (cm)	Fabric weight (g/m^2)	Fabric density (yarns/10 cm)		Yarn count	
						Vertical	Horizontal	Vertical	Horizontal
1	LE	W100	Twill texture	156	177.0	314	274		
2	PLE1	P/W 30/70	Twill texture	156	194.0	363	266		
3	PLE2	P/W 50/50	Twill texture	151	257.9	282	222	72/2	72/2
4	PLE3	P/W 60/40	Dot texture	156	143.0	271	245		
5	PLE4	P/W 70/30	Twill texture	152	221.0	318	254		

2.2. Research content

Study on the effect of 5 types of woven wool and polyester-wool blended fabrics with different compositions on certain physical and mechanical properties of fabrics: water wicking capacity, wrinkle resistance, breathability, and shrinkage.

2.3. Research method

2.3.1. Evaluation of fabric wicking capacity

The wicking capacity of woven fabrics was determined according to the TCVN 5073-90 standard [5].

The wicking test results represent the average of three test samples. The wicking rate is calculated using the formula:

$$V = \frac{h}{t} (\text{cm} / \text{min}) \tag{1}$$

where V is wicking rate (cm/min), h is wicking height (cm), t is wicking time (min).

The wicking results are expressed in cm/min for both the warp and weft directions of the fabric. The final accurate result of the test is rounded to the nearest 0.1 cm.

The experiment was conducted at the Laboratory for analysis and applications, Faculty of Chemical Technology, Hanoi University of Industry.

2.3.2. Evaluation of fabric crease recovery through the crease recovery angle

The crease recovery angle of woven fabric was determined according to the TCVN 7425:2004 standard [6].

The wrinkle resistance of woven fabric in the warp and weft directions (X) is expressed as a percentage, calculated using the following formula:

$$X = \frac{\alpha}{\gamma} \cdot 100 \tag{2}$$

$$\alpha = \frac{\sum_{i=1}^{n} \alpha_i}{n} \tag{3}$$

where α_i is the crease recovery angle in the warp or weft direction for each individual measurement, expressed in degrees, n is the number of tests in the warp or weft direction of the fabric.

The fully creased angle of the sample is 180°. Intermediate calculations are made with a precision of 0.1° and rounded to the nearest 1°.

The experiment was conducted at the Textile Testing Center of the Textile and Garment Research Institute Joint Stock Company.

2.3.3. Evaluation of fabric breathability

The breathability of woven fabric was determined according to the TCVN 5092:2009 standard [7].

The breathability results were obtained by calculating the average value of 10 trials, expressed in the international SI unit cm³/s/cm², using the following formula:

$$K_p = \frac{V}{F} \cdot T \tag{4}$$

where is V is the volume of air passing through the sample (cm³), F is the area of the sample (cm²), T is the time (s).

The experiment was conducted at the Textile Testing Center of the Textile and Garment Research Institute Joint Stock Company.

2.3.4. Evaluation of dimensional changes during washing and drying

The dimensional changes during washing and drying of woven fabric were determined according to the TCVN 8041:2009 [8].

The experimental results of dimensional changes of the test samples after washing and drying represent the average value of the measurements from the test samples, calculated with shrinkage data accurate to 1 mm.

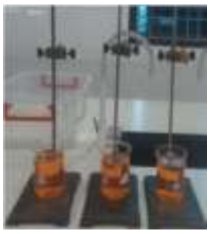

Fig. 1. Wicking measurement device.

Fig. 2. Crease recovery angle tester.

Fig. 3. Breathability tester.

Fig. 4. Industrial washing machine.

Dimensional changes after washing and drying are expressed as a percentage, calculated using the following formula:

$$\alpha = \frac{L_0 - L_1}{L_0} \cdot 100\,(\%) \tag{5}$$

where L_0 is the length of the sample before washing (mm), L_1 is the length of the sample after washing (mm), α is the percentage (%) of dimensional change after washing.

The experiment was conducted at the Dyeing Laboratory of Nam Dinh Silk Textile Joint Stock Company.

Some equipment used in the study are presented in Figs. 1-4.

3. Results and discussion

3.1. Effect of material composition on the wicking capacity of finished woven wool and polyester-wool blended fabrics

The woven fabric samples used in the study, with different material compositions, were coded as LE, PLE1, PLE2, PLE3, and PLE4, and were prepared according to TCVN 1749:1986. The wicking capacity of the fabrics was then determined according to TCVN 5073-90 [5], and the results are shown in Fig. 5.

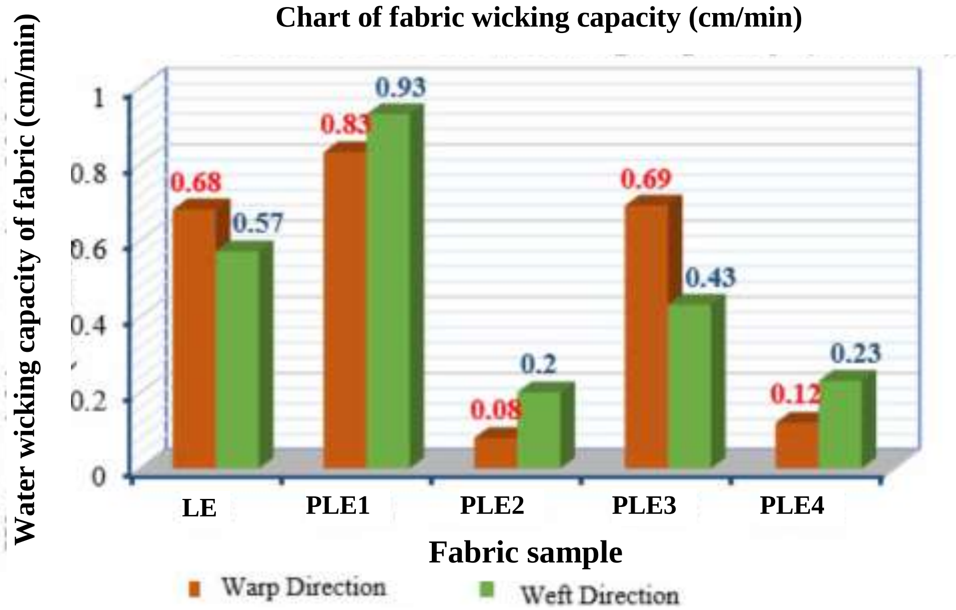

Fig. 5. Results of the wicking capacity of finished woven wool and polyester-wool blended fabrics.

From the results in Fig. 5, it can be observed that all five fabric samples tested exhibited wicking ability; however, their wicking rates were generally low. Among the five samples, the PLE1 fabric has the highest wicking capacity in both the vertical and horizontal directions, at 0.83 and 0.93 cm/min, respectively. The PLE2 fabric has the lowest wicking capacity in both directions, at 0.08 and 0.20 cm/min, respectively. The other fabrics, PLE3, LE, and PLE4, have wicking speeds in the vertical and horizontal directions of 0.69, 0.68, and 0.12 cm/min, and 0.43, 0.57, and 0.23 cm/min, respectively. This phenomenon could be due to the fact that all the fabric samples studied are finished fabrics that have undergone a finishing process. The fibers in the fabric are covered by a chemical coating from the finishing process, which significantly reduces the surface tension of the fabric compared to the surface tension of the wicking solution. As a result, the fabric samples in this study have a low wicking capacity.

The results of the wicking test show that the PLE1 fabric, which has the highest warp density (363 fibers/10 cm), has the highest wicking rate of 0.83 cm/min. This fabric also has the highest wicking rate in the weft direction, at 0.93 cm/min, with a weft density of 266 fibers/10 cm. However, the PLE2 fabric also has a relatively high fiber density in both the warp and weft directions (282 and 222 fibers/10 cm, respectively), yet it exhibits the lowest wicking rate, at 0.08 and 0.20 cm/min, with a significant difference compared to the PLE1 fabric. The other fabrics, although having high fiber densities in both directions, show low wicking rates. Notably, the PLE4 fabric, with a warp density of 318 fibers/cm (second only to PLE1), has a wicking rate of only 0.12 cm/min.

Thus, theoretically, fabrics with higher fiber density (more fibers per unit area) have higher wicking ability, as the distance between fibers decreases, which improves the liquid transfer along the fiber surface. Conversely, fabrics with lower fiber density show reduced wicking ability. In this study, all the fabric samples tested are finished fabrics. Therefore, water droplets have difficulty entering or adhering to the fiber surface, instead sliding off, increasing the fabric's ability to keep the product dry or retain heat.

From a material composition perspective, wool has excellent moisture absorption due to the hydrophilic groups in the molecules and the structure with a high amorphous ratio (moisture absorption can reach 17-18% under standard conditions and 40% under saturated environmental conditions), which results in high wicking capacity. In contrast, polyester (PES) absorbs almost no moisture (only 0.4% under standard conditions), making the fabric have low wicking properties. In this study, the experimental fabric samples showed very low wicking rates, almost as if the fabric did not wick at all, meaning the fabric does not absorb water into the fibers.

3.2. Influence of material composition on the wrinkle resistance of woven wool and polyester-wool blended fabrics

The woven fabric samples used in the study, which have different material compositions, are coded as LE, PLE1, PLE2, PLE3, and PLE4. These samples were prepared according to TCVN 1748:2007, and then the wrinkle recovery angle of the fabrics was determined according to TCVN 7425:2004 [6]. From the results in Fig. 6, it can be observed that the wrinkle recovery angle of all five fabric samples shows excellent wrinkle resistance. Among the five samples, the PLE2 fabric has the largest recovery angle in the warp direction at 174.50°, while the PLE4 fabric has the largest recovery angle in the weft direction at 170.50°, corresponding to wrinkle recovery coefficients of 96.40% and 94.70%, respectively. The PLE3 fabric has the lowest wrinkle recovery angle in the warp direction among the five samples, achieving 162.50° with a recovery coefficient of 90.10%. The PLE1 fabric has the lowest recovery angle in the weft direction at 87.20%, with a recovery coefficient of 87.20%. This phenomenon is due to the superior properties of wool and polyester-wool blends.

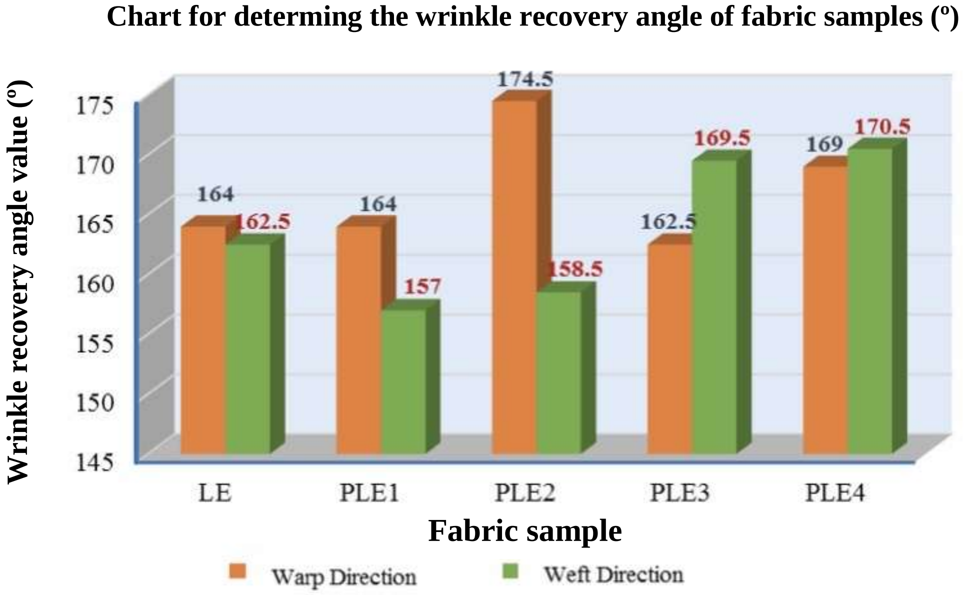

Fig. 6. Wrinkle recovery angle results of woven wool and polyester-wool blended fabrics.

The wrinkle recovery angle measurements for the LE, PLE1, and PLE2 fabrics in the warp direction are higher than in the weft direction. Specifically, the PLE2 fabric's wrinkle recovery in the warp direction is 8.80% higher than in the weft direction, making it the fabric with the highest warp recovery among the five experimental samples. The LE fabric's recovery in the warp direction exceeds that in the weft direction by 0.80%, showing the smallest difference between the two directions. The PLE1 fabric shows a 3.9% higher recovery in the warp direction compared to the weft direction, and it also has the lowest recovery in the weft direction among the five samples.

The wrinkle recovery angle results for PLE3 and PLE4 fabrics show higher values in the weft direction compared to the warp direction. Specifically, the PLE4 fabric has a 0.6% higher recovery angle in the weft direction than in the warp direction. This fabric demonstrates the highest wrinkle recovery among the five experimental samples and also shows the smallest difference between the warp and weft directions.

Thus, the results indicate that the different fiber compositions of wool and polyester-wool blends affect the wrinkle recovery ability of the fabric, demonstrating that the material composition significantly impacts the wrinkle recovery of the fabric. The PLE4 fabric, with a composition of 70% polyester and 30% wool, exhibits the highest wrinkle recovery angles in both the warp and weft directions, 169.0° and 170.50°, respectively. Meanwhile, the LE fabric, composed of 100% wool, shows the lowest wrinkle recovery angles in both directions, 164.0° and 162.50°.

3.3. Influence of material composition on the air permeability of woven wool and polyester-wool blended fabrics

The woven fabric samples used in the study, with different material compositions, are coded as LE, PLE1, PLE2, PLE3, and PLE4. These samples were prepared according to ASTM D1776 standards and then tested for air permeability according to TCVN 5092:2009 [7]. The results are shown in Fig. 7.

Graph of Air Permeability (cm^3/s/cm^2)

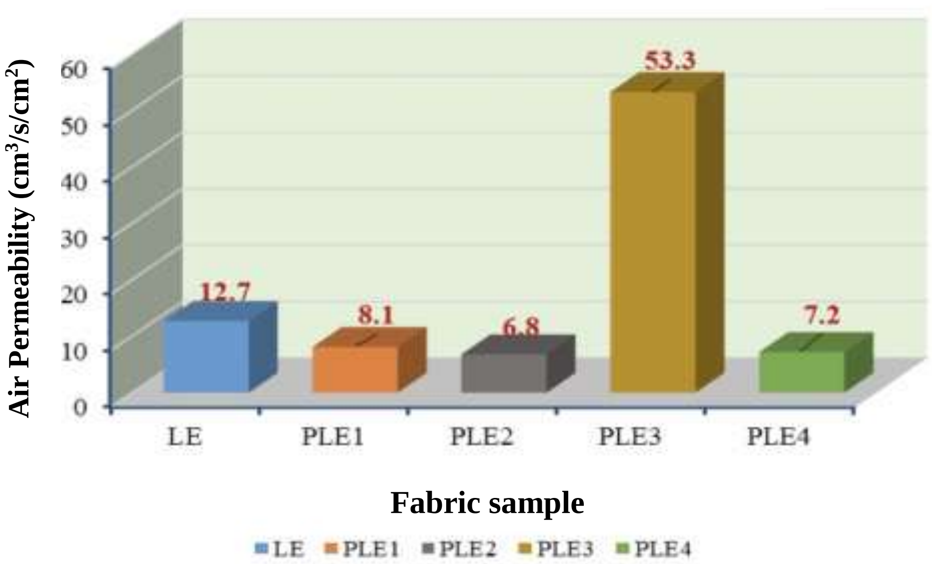

Fig. 7. Air permeability chart of the experimental fabric samples.

From the results shown in Fig. 7, the data reveal that the air permeability of the five experimental fabric samples shows that the PLE3 fabric is significantly higher than the other four samples (with a value of 53.30 cm^3/s/cm^2), 7.8 times higher than the fabric with the lowest air permeability, PLE2 (which only reached 6.80 cm^3/s/cm^2), and 7.4 and 6.6 times higher than the PLE2 (7.20 cm^3/s/cm^2) and PLE1 (8.1 cm^3/s/cm^2) samples, respectively. This phenomenon can be explained by the fact that PLE3 is the only fabric sample used in the experiment that is woven with a plain weave, and it has the lowest fiber density among the five samples tested (with warp density of 271.30 fibers/10 cm and weft density of 244.50 fibers/10 cm); the other four experimental samples are woven in twill weave, which has higher warp and weft densities than the PLE3 fabric. This indicates that the gaps between the fibers in the PLE3 fabric are larger, resulting in higher air permeability compared to the other samples.

The LE fabric sample has the second highest air permeability among the five experimental fabrics (at 12.70 $cm^3/s/cm^2$). This is also the fabric with the highest air permeability among the four twill-woven samples, including LE, PLE1, PLE2, and PLE4. This is one of the advantageous characteristics of fabrics with wool content.

The results for the air permeability of the three fabric samples PLE2, PLE4, and PLE1 are all low, at 6.80, 7.20, and 8.10 $cm^3/s/cm^2$, respectively. This is completely consistent with their wrinkle resistance measurements. These fabrics all have high wrinkle resistance, and generally, fabrics with high wrinkle resistance tend to have lower air permeability.

Thus, the material composition affects the air permeability of the five experimental fabrics, and additionally, the weave pattern also influences the fabric's air permeability.

3.4. Influence of material composition on dimensional changes during washing and drying of woven wool and polyester-blend fabrics

The woven fabric samples used in the study, which have different material compositions, are coded as follows: LE, PLE1, PLE2, PLE3, and PLE4. These samples were prepared according to TCVN 1748:2007, and then the dimensional changes of the fabrics after washing and drying were determined according to TCVN 8041:2009 [8]. The data from Fig. 8 indicate that the shrinkage after washing of the 5 experimental fabric samples in both the longitudinal and transverse directions is not significant. The longitudinal shrinkage tends to decrease as the proportion of wool blended with polyester increases. Specifically, the longitudinal shrinkage of the fabric samples LE, PLE1, PLE2, PLE3, and PLE4 are 1.8%, 1.4%, 1.2%, 0.8%, and 0.4%, respectively. For the transverse shrinkage, the 3 fabric samples LE, PLE1, and PLE2 also show a decreasing trend, with shrinkage values of 1.0%, 0.8%, and 0.6%, respectively. However, the shrinkage of the PLE3 and PLE4 samples tends to increase, with values of 4% and 2%, respectively. This phenomenon can be explained by the fact that the PLE3 fabric has a point weave pattern, is thinner (with the lowest weight among the 5 experimental fabric samples), and has a looser transverse structure, which leads to higher shrinkage after washing compared to the other samples.

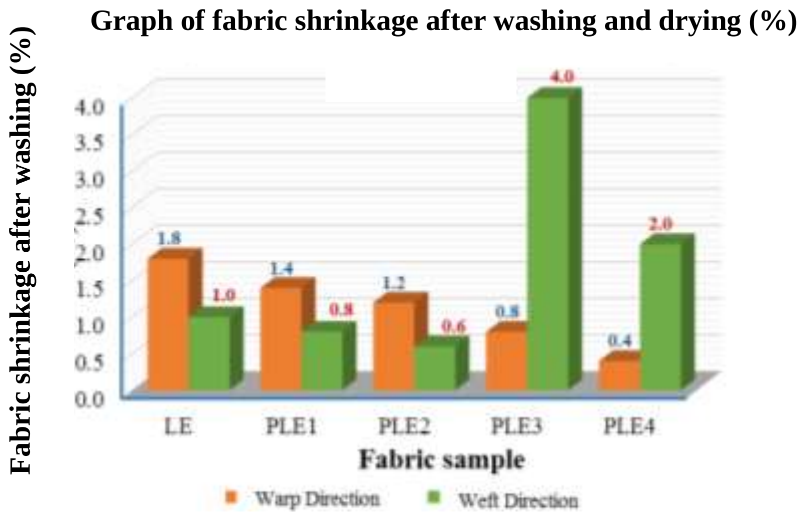

Fig. 8. Results of fabric shrinkage after washing for woven wool and polyester-blended finished fabric.

For the 4 fabrics LE, PLE1, PLE2, and PLE4, all woven fabrics, the shrinkage in both directions (longitudinal and transverse) is either less than or equal to 2%. Only the PLE3 fabric has a transverse shrinkage of 4%, slightly higher than the other samples but not significant. The longitudinal shrinkage is only 0.8%, so all 5 fabric samples can be considered as having minimal shrinkage.

4. Conclusion

The experimental results show that the fabric composition affects several physical and mechanical properties of the fabric, specifically:

The fabric composition has minimal effect on the capillarity of the fabric. Among the 5 experimental fabric samples, the PLE1 (P/W 30/70) sample has the highest capillary rise in both longitudinal and transverse directions, measuring 0.83 cm/min and 0.93 cm/min, respectively. The PLE2 sample has the lowest capillary rise in both directions, with values of 0.08 cm/min and 0.20 cm/min, respectively. The other fabric samples, PLE3, LE, and PLE4, show capillary rise rates of 0.69, 0.68, 0.12 cm/min and 0.43, 0.57, 0.23 cm/min in the longitudinal and transverse directions, respectively. Thus, wool and polyester blend fabrics, with varying ratios, exhibit very low capillary rise values, which suggests that the fabric does not absorb water into the fibers.

The fabric composition also affects the wrinkle recovery of the fabric. All experimental fabric samples demonstrate excellent wrinkle recovery. Among them, the PLE2 sample shows the highest wrinkle recovery angle in the longitudinal direction, reaching 174.5°, with a wrinkle resistance factor of 96.4%. The PLE4 sample has the highest wrinkle recovery angle in the transverse direction at 170.5°, with a wrinkle resistance factor of 94.7%. The PLE3 sample has the lowest wrinkle recovery angle in the longitudinal direction at 162.5°, with a wrinkle resistance factor of 87.2%. The sample with the lowest wrinkle recovery angle in the transverse direction is PLE1, at 157°, with a wrinkle resistance factor of 87.2%. The results indicate that the excellent wrinkle resistance of wool and polyester fabric blends is a significant advantage during use. This property results in fabrics with good appearance and ease of use, and especially helps designers create high-end products such as suits and coats that can be machine-washed without affecting their shape or appearance. This also allows the wearer to save time on ironing, increasing the product's utility value.

The fabric composition affects the fabric’s breathability. Among the 5 experimental fabric samples, the PLE3 fabric exhibits the best breathability, measuring 53.3 $cm^3/s/cm^2$. This is also the only sample woven in a point weave pattern, allowing air to easily pass through the spaces, making it more breathable than fabrics woven in a twill pattern. The LE sample also has the second-highest breathability, which is understandable because the sample is made from 100% wool, which naturally has good breathability. The PLE4 sample shows the lowest breathability at 7.2 $cm^3/s/cm^2$.

The fabric composition influences the shrinkage after washing, although the shrinkage in the experimental samples is not significant. Among the 5 fabric samples, the LE sample has the highest longitudinal shrinkage at 1.8%. The PLE4 sample has the lowest longitudinal shrinkage at 0.4%. The longitudinal shrinkage tends to decrease as the wool proportion in the polyester blend increases. The PLE3 sample shows the highest transverse shrinkage at 4.0%. The PLE2 sample has the lowest transverse shrinkage at 0.6%. The transverse shrinkage generally decreases as the wool proportion in the polyester blend increases.

References

[1] G. A. A. Nassif, “Effect of weave structure and weft density on the physical and mechanical properties of micro polyester woven fabrics”, *Journal of American Science*, Vol. 8, No. 8, pp. 947-952, 2012. DOI: 10.7537/marsjas080812.140

[2] A. Gurarda *et al.*, “Investigation of the effects of fabric structural properties of wool suits on surface roughness and air permeability”, 18th AUTEX World Textile Conference, June 20-22, 2018, Istanbul, Turkey, pp. 365-367.

[3] A. K. Samanta, “Effect of blend ratio on yarn evenness and imperfections characteristics of wool/polyester ring-spun yarn”, *Indian Journal of Fibre & Textile Research*, Vol. 39, No. 1, pp. 89-92, 2014.

[4] P. H. Chí, "Sản xuất thử nghiệm vải len pha polyester", Báo cáo tổng hợp kết quả nghiên cứu Dự án sản xuất thử nghiệm độc lập cấp Nhà nước, Mã số DAĐL 2005/12, tr. 3-5, TP. Hồ Chí Minh, 2008.

[5] *Vải dệt thoi - Phương pháp xác định độ mao dẫn,* Tiêu chuẩn Việt Nam TCVN 5073-90, Hà Nội, 1990.

[6] *Vải dệt - Xác định sự hồi phục nếp gấp của mẫu bị gấp ngang bằng cách đo góc hồi nhàu*, Tiêu chuẩn Việt Nam TCVN 7425:2004, Hà Nội, 2004.

[7] *Vật liệu dệt - Vải dệt - Phương pháp xác định độ thoáng khí,* Tiêu chuẩn Việt Nam TCVN 5092:2009, Hà Nội, 2009.

[8] *Vật liệu dệt - Xác định sự thay đổi kích thước trong quá trình giặt và làm khô*, Tiêu chuẩn Việt Nam TCVN 8041:2009, Hà Nội, 2009.

ĐÁNH GIÁ MỘT SỐ ĐẶC TÍNH CỦA VẢI DỆT THOI LEN VÀ POLYESTER PHA LEN

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Tóm tắt: Bài báo trình bày kết quả đánh giá một số đặc tính của vải dệt trên 5 mẫu vải dệt thoi len và polyester pha len có tỉ lệ thành phần nguyên liệu khác nhau được cung cấp bởi Công ty Cổ phần Dệt lụa Nam Định để nghiên cứu. Các đánh giá được thực hiện liên quan đến độ mao dẫn của vải được xác định theo tiêu chuẩn TCVN 5073-90, độ không nhàu của vải xác định theo tiêu chuẩn TCVN 7425:2004, độ thoáng khí của vải được xác định theo tiêu chuẩn TCVN 5092:2009, độ co của vải sau giặt được xác định theo tiêu chuẩn TCVN 8041:2009 ISO 5077:2007. Kết quả nghiên cứu cho thấy thành phần nguyên liệu của vải có ảnh hưởng đến một số đặc tính của vải gồm mẫu vải PLE1 (LE (P/W/C 29,5/70/0,5) có khả năng mao dẫn cao nhất theo hướng dọc và hướng ngang, tương ứng là 0,83 cm/phút và 0,93 cm/phút; mẫu vải PLE2 có góc hồi nhàu lớn nhất theo hướng dọc đạt 174,5^o với hệ số chống nhàu là 96,4%; mẫu vải PLE3 có độ thoáng khí tốt nhất đạt 53,3 $cm^3/s/cm^2$; mẫu vải LE đó độ co cao nhất theo hướng dọc đạt 1,8%; mẫu vải PLE3 có độ co cao nhất theo hướng ngang đạt 4,0%. Kết quả nghiên cứu có thể gợi ý cho nhà thiết kế sản phẩm dệt may tham khảo để lựa chọn nguyên liệu phù hợp khi thiết kế đáp ứng yêu cầu sử dụng, góp phần nâng cao chất lượng sản phẩm dệt may.

Từ khóa: *Vải dệt thoi; polyester pha len; độ mao dẫn; độ không nhàu; độ thoáng khí; độ co sau giặt của vải.*

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