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Exercise and fitness are essential elements of health and well-being. With increased attention to living a healthy lifestyle, people tend to allocate more time to exercise and are participating in sport and leisure activities more often. This leads to increased consumption and usage of sportswear. To accommodate people's desire to be kept dry, comfortable, and moving freely, while enhancing athletic performance, the production of sweat-management fabricated (SMF) apparels have accelerated (Davis & Bishop, 2013). The SMF apparels are also called "dry-quick apparels" or "quick drying apparels". Numerous manufacturers and retailers have paid attention and developed lines of fabrics used to make shorts, shirts, socks, pants and more. Each manufacturer has created different names or trademarks for these SMF apparels, such as Drifit of Nike, ClimaCool of Adidas, PlayDry of Reebok, CoolGear of Under Armour, and DoubleDry of Champion. Made of polyester, cotton blend, nylon blend, or elastin materials, SMF apparels have the appropriate physical properties to transfer sweat from the body to the environment while maintaining the comfort of dry and breathable fabric (Dai, 2011).

Despite these trends, research related to the thermal comfort of SMF apparels, especially determining appropriate fabric or fabric combination for SMF apparels, is scant. In addition, effectiveness of SMF apparels to maintain a stable body temperature while exercising or doing activities should be evaluated. Therefore, the purpose of this study is to evaluate the thermal comfort of sweat-management fabrics to reveal their suitability for sportswear. Thermal comfort is measured by the combination of thermal resistance and thermal absorptivity. Thermal resistance measures the body's ability to prevent heat from flowing through a fabric, while thermal absorptivity measures feelings of warm/cool (Oğlakcioğlu & Marmarali, 2007). This study examined several types of sweat-management fabrics to compare their usefulness in terms of thermal comfort. Dry thermal resistance (R_{ct}) for thermal resistance and water vapor resistance (R_{et}) for thermal absorptivity were used to identify thermal comfort. The Sweating Guarded Hot-Plate (SGHP) manufactured by Measurement Technology Northwest was used to measure the thermal properties of fabrics.

Three types of sweat-management fabrics; 100% polyester (PL), polyester-cotton blend (PLCO), and polyester-spandex blend (PLSP); which are commercially available to make SMF sportswear, were selected for testing. Researchers selected several well-known athletic manufacturers and purchased samples of SMF apparels made by these manufacturers. The dimensions for all of the fabric specimens were 12 inches in length and 12 inches in width. A minimum of three test specimens for each fabric were cut and prepared. All specimens were conditioned for a minimum of 12 hours at the temperature and humidity specified in the appropriate environmental conditions in accordance with ASTM F1868-09 standards.

The data were analyzed using analysis of variance (ANOVA) by Statistical Analysis System (SAS) software to compare fabric groups. In the table 1, the result highlighted significant differences among the three different sweat-management fabrics in dry thermal resistance (R_{ct}) for thermal resistance; PL, PLCO, and PLSP in R_{ct} ($F (2, 21) = 86.740$, $p <.000$). The post hoc LSD test in R_{ct} showed that each type of fabrics has its own group separately. It indicates that each fabric possesses different levels of dry thermal resistance; PLSP (.0091) owns the lowest R_{ct}, PL (.0137) and PLCO (.0270) followed. In the table 2, the finding presented significant differences among the three different sweat-management fabrics also in water vapor resistance (R_{et}) for thermal absorptivity; PL, PLCO, and PLSP in R_{et} ($F (2, 8) = 22.910$, $p < .002$). For R_{et}, the post hoc LSD test showed that the PLSP and PL grouped together and PLCO has its own group. It indicates that the first two types, PLSP (2.0132) and PL (2.2743), possess similar levels of water vapor resistance and PLCO (2.9203) demonstrates the highest R_{et}, which translates to weak water vapor resistance.

Table 1. Dry thermal resistance (R_{ct}) Result of ANOVA

R_{ct}	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.001	2	.001	86.740	.000***
Within Groups	.000	21	.000		
Total	.002	23			

Table 2. Water vapor resistance (R_{et}) Result of ANOVA

R_{et}	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.308	2	.654	22.910	.002***
Within Groups	.171	6	.029		
Total	1.480	8			

According to the results of R_{ct} and R_{et}, the polyester-spandex blend (PLSP) fabric, which possesses the lowest R_{ct} and R_{et}, was the most appropriate fabric for SMF apparels and 100% polyester (PL) fabric followed. This indicates that the polyester-spandex blend (PLSP) fabric transfers heat well the body to the outside throughout the fabric layer as well as controlling sweat. However, the polyester-cotton blend (PLCO) fabric, which displayed the highest R_{ct} and R_{et}, was the least suitable fabric for SMF apparels in terms of dry thermal resistance and water vapor resistance.

The present study concluded that evaluating the fabrics functionality of sportswear, especially sweat-management fabricated apparels, should be highly prioritized. Based on these findings, this study suggests selecting proper fabric combinations should become one of the key factors for the future SMF apparel manufacturing. The findings will also provide fabric manufactures with suggestions for effective marketing strategies.

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