

Analysis of Moisture Wicking Properties in Assessing Sleepwear Performance Claims

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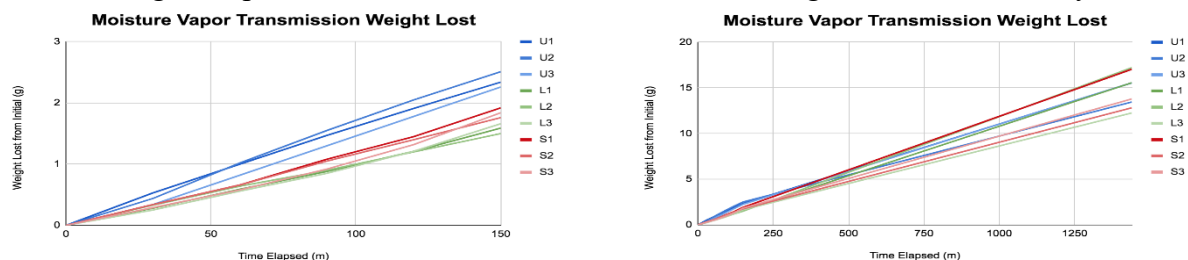
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Significance. Comfort is a key factor in sleep quality. Comfort can be impacted by many different sleep factors, including choice of mattress or sheets, pillow type, or even clothing. According to statistics, nearly 40% of Americans wear underwear or sleep in the nude during the night, 23% wear shorts and a T-shirt, while a third dress for the occasion with pajamas or nightgowns (Sandwood, 2019). As women enter middle-age, they begin experiencing a periodic rise and fall in body temperature during menopause, known as hot flashes. The comfort of a cooling pajama can ease discomfort and increase sleep quality. According to a 2015 study, approximately half of women experience menopausal symptoms for seven or more years. Considering symptoms and the problem may not end abruptly, ensuring sleep comfort is of utmost importance. According to Pam Stephan, there are many causes of night sweats (2019) and a variety of homeopathic approaches to address comfort levels including diet changes, vitamin or hormone supplements, and even antibiotics. She also notes that high-performance fabrics used in sleepwear can increase comfort levels. Aman (2020) notes the best pajamas for menopause have fabrics that wick away sweat and moisture from the body as the wearer sleeps. Wicking sleepwear has received much media attention as new fabric technologies and finishes have been developed and marketed in the sleepwear industry. Research has shown superior results for sleepwear that was loose fitting and contained cotton and/or bamboo in combination with synthetic fibers specifically designed to draw moisture away from the body and into the fabric (Aman, 2020). YALA, a lifestyle brand producing sleepwear, believes strongly in their comfort mission for women. YALA's popular nightgown, the Cleo Gown, has a fiber content of 95% viscose from bamboo and 5% spandex. The company promotes this gown as the softest wicking sleepwear and it feels like a second skin due to its drape and incredible softness (YALA, 2020).

Research Problem. Thus, the goal of this study is to analyze YALA's moisture control properties to determine if the gown satisfies the stated claims. Common properties for moisture wicking clothing include the comfort to the wearer, permeability, and ability for moisture to move through the fabric (Kadolph, 2007). The gown was evaluated against its own claims and also compared with findings from other sleepwear products in the marketplace.

Method. In order to evaluate the moisture properties of the YALA hot flash nightgown and comparative brands, the following AATCC procedures were carried out: Moisture Vapor Transmission, Horizontal Wicking, Vertical Wicking, Wetting, and Saturation and Liquid Holding Capacity. Each test was conducted on specimens from the Cleo gown and five other brands of nightgowns in three states, unlaundered, laundered (30 times), and laundered with softener (30 times), and each test was reproduced three times in each state and product.

Results. The Moisture Vapor Transmission (MVT) test conducted on the unlaundered Cleo garment specimens yielded an average of 6.7% decrease in weight, the laundered garment specimens yielded an average 6.8% decrease in weight, and the laundered with softener yielded an average 6.4% loss in weight. Measures were taken every 30 minutes. At the 150-minute interval, the MVTs of the unlaundered garment specimens were higher universally and the MVTs of the laundered were lowest. This suggested that the softener helped the fabric retain some of its moisture transfer qualities. However, after 24 hours, the vapor transfer rates were scattered by all three specimen states (see charts). When performing the horizontal wicking test on the Cleo gown specimens, the waterline did not reach the edge of the circle on any of the



three unlaundered specimens before the five-minute mark. The horizontal wicking rate of the unlaundered garments were therefore very low with an average of $3.47\text{mm}^2/\text{s}$. The horizontal wicking rate of the laundered garment specimens averaged $111.65\text{mm}^2/\text{s}$. The average horizontal wicking rate of the softener specimens was $72.36\text{mm}^2/\text{s}$. The average vertical wicking rates (d/t) for the unlaundered garment for wales and courses, respectively, were 114.7 and 78.5, for laundered, the rates were 64 and 34, and for the softener specimens, the vertical wicking rates were 80.4 and 78.5. Results of the wetting test revealed that the unlaundered garment specimens were able to hold water before spread for an average of 15.26 seconds. For both the laundered and softener specimens, the fabric wet out almost immediately, which suggests that any fabric finishes on the original unlaundered garment had worn off during the 30 launderings. The liquid holding capacity of the unlaundered garment specimens averaged 183%, and the garment specimens for the laundered and softener specimens averaged 178.7% and 168%, respectively.

Discussion & Implications. After conducting performance tests on the Cleo Gown, researchers supported claims that it effectively performed as a hot flash garment. When assessing MVT, the unlaundered specimen revealed greatest moisture transfer over the time elapsed, with reduced MVT on the laundered and softener specimens. This indicated that laundering negatively impacted the ability of the garment to maintain its MVT performance ability. The addition of the detergent and softener decreased the permeability of the fabric, causing less moisture control and comfort for the wearer. The wetting test allowed the researcher to determine if the fabric was hydrophobic or hydrophilic. Test results indicated a deterioration of garment performance through laundering, while softener provided some protection from loss of performance properties. In assessing wicking properties, the gown performed well, but in each test, performed best in the unlaundered state, indicating a reduction in effectiveness over number of launderings. Research is not sufficient to decisively conclude wicking values that ensure

comfort, thus, a comparison was made of the wicking capabilities to other brands. The Cleo gown, when compared to test results for other hot flash pajama brands, Fishers Finery, Cool Jams, GYS, Vermont Country Store, and Ekouaer, had the highest horizontal wicking rate. However, the vertical wicking test produced a contrasting result. Of the five brands, the Cleo gown had the second lowest vertical wicking rate. These outcomes suggest that the Cleo fabric is proficient at directional moisture wicking and compares well against competitors. This study indicates that moisture control properties are weakened over the course of laundering. Reproducing these tests multiple times and recording results at different intervals would give a better idea of long-term wear. Additional laundering conditions (e.g. cool water, hand wash, line dry) could reveal prolonged performance properties as those noted in this study were AATCC laundering test specific. Additionally, to accurately assess brand comparison, it is the researchers' recommendation that performance and comfort factor tests be conducted across multiple brands, and results disseminated for market comparisons.

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