5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-005

Complex Evaluation of Moisture Management Properties of Cotton-Antistatic Polyester Knitted Fabrics

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The comfort of cotton-polyester knitted fabrics can be improved by adding polyester fibres to the fabric content. But the presence of synthetic fibres increases the accumulation of electrical charging on the fabric surface. Thus, the addition of carbon black to the fabric may influence the antistatic behaviour of synthetic textiles. Therefore, for this investigation, knitted materials of two knit patterns, such as 1×1 rib and half-Milano, were developed from yarns having different fiber blend ratios of cotton and polyester containing 0.6 wt. % carbon black. Subsequently, these fabrics were dyed, treated with hydrophilic softener, and antibacterial Polygiene VO-600 finish to increase fabric functionality. SEM analysis and standard test methods were applied to characterise the structure, mechanical, electrical, antibacterial, and air permeability behaviour of the fabrics. For the analysis of the moisture management properties of the investigated fabrics, the water absorption capacity, water absorption time, the relative water vapour permeability, and the relative water vapour resistivity were examined. MATLAB software was applied for linear regression analysis between the overall moisture management capability (OMMC) estimated using the M259 device and individual standard parameters, such as resistance and permeability, water absorption, and air permeability. The linear regression equation OMMC = a + b× X1 + c× X3, where X1 - relative water vapour permeability; X3 - air permeability, was found to be suitable for predicting complex moisture management strongly related to the thermophysical comfort of a particular garment.

Biography:

Professor Virginija Daukantienė, Ph.D in Technological Sciences, Materials Engineering (T008) (Textiles) since 2001. Member of the KTU University Study Quality Committee and the T21 Textile Standardisation Committee on the Lithuanian Standards Board, and expert at the Centre for Quality Assessment in Higher Education. The most significant published scientific articles are available at: ORCID ID 0000-0002-6800-1304.

Research interests: sustainability; fashion industry; textiles; garment technology; clothing manufacture; research design; material testing; material characterisation; functional textiles; textile finishing; microfibers release; new materials; new textile joining methods; modelling of exploitation.