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YANA REDKO, ANNA VARDANIAN, OLHA
HARANINA, IEVGENIIA ROMANIUK
Kyiv National University of Technologies and Design, Ukraine

INFLUENCE OF ANTIBACTERIAL TREATMENT ON THE DURABILITY PROPERTIES OF BLENDED FABRICS

Purpose. *To investigate the effect of antibacterial treatment on the mechanical properties of blended fabrics.*

Keywords: *antibacterial textile, finishing production, dyeing, durability properties, intensifier*

Objectives. Today, there is an urgent problem of creating textile materials with antibacterial properties. The global urbanization of society determines the main trends in the development of production. As a result, humanity needs effective protection to prevent the spread of infectious diseases. One of such measures is the use of textile products that have a predictable antibacterial action with a prolonged effect. It should be noted that the type of textile product is chosen depending on the needs of the consumer, in accordance with the operating conditions.

The Kyiv National University of Technologies and Design is conducting research on the development of textile materials with specified antibacterial properties [1-2]. The raw material composition of textile products may vary depending on the needs of the consumer and the conditions of use.

The blended textile materials were used for the study (polyester/cotton/elastane), which provides high durability and hygienic properties. The antibacterial effect (resistant to *S. aureus* ATCC 6538; *P. aeruginosa* ATCC 9027; *Escherichia coli* ATCC 10231) was achieved through the dyeing process with the inclusion of a phenyl-phenolic product in the working bath, which is confirmed by the protocol of microbiological research results provided by the State Institution 'Institute of Public Health of the National Academy of Medical Sciences of Ukraine' Laboratory of Sanitary Microbiology and Disinfectology. It should be assumed that phenyl-phenolic products also play the role of an intensifier of the dyeing process due to the partial plastification of the synthetic component of the textile material. Durability characteristics play an important role in the selection of textile materials for the production of special purpose products,

including goods with antibacterial properties. In this regard, it is necessary to study the mechanical properties of textile materials before and after finishing. Non-conforming test results of textile materials directly exclude the exploitation of the future product [3-5].

Methodology. DSTU EN ISO 13934-1:2018 Textiles. Tensile properties of fabrics. Part 1: Determination of maximum force and elongation at maximum force using the strip method was used.

Research results. To achieve the research purpose, the antibacterial treatment of blended textile materials with an antibacterial agent of the phenyl-phenolic series was carried out, accompanied by a study of durability characteristics, namely, determination of the durability properties of textile samples with comparison of the results obtained with the test results of the control sample. The tests were carried out at the Analytical Research Testing Laboratory 'Textile-TEST'. Three samples of textile materials were selected for testing the durability characteristics: a control fabric (sample 1), a white stretch shirt (sample 2), and a white stretch shirt (sample 3). Sample 2 and sample 3 were finished using a phenyl-phenolic product with the same concentration (2 g/l) from different manufacturers (China - sample 2, Japan - sample 3). The results of the research are presented in Fig. 1 and Fig. 2.



Fig. 1. Comparison of the breaking load of tested samples, N



Fig. 2. Comparison of the breaking elongation of tested samples, %

According to the obtained results during the comparison of the treated samples with the control sample, a slight decrease in both the

breaking load and breaking elongation can be noted. Among the tested textile samples, the sample treated with the antibacterial agent made in China (sample 2) showed higher breaking load values than the sample treated with the antibacterial agent made in Japan (sample 3), both on the warp and weft. In turn, sample 3 obtained higher values of breaking elongation on the weft.

Conclusion. The results of the study of the durability characteristics of textile materials treated with an antibacterial agent of the phenyl-phenolic series, regardless of the country of manufacture, showed a slight decrease in the breaking load and elongation at the time of rupture compared to the control sample.

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