

ENHANCING THE WRINKLE RECOVERY PERFORMANCE OF SILK FABRICS WITH CROSSLINKING AT LOW TEMPERATURE

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Abstract:

Smaller diameter is one of the characteristics of silk fibers between 10 and 15 μm and this property results with thinner fabric structures between 32 and 90 grams per meter square [1]. Due to having smaller diameter silk fibers are ideal for staying cool and comfortable. They are also able to breathe, wick moisture away, and be refreshed in hot conditions. [2, 3] Although silk fiber is valued for the many benefits it provides in garments, its tendency to wrinkle can be problematic. To avoid this undesired wrinkling condition, several investigations have been carried out in the literature. However, it has become obvious that the studies require additional improvement. It is readily apparent that some of the chemicals used to create wrinkle-free fabrics are expensive and need for specialized machinery, making them less desirable to the traditional textile business. To make it wrinkle-free, firstly, we worked on three distinct finishing formulas. In the finishing procedures, we employed cationic softener, silicon, 6-carbon fluorocarbon, and fixator as chemicals. Moreover, when a literature review was undertaken, it was confirmed that the crosslinks formed in the fabric's structure had a favorable impact on the fabric's wrinkle-free behavior. Citric acid was chosen for crosslinking with silk fabric in consideration of all these characteristics. In addition, as silk is a natural material, eco-friendly treatments are receiving more attention. One of the cost-effective and ecologically favorable carboxylic acids is citric acid. It is also a chemical that is more often used in industry. Because of this, we used citric acid as the primary chemical in this investigation and subjected textiles to a variety of concentrations, pH levels, and treatment time limits. Within the scope of our work, we performed various tests such as crease angle

test, light fastness, color fastness, rubbing, and Martin Dale abrasion tests. Results show that high WRA can be achieved with finishing processes and crosslinks. Considering the sustainability and fastness values, it has been revealed that crosslinks made with citric acid are more advantageous. Optimum values were obtained at 5% citric acid, pH 7, and 6 hours.

Keywords: silk fiber, comfort, wrinkle recovery, crosslinking

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