

Abstract

The psychological satisfaction of the textile customer is the first criteria used to evaluate clothing and a lack of aesthetics, while fashionability and physical appearance contribute to the psychological discomfort of users. Either inherently or due to processing, cotton cloths demonstrate different psychological comfort behaviours. Manufacturers must therefore produce fabrics with optimum psychological comfort parameters. The objective of this research was to study the effect of cotton yarn parameters on the psychological comfort properties of woven fabrics. Four woven fabrics were produced from cotton yarns with different yarn twists, yarn counts, strengths and yarn elongations. Psychological comfort parameters such as wrinkle, drape, crease, bending modules and flexural rigidity were measured and analysed in accordance with the ES ISO 9867, ISO 9073-9, ES ISO 2313 and ASTM D1388-18 standards, respectively. Multiple regression equations were developed to predict the comfort properties of clothing in relation to yarn parameters. A statistical analysis showed that the wrinkle recovery and drapability of fabrics were significantly affected by yarn twist, count and tenacity, and the elongation of yarns. However, yarn twist, count, tenacity and elongation had an insignificant effect on the crease recovery of woven samples at an F-value of 3.546 and a P-value of 0.069. The stiffness properties of the fabrics such as flexural rigidity and bending modules also showed insignificant difference between samples at $F = 38487.969$, $P = 0.057$ and $F = 25.506$, $P = 0.055$ respectively. A multiple regression analysis showed a positive correlation between yarn parameters (factors) and response, with Adj. R² of 0.0998, Adj. R² of 0.975 and Adj. R² of 1 for crease recovery, wrinkle recovery and drape coefficient, respectively. The equations developed are helpful to fabric manufacturers in sourcing yarns with specific parameters to produce the desired comfort level in a fabric.