



## **EFFECTS OF INSTRUMENTAL WEATHERING ON THE COLOR OF NATURALLY COLORED COTTON**

Janet Evenson and Helen H. Epps  
The University of Georgia, Athens, GA 30602

While laundering and weathering cause many types of fibers to fade, previous research has shown that naturally colored cotton fabrics may darken when laundered. However, prior to this study, little was known about the effects of weathering on naturally colored cotton fabrics.

The purpose of this project was to assess the effects of instrumental weathering on naturally colored and naturally white cotton fabric. Three plain-weave, 100% colorganic cotton fabrics, identical except for color, were used. The three fabrics were FoxFiber™ naturally colored brown, green, and white.

Eighty specimens of each fabric were weathered in a water-cooled xenon-arc weatherometer using a continuous light cycle and conditions to simulate outdoor weathering. Half were weathered at 30% RH and half at 90% RH. Specimens of each fabric at each humidity level were exposed for durations of 20, 40, 60 and 80 hours. Spectral reflectance and CIELAB color measurements were taken after exposure, and differences in color between exposed and unexposed fabrics were calculated.

Overall color change of each fabric increased, and each fabric became increasingly lighter as exposure duration increased. Each fabric showed significantly more color change after exposure to light at high humidity than at low humidity. The green fabric had the greatest color change at both humidity levels (mean delta E values of 5.1 at low humidity and 8.7 at high humidity). Even the least overall color change, a mean delta E value of 3.34 for the brown fabric exposed at low humidity, was significant and easily visible.

This study shows that these particular naturally colored cotton fabrics are not color-fast to light, that their color change is influenced significantly by humidity level, and like many other fabrics, they become lighter in color and undergo minor hue shifts on exposure to instrumental weathering.