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The Ultraviolet Protection Factor of Naturally-pigmented Cotton

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Textile Technology[Full Text PDF](#) (187K)

The sun-blocking properties of a textile are enhanced when a dye, pigment, delustrant, or ultraviolet absorber finish is present that absorbs ultraviolet radiation and blocks its transmission through a fabric to the skin. For this reason, dyed fabrics provide better sun protection than bleached fabrics. Since naturally-colored cottons contain pigments that produce shades ranging from light green to tan and brown, it seemed reasonable to postulate that they would provide better sun protection than conventional bleached cotton, and that natural pigments might prove more durable to laundering and light exposure than dyes, but there is no published research on the ultraviolet transmission values for naturally-pigmented cottons. The purpose of this study was to determine the ultraviolet protection (UPF) values of naturally-pigmented cotton in three shades (green, tan, and brown), and the effect of light exposure and laundering on the sun-blocking properties of naturally-pigmented cotton. Naturally-pigmented cotton specimens were exposed to xenon light and accelerated laundering, ultraviolet transmission values measured, and UPF values calculated following light exposure and laundering. The naturally-pigmented cottons exhibited significantly higher UPF values than conventional cotton (bleached or unbleached). Although xenon light exposure and laundering caused some fading, the UPF values of naturally-pigmented cotton continue to be sufficiently high so that all three shades continue to provide good sun protection after the equivalent of 5 home launderings and 80 American Association of Textile Chemists and Colorists fading units (AFUs) of xenon light exposure.