

Influence of Using Different Blend Ratios of Banana Fiber on the Mechanical Properties of Woven Fabrics

Assist. Prof. Dr. Hafez S. Hawas

Spinning, Weaving & Knitting dept., Faculty of Applied Arts, Helwan University

Hafez_Hawas2000@yahoo.com

Assist. Prof. Dr. Yasmin Abo El Amaim

Spinning, Weaving & Knitting dept., Faculty of Applied Arts, Beni Suef University

engsamaim2000@hotmail.com

Abstract:

Mechanical properties are very important properties of woven fabric; it affects the stress that a textile material can withstand during use. Recently, attention has been increased toward the use of renewable resources especially of plant origin, keeping in view the ecological concerns. Banana fibre is biodegradable and has no negative effect on environment and thus can be categorized as eco-friendly fibre.

This paper is aiming to investigate the mechanical properties of (banana/cotton) woven fabrics based on three different weft arrangements which lead to different banana fibre ratios in weft direction (50% banana: 50% cotton, 33.4% banana: 66.6% cotton & 25% banana: 75% cotton) respectively. With three weave structures (plain 1/1, twill 2/2 and satin 4) differ from each other in the float length.

Mechanical Properties of produced samples were investigated according to ASTM standard methods including tensile strength, elongation, tearing and abrasion resistance. The results were evaluated using statistical analysis and it is noticed that there is a direct proportional relationship between increasing the banana fibre ratio and the tensile strength in warp direction and elongation in both directions, whilst there is an inverse relationship between the ratio of banana fibre and the tensile strength in weft direction, tear strength in weft direction and abrasion resistance.

The weave structure plain1/1 has scored a high rate of tensile strength in warp direction, tensile strength in weft direction, elongation in warp direction and abrasion resistance, on the other hand, the satin 4 weave structure has recorded a high value in tear strength in weft direction and elongation in weft direction.

Keywords

Natural fibers, Banana fibers, Mechanical properties, Woven fabrics, Eco-friendly fibers.