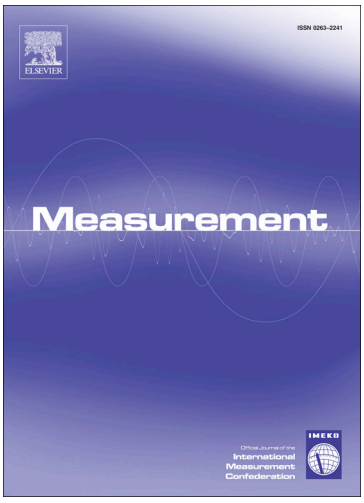

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A. Saaidia, A. Bezazi, A. Belbah, H. Bouchelaghem, F. Scarpa, S. Amirouche

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Mechano-physical properties and statistical design of Jute Yarns

A. SAAIDIA[1], A. BEZAZI[1*], A. BELBAH[1], H. BOUCHELAGHEM[2,1], F. SCARPA[3], S. AMIROUCHE[4]

[1]Laboratoire de Mécanique Appliquée des Nouveaux Matériaux (LMANM), Université 8 Mai 1945 Guelma, B.P.401 Guelma 24000 Algérie.

E-mails: saidia_aziz@yahoo.fr ar_bezazi@yahoo.com ahmedbelbah@gmail.com

[2]Université des frères Mentouri, Constantine, Département de Génie Mécanique, route de Ain El Bey Constantine 25000, Algérie. E-mail: bouchelghem_h@yahoo.fr

[3]Department of Aerospace Engineering, University of Bristol, Queens Building, University, Walk BS8 1TR Bristol UK. E-mail: f.scarpa@bris.ac.uk

[4]Université de Tizi-Ouzou –Algeria E-mail: say.amirouche@yahoo.fr

Abstract:

The work describes the statistical characterization of the tensile properties of raw and treated jute yarn fibers. The yarns are treated with various alkaline sodium hydroxide concentrations (0.5, 2 and 5%) and different immersion times at room temperature (30 minutes, 2, 8 and 12 hours). Due to the scattering of the experimental results, statistical analysis was performed using both two- and three-parameters Weibull, and Anova variance methods. In terms of stress, failure strain, and Young modulus, the results obtained from uniaxial tensile yarns show a variation that depends essentially on the immersion time and the NaOH concentration. Optimum mechanical properties are obtained for a concentration of 2% of NaOH and an immersion time of 2 hours. The results are further discussed in view of an extensive Fourier Transform Infrared Spectroscopy (FTIR) analysis carried out on the different classes of yarns.

Key words:

Jute fiber, Material testing, Mechanical properties, Chemical treatment, Statistical analysis

* Corresponding author:

Prof. Abderrezak BEZAZI

Laboratoire de Mécanique Appliquée des Nouveaux Matériaux (LMANM), Université 8 Mai 1945 Guelma, B.P.401 Guelma 24000 Algérie.

E-mail : ar_bezazi@yahoo.com