

The Effect of Alkaline Treatment on Tensile Strength and Morphological Properties of Kenaf Fibres for Yarn Production

Authors : A. Khalina, K. Shaharuddin, M. S. Wahab, M. P. Saiman, H. A. Aisyah

Abstract : This paper investigates the effect of alkali treatment and mechanical properties of kenaf (*Hibiscus cannabinus*) fibre for the development of yarn. Two different fibre sources are used for the yarn production. Kenaf fibres were treated with sodium hydroxide (NaOH) in the concentration of 3, 6, 9, and 12% prior to fibre opening process and tested for their tensile strength and Young's modulus. Then, the selected fibres were introduced to fibre opener at three different opening processing parameters; namely, speed of roller feeder, small drum, and big drum. The diameter size, surface morphology, and fibre durability towards machine of the fibres were characterized. The results show that concentrations of NaOH used have greater effects on fibre mechanical properties. From this study, the tensile and modulus properties of the treated fibres for both types have improved significantly as compared to untreated fibres, especially at the optimum level of 6% NaOH. It is also interesting to highlight that 6% NaOH is the optimum concentration for the alkaline treatment. The untreated and treated fibres at 6% NaOH were then introduced to fibre opener, and it was found that the treated fibre produced higher fibre diameter with better surface morphology compared to the untreated fibre. Higher speed parameter during opening was found to produce higher yield of opened-kenaf fibres.

Keywords : alkaline treatment, kenaf fibre, tensile strength, yarn production

Conference Title : ICASTE 2017 : International Conference on Agricultural Science, Technology and Engineering

Conference Location : Kyoto, Japan

Conference Dates : April 27-28, 2017