

Industrial feasibility of Ring-Spun yarns from bast fiber and organic cotton blends.

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Abstract

Purpose The demand for sustainable textiles has led to innovations in natural fiber blends as eco-friendly alternatives to conventional cotton and synthetic yarns. This study aims to evaluate the industrial feasibility of producing ring-spun yarns blended with bast fibers, jute, flax and hemp using organic cotton, focusing on their mechanical and structural properties.

Design/methodology/approach A fixed 70:30 cotton-to-bast fiber ratio was used to produce yarns on an industrial-scale ring-spinning system. Fiber preparation included degumming, cottonization and individualization to improve spinnability. Yarn properties were assessed using advanced testing techniques, such as the Uster Evenness Tester and Tensile Strength Tester, to determine performance and processing feasibility. **Findings** The results showed that flax-cotton blends exhibited superior evenness and tenacity, making them ideal for smooth, uniform yarns. Jute-cotton blends demonstrated higher elongation and moderate strength, while hemp-cotton blends balanced strength and processability but faced challenges related to fiber stiffness and variability. Jute and hemp blend also had higher hairiness levels, which may cause downstream processing difficulties. **Originality/value** This study uniquely investigates bast fiber and organic cotton blends at an industrial scale, offering insights into their mechanical performance and processing challenges. The findings contribute to sustainable textile development, providing viable alternatives to conventional yarns for eco-friendly manufacturing.

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