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# Influence of Natural Dye-Based Treatments on the Mechanical and Aesthetic Properties of Kenaf Fabrics

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**Structured Abstract**

**Background:** This research dedication will focus on how turmeric-based natural dye will affect the mechanical and aesthetic properties of woven kenaf fabric. As the textile industry will increasingly explore eco-friendly and sustainable alternatives, natural dyes like turmeric will be recognized for their potential to replace synthetic dyes that are known for their environmental and health hazards. In this research, the natural fabric to be used will be kenaf, a cellulose-based bark fibre that will be recognized for its biodegradability, strength, and minimal environmental impact.

**Methods:** Kenaf yarns were first soaked using sodium carbonate to remove natural impurities, followed by bleaching with hydrogen peroxide to improve fiber cleanliness, fabric whitening, and dye absorption. The treated kenaf yarns were woven using a 1/1 weaving structure to make sample. The bleached fabric samples were treated with iron(II) sulfate to improve dye fixation. Natural dyeing was then carried out using turmeric at two different concentrations, namely 3% and 5% owf, under controlled temperature and time conditions. After dyeing, the samples were soaped and rinsed to remove non-permanent dyes before drying. The treated kenaf yarns were then evaluated for mechanical properties (tensile strength and stiffness) and aesthetic properties (color fastness to washing).

**Results:** This project demonstrates that turmeric dyeing alters both the mechanical and aesthetic properties of textile samples. The dyed fabrics exhibited changes in stiffness, thickness, and weight, which influenced their ability to withstand applied force. In addition, aesthetic qualities such as color transformation were significantly affected, highlighting turmeric's dual role as a natural dye and modifier of fabric performance. These findings support the thesis that natural dyeing processes not only enhance sustainability but also impact the functional characteristics of textiles, offering insights for eco-friendly material development.

**Conclusion**: The findings of this research will have the potential to substantially improve ecological dyeing processes and will increase the market appeal of kenaf as a potential eco-textile solution. Furthermore, beneficial ideas will be obtained for future improvements in the application of natural dyes to bast fibres, which will promote environmentally sustainable textile production processes.
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**Keywords:** Natural Dyes, Turmeric, Kenaf, Mechanical Testing, Aesthetic Properties,

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