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# Utilizing Circulose fibers in the production of denim fabrics in the context of textile waste management: A case study in DNM textile factory

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## Abstract:

The textile industry has a massive environmental impact, not only because it consumes enormous amounts of raw materials and effluents, but also because each piece of textile produced eventually adds to the vast number of waste textiles. This research aims to study how textile waste can be recycled and reused in the textile industry. This research was conducted through a field study of DNM textile for spinning, weaving and dyeing factory in new Damietta, Egypt, where yarns produced from recycled Circulose fibers blended with Cotton fibers and used as weft yarns to produce denim fabrics with various structure weaves (3/1 Twill weave – Satin 4 weave – 2/2 Twill weave and 2/2 Matt weave) and compare them with samples made with same weave structures with traditional blended Tencel/Cotton yarns as wefts in fiber cost and mechanical properties of produced fabrics. The results showed that the cost of Circulose fibers is lower than that of Tencel fibers, with the percentage of 21.88%, and blended Circulose/Cotton achieved a quality coefficient convergent with Tencel/Cotton in mechanical properties, with a difference percentage of 1.21%.

**Research problem:** The research problem is limited to the following questions: What is the importance of textile recycling in disposing of textile waste? How can we protect the environment by recycling textile waste? How can textile waste be recycled and reused as fibers, such as Circulose fibers, in producing denim fabrics with a lower cost and appropriate quality? What is the difference between recycled Circulose fibers and Tencel fibers used in the DNM factory in terms of cost and mechanical properties when used in the production of denim fabrics?

**Research importance:** Raising environmental awareness of the importance of recycling industrial waste, especially in the textile industry, to preserve the environment. Reducing the consumption of resources required to manufacture textile products and replacing them with resources extracted from textile waste. Utilizing Circulose fiber from textile waste to produce denim fabrics at a low cost and appropriate quality for traditional fabrics from Tencel fibers used in the DNM factory.

**Research objective:** This study aims to: A case study in DNM textile for spinning, weaving, and dyeing factory in New Damietta, Egypt, on the production of denim fabrics using recycled Circulose fibers from textile waste. Study the mechanical properties of fabrics produced from recycled Circulose fibers and compare them with traditional fabrics from Tencel fibers with the same weave structures.

**Research methodology:** This research follows the experimental method and the analytical method.

## Paper History:

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## Keywords:

Sustainability, Textile waste management, Recycling, Circulose® fibers, DNM.

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