

# INVESTIGATION OF YARN PERFORMANCE OF SUSTAINABLE TRIPLE FIBRE BLENDS

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## Abstract:

In recent years, the fashion industry has experienced rapid growth in consumption, resulting in an increase in waste [1]. In order to address the environmental impact of this waste and reduce pollution, the use of eco-friendly products and recycling has become increasingly important [2-4]. Polylactic acid (PLA) and lyocell fiber blend is increasingly being used in yarn production by blending with cotton fibers as it offers an environmentally friendly alternative. PLA, which is produced from renewable resources, has been included in the literature in recent years as a promising sustainable fiber since it is a bio-based and biodegradable polyester [3]. In this study, 50% cotton, 25% lyocell and 25% PLA compositions were produced in three different types of ring spinning systems: rigid, core-spun and dual core-spun. The physical test performance of the yarns were evaluated. Rigid, core-spun and dual core-spun yarns were compared among each other. The strength, elongation, unevenness, and hairiness values of the yarns were analyzed. As a result, it was observed that increasing the core content in the yarn decreased the strength and unevenness but increased the elongation. In addition, when the test results were evaluated, it was seen that PLA and lyocell fibers can be used as an environmentally friendly alternative in textile applications.

**Keywords:** Poly(lactic acid) fiber, lyocell, yarn performance,

**Table 1** Ecological information of PLA fiber

Mobility	No data available
Bioaccumulation	Does not bio-accumulate. Inherently biodegradable
Further Information	There is currently no information that this material poses a risk to environment

**Table 2** Properties of PLA fiber [2]

Specific gravity	1.25
T <sub>m</sub> (°C)	130-175
Tenacity(g/d)	6.0
Elastic recovery (5% strain)	93
Moisture regain (%)	0.4-0.6
Flammability	Continues to burn for 2 min after flame removed
Smoke generation	63 m <sup>2</sup> /kg
Limiting oxygen index(%)	26
Refractive index	1.35-1.45

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