WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

A Review on: Improving the Quality Parameter of Linen Yarn for Knitting

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Abstract:

The 100% linen short-staple yarns, spun using the wet spinning technique. As the raw linen yarns are stiff, they cannot be directly used for knitting without any blend. This study was focused on the softening of 100% linen yarns using softeners showed good results like increase in softness, elongation, improved flexural rigidity, hairiness, friction, and unevenness with minimum loss in strength. Linen fabrics are known for their superior comfort properties over fabrics of other origins This leads to a good result in the softening of 100% linen yarn. Knitting trials were also carried out, the untreated linen yarns show poor knittability and the knitted fabrics produced using softener treated yarns showed excellent knittability without any defects in the fabrics.

Keywords: Linen, Knitting, softening, comfort.

Introduction:

Knitting is a mechanical process in which yarn loops are interlocked or intermeshed to form a fabric. Superior fabric quality like comfort, smoothness, and fitting are the main reasons for the popularity of knitted fabrics. Further, 100% linen yarns cannot be converted into pure knitted fabrics mainly due to their inherent flexural rigidity and inelastic nature which offer greater resistance in the formation of loops. As the 100% linen yarns are rigid and will not bend easily in the formation of loops while knitting. Therefore, to improve the 100% linen yarns using softeners thereby increasing its knittability (1).Flax, is two to three times stronger than cotton, making it be known as the strongest natural fiber. The addition of flax to clothing fabrics is helping it by keeping the skin cool and improvement of moisture-wicking and one more important feature of linen is air permeability, which allows helping the fabrics to dry quickly(2) The major disadvantage of linen fabric is that it gets wrinkled easily and also has a stiff handle so the usage of 100% linen is less it is mostly used in blends with natural or synthetic fibers. The properties of the fabrics that are used to produce the garments have great influence on the development of the programs that are used as functions of new-generation (3)

Low temperature plasma treatments are applied to linen with oxygen and argon at various discharge power levels and exposure times. Their effects on bulk structure, surface morphology, flax fiber properties, and related fabric properties are investigated with a range of analytical methods. X-ray photoelectron spectroscopy reveals that the surface oxygen content of the plasma treated samples increases, which is supported by the results from fabric whiteness tests. (4). Wetting is important for textile processing and performance. The comfort of clothing made from cellulosic fibers is closely associated with moisture absorbency. The hydrophilic properties of cellulosic fibers also have great industrial importance for many processes, e.g., scouring, dyeing, and finishing. Wetting and wicking abilities of plasma treated linen are investigated using contact angles and upward and downward water wicking methods. (5).

In this study, the effect of linen and linen blends on the comfort properties of bedding fabrics was investigated. Thermal and handle properties of fabrics, which were woven with 100% linen in terms of thermal absorptivity, but increased the air permeability, bending and shear ability. The results of this study proved that the fabric produced with 100% cotton l provide a good thermal and handle comfort for bedding fabrics.(6,7)

Physical Properties of Linen

- Tensile Strength: Linen is a strong fibre. It has a tenacity of 5.5 to6.5gm/den. The strength is greater than cotton fibe
- Elongation at break: Linen does not stress easily. It has an elongatio at break of 2.7 to3.5%.
- Colour: The colour of linen fibre is yellowish to grey.
- Length: 18 to 30 inch in length.
- Lustre: It is brighter than cotton fibre and it is slightly silky.

- Elastic Recovery: Linen fibre has not enough elastic recovery properties like cotton fibre.
- Resiliency: very poor.
- Moisture Regain(MR%): Standard moisture regain is 10 to 12%.
- Specific Gravity: specific gravity of linen fibre is 1.50.

Study of knittability

The Untreated linen yarns show poor knittability and the knitted fabrics were not able to produce from these yarns. Knitting in linen yarn is very poor quality due to stiffness and rough surface. The linen yarn are little harder and it can break the needle frequently.The softener treated yarns show good knittability and produced excellent single jersey knitted fabric without any defects.

Methods Softening of linen yarn

The difficulties of linen yarn due to stiffness and rough surface will be overcome by providing chemical treatments to the yarn .The softener used for linen yarn based on literatures

1. Silicone softener
2. Cellulase Enzyme

100% linen yarn are softened in different variations using softeners and the treatment parameters .The effect of the treatments was analyzed using SEM, yarn strength, flexural rigidity, friction, evenness, and hairiness .

Benefits to Using and Wearing Linen

Linen is a bit of a wonder fabric, able to be used for many different purposes.

1. **Absorbent**. Linen holds water incredibly well, hence why it is a popular material for towels and sheets.
2. 2. **Breathable**. The fabric is very light and allows air through it easily, making it an ideal fabric for clothing during the summer months.
3. **Not elastic**. Linen does not have much stretch, though it does hold its shape very well and will not change size over multiple wears and washes.
4. **Soft**. Linen is very soft and smooth, and it even becomes softer the more often it is washed.
5. **Environmentally friendly**. Linen is generally considered an eco-conscious fiber because it doesn't take as much water and chemicals to produce as other fabrics.
6. **Hypo-allergenic**. Linen fabric is naturally hypoallergenic

Drawback

There are a few downsides to consider about linen:

1. **Wrinkles easily**. While linen is light and holds its shape well, it wrinkles extremely easily.
2. **Expensive**. Since the production process is lengthy and portions are still done by hand, linen is often expensive.

Conclusion

In this study, the effects of physical parameters such as Evenness, Hairiness, Strength, Elongation, Flexural Rigidity, and Co-efficient of friction on Untreated and softener treated 100% linen yarn has been examined. so the study was focused on the softening of the linen yarn to improve it for further processes like weaving and knitting to cling to the feel of freshness and magnificent brilliance. Here the focus of softener treatment to linen yarn is to subject it for knitting. Hence this new approach paves way for 100% linen knitted fabrics that can be used for commercial applications. Even though linen is considered an expensive fabric, it is competitive in price compared to any other fabric in today's world which possesses great properties.

Reference:

1. Senthil, Narmadha, and BhaarathiDhurai. "Knittability Enhancement Study of 100% Linen yarn using Softeners." *Journal of Natural Fibers* 19.12 (2022): 4393-4402.
2. Behera, B. K. "Comfort and handle behaviour of linen-blended fabrics." *AUTEX Research Journal* 7.1 (2007): 33-47.

3. Gocek, Ikılem, et al. "A study on easy-care laundering of linen fabrics." *Textile Research Journal* 83.18 (2013): 1961-1973.
4. Wong, K. K., et al. "Low temperature plasma treatment of linen." *Textile Research Journal* 69.11 (1999): 846-855.
5. Wong, K. K., et al. "Wicking properties of linen treated with low temperature plasma." *Textile Research Journal* 71.1 (2001): 49-56.
6. Sundaresan, Sivaprakash, et al. "A detailed analysis on physical and comfort properties of bed linen woven fabrics." *International Journal of Advance Research and Innovative Ideas in Educatio* 2.2 (2016): 1649-1658.
7. Bilen, Umut. "The effect of linen and linen blends on the comfort properties of bedding fabrics." *Journal of Natural Fibers* 18.3 (2021): 430-441.