Properties of Woven Fabrics Made from Compact, Ring and Open-End Rotor Cotton Yarns

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OBJECTIVE

- The main objective of this study was to compare the properties of fabrics produced with open-end, conventional ring- and compact-spun yarns.

MATERIALS AND METHODS

- Giza 80 and Giza 86 as Long Staple Egyptian Cottons.
- Compact , Ring and Open-end rotor yarns were spun in the constant yarn count of "Ne 30/1" with constant twist multiplier "4.0 Tm".
- Yarn samples were separately used to produce plain woven fabrics.
- Physical and mechanical tests were carried out in weft and warp direction after conditioning of the fabrics for 24 hours under the standard atmospheric conditions.
- The following tests were carried out according to standard textile testing methods.

RESULTS AND DISCUSSION

Yarn tensile properties:

- The test results show that compact spun yarns had the highest tenacity values from Ne 30/1 cotton yarn, while open-end rotor yarns were the weakest.
- Giza 86 showed higher strength and elongation (%) than Giza 80 .
- A difference in yarn strength and elongation (%) between the deferent spinning systems understanding by referring to the scanning micrographs

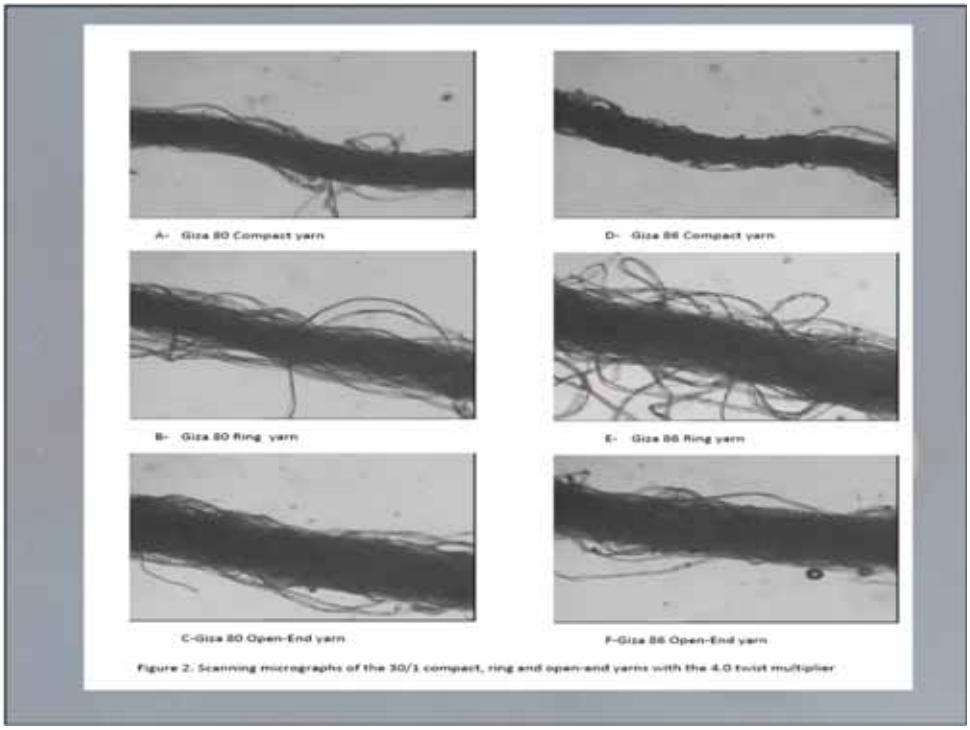
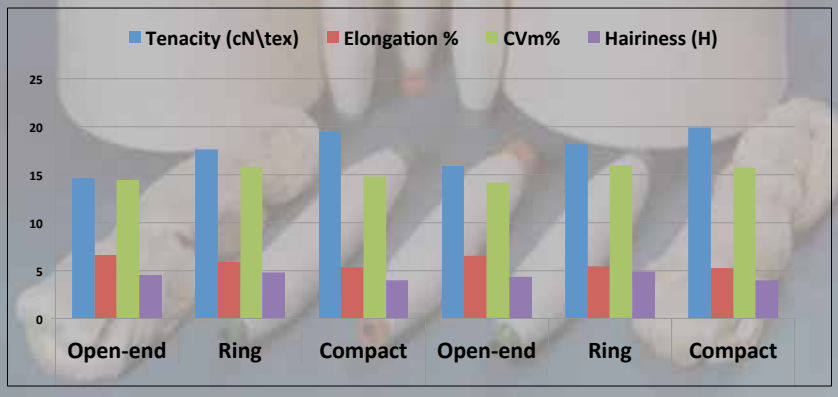
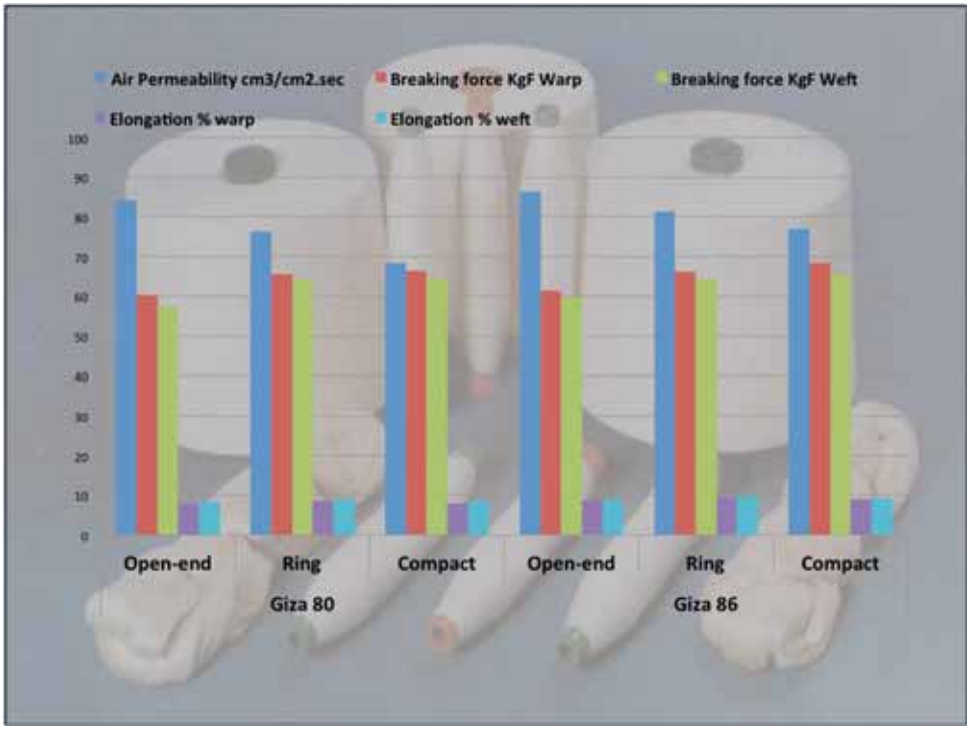
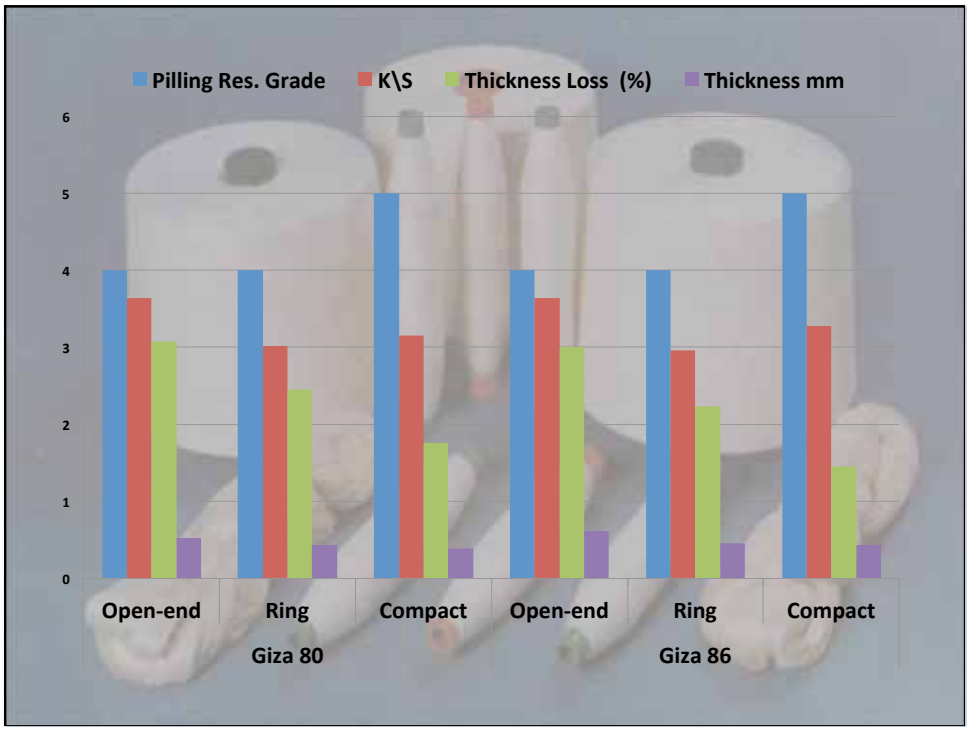


Figure 2: Scanning micrographs of the 30/1 compact, ring and open-end yarns with the 4.0 twist multiplier

- **The spun Giza 86 yarn show high strength, elongation, evenness and lower neps and hairiness values than the equivalent Giza 80 yarn irrespective of yarn formation, which due to the higher fiber quality of Giza 86.**




Air Permeability cm3/cm2.sec
Breaking force KgF Warp
Breaking force KgF Weft
Elongation % warp
Elongation % weft
100
90
80
70
60
50
40
30
20
10
0
Open-end
Ring
Compact
Open-end
Ring
Compact
Giza 80
Giza 86


Pilling Res. Grade
K\S
Thickness Loss (%)
Thickness mm
6
5
4
3
2
1
0
Open-end
Ring
Compact
Open-end
Ring
Compact
Giza 80
Giza 86

CONCLUSION

- The results revealed that compact spun yarns have higher strength, lower hairiness and unevenness and better pilling resistance over ring and open-end rotor spun yarns. The improvement in yarn strength is greater for compact spun than for ring and open-end rotor yarns. The fiber of the compact yarns was much better aligned with the yarn axis than those of the ring yarn, while open-end yarns recorded the last one.

- Furthermore, the spun Giza 86 yarn show high strength, elongation, evenness, lower neps and hairiness values than the equivalent Giza 80 yarn irrespective of yarn formation, which due to the higher fiber quality of Giza 86. However, the fabrics consisting of compact yarns exhibit much better pilling performance compared to the fabrics produced by conventional ring and open-end spun yarns. Compact yarns are reported to have higher abrasion resist-ance than ring and open-end yarns in terms of weight loss.


THANK YOU