

ABSTRACT

Abdallah Mahmoud El-Sayed Pharoun, " Effect of mercerization and spinning variables on yarn properties of some Egyptian cotton cultivars ", Unpublished Master of Science, Agronomy Department, Faculty of Agriculture, Ain Shams University, 2003

The main objective of this study was to investigate the effect of mercerization under specified conditions and spinning variables on the fiber and yarn quality, of six commercial cotton cultivars grown in 1999 season. These cultivars were Giza 45, Giza 70 and Giza 77 as extra-long staple cottons [E.L.S] and Giza 86, Giza 89 and Giza 83 as long staple cottons [L.S].

The cotton samples of the three extra-long staple cultivars were spun into three carded yarn counts 50's, 60's and 70's at the twist factors 3.6 and 4.0 for each count, and the three long staple varieties were spun into three carded yarn counts 40's, 50's and 60's at the twist factors 3.6 and 4.0 for each count. The ring spinning technique was carried out according to the routine method used at the experimental spinning mill, Cotton Research Institute. All samples were tested for fiber and yarn properties, under standard conditions of [65 % \pm 2%] relative humidity and [20 c° \pm 1.1 c°] temperature. All fiber and yarn properties tests were done in the laboratories of Cotton Technology Research Division, Cotton Research Institute, Agricultural Research Center, Giza, Egypt.

The mercerization processes (slack mercerization of fiber and yarn, mercerization of yarn at a constant length and mercerization of yarn under tension) were carried out in a bath containing a solution of 20 % [w/w] sodium hydroxide. Instrumental tests were done on fiber properties including: length, micronaire reading, fineness and maturity, color, diameter, luster degree, flat-bundle strength and elongation, strength uniformity ratio and flat-bundle toughness and stiffness.

Tests were also made on yarn tensile properties including: single yarn strength (g/tex), elongation %, unevenness and neppiness, twist factor and luster degree.

The results show that the slack mercerization reduced actual yarn tensile strength, increased yarn elongation and increased luster degree. Mercerization at constant length leads to increasing in each of strength and luster degree whereas it reduced elongation. Mercerization under tension had the same effect as mercerization at constant length but with more effect. Different cotton varieties revealed variations in their magnitude of response due to varying mercerization treatments.

KEY WORDS:

Cotton – mercerization – slack, constant length, under tension – fiber properties – yarn – strength – elongation – luster degree – count – twist.

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